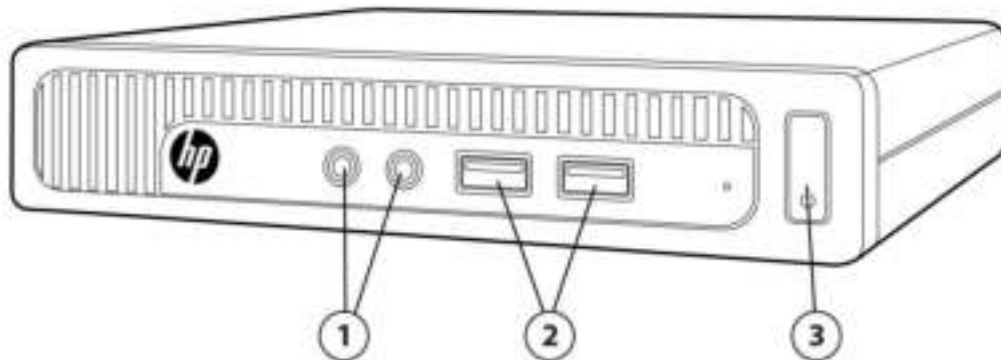


### Overview

#### HP EliteDesk 800 G1 Desktop Mini Business PC



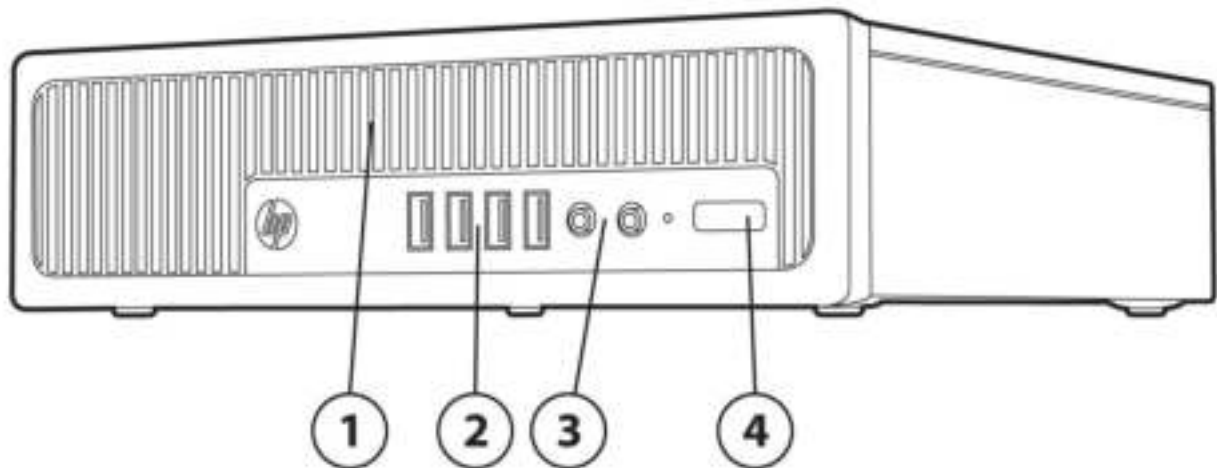
1. 3.5mm headphone output and microphone jacks
2. (2) Front USB 3.0 ports (1 USB Fast charging port)
3. Power button and PC status LED

#### Not Shown

- |          |                                                                                                                                               |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Slots    | (1) internal M.2 PCIe x4 connector for optional wireless NIC<br>(1) internal M.2 PCIe x4 connector for optional SSD drive                     |
| Bays     | (1) 2.5" internal storage drive bay                                                                                                           |
| Rear I/O | (4) USB 3.0 ports<br>(1) VGA video port; (2) DisplayPort with multi-stream video ports<br>(1) RJ-45 network connector<br>3.5mm audio out jack |
| VESA     | Support for VESA 100 mounting system on bottom of PC chassis                                                                                  |

### Overview

#### HP EliteDesk 800 G1 Ultra-slim Desktop Business PC



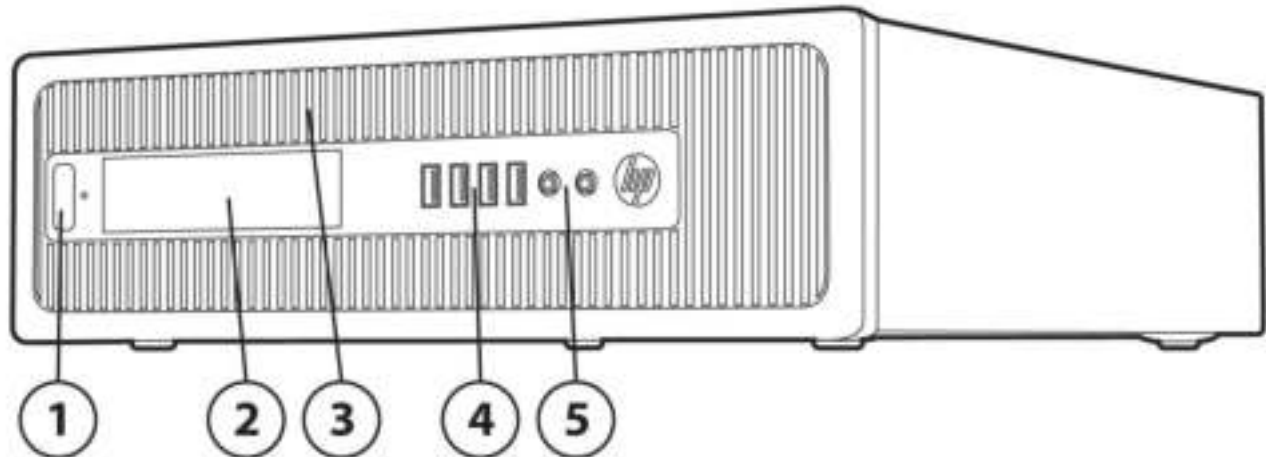
1. 5.25" Slim drive bay supporting an optical disk drive (located behind removable bezel)
2. (2) USB 3.0 ports, (2) USB 2.0 ports
3. 3.5mm headphone output and microphone jacks
4. Power button and PC status LED

#### Not Shown

|          |                                                                                                                                                                                                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slots    | (1) internal mSATA connector<br>(1) internal PCI Express mini-card connector<br>(1) MXM graphics connector                                                                                            |
| Bays     | (1) 2.5" internal storage drive bay                                                                                                                                                                   |
| Rear I/O | (2) USB 3.0 ports; (4) USB 2.0 ports<br>(1) VGA video port; (2) DisplayPort with multi-stream video ports<br>(1) RJ-45 network connector<br>3.5mm audio in/out jacks<br>PS/2 keyboard and mouse ports |
| VESA     | Support for VESA 100 mounting system on top and bottom of PC chassis                                                                                                                                  |

### Overview

#### HP EliteDesk 800 G1 Small Form Factor Business PC



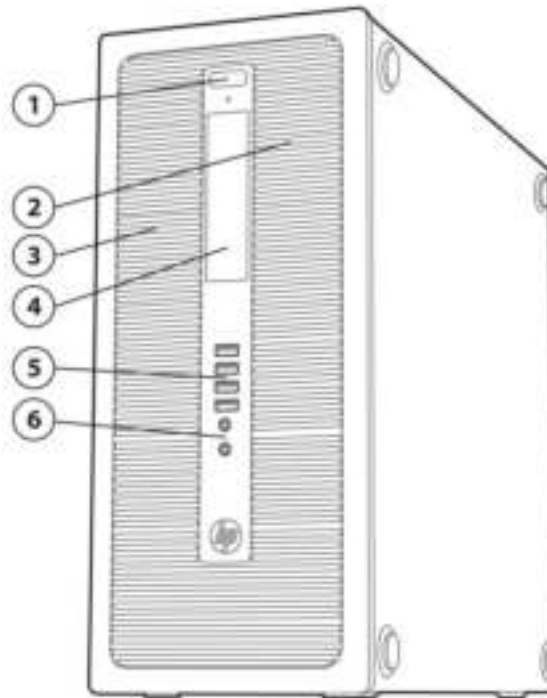
1. Power button and PC status LED
2. 3.5" external drive bay; used for installing a Media Card Reader or 2<sup>nd</sup> data storage drive
3. 5.25" Slim drive bay supporting an optical disk drive (located behind removable bezel)
4. (2) USB 3.0 ports, (2) USB 2.0 ports
5. 3.5mm headphone output and microphone jack

#### Not Shown

|          |                                                                                                                                                                                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slots    | (2) PCI Express x16 graphics connectors; one wired as a x4<br>(2) PCI Express x1 accessory connectors                                                                                                                           |
| Bays     | (1) 2.5" internal storage drive bay<br>(1) 3.5" internal storage drive bay                                                                                                                                                      |
| Rear I/O | (2) USB 3.0 ports; (4) USB 2.0 ports<br>(1) VGA video port; (2) DisplayPort with multi-stream video ports<br>(1) RJ-45 network connector<br>(1) RS-232 serial port<br>3.5mm audio in/out jacks<br>PS/2 keyboard and mouse ports |

### Overview

#### HP EliteDesk 800 G1 Tower Business PC



1. Power button and PC status LED
2. 5.25" Slim drive bay supporting an optical disk drive (located behind removable bezel)
3. 5.25" half height external drive bay (located behind removable bezel)
4. 3.5" external drive bay; used for installing a Media Card Reader
5. (2) USB 3.0 ports, (2) USB 2.0 ports
6. 3.5mm headphone output and microphone jack

#### Not Shown

- Slots (2) PCI Express x16 graphics connectors; one wired as a x4  
(2) PCI Express x1 accessory connectors  
(1) PCI accessory connector (optional)
- Bays (1) 2.5" internal storage drive bay  
(2) 3.5" internal storage drive bays
- Rear I/O (2) USB 3.0 ports; (4) USB 2.0 ports  
(1) VGA video port; (2) DisplayPort with multi-stream video ports  
(1) RJ-45 network connector  
(1) RS-232 serial port  
3.5mm audio in/out jacks  
PS/2 keyboard and mouse ports

### Overview

### At A Glance

- Choice of four chassis form factors: Desktop Mini, Ultra-slim Desktop, Small Form Factor and Tower
- PC chassis and all internal components and modules are manufactured with low halogen content
- HP developed and engineered UEFI BIOS supporting security, manageability and software image stability
- Intel® Q87 chipset supporting Intel 4th generation Core processors, featuring integrated Intel HD Graphics and Intel® vPro™ Technology (available with select processors)
- Processor support up to 84W (TWR/SFF), 65W (USDT), 35W (DM)
- Intel® Ethernet Connection I217L GbE LOM integrated network connection
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Multi-independent monitor support via VGA and dual digital DisplayPort video interfaces with multi-stream
- DTS Studio Sound audio management software
- Standard and high efficiency energy saving power supply options
- SFF and TWR models can be configured with multiple data drives in a RAID array
- Optional Intel Smart Response Technology disk cache modules
- ENERGY STAR® qualified and certified EPEAT® Gold models
- Guaranteed lengthy purchase lifecycles and image stability

### Technical Specifications – Core vPro Processors

#### STANDARD FEATURES AND CONFIGURABLE COMPONENTS

##### CHIPSET

|                    | <u>DM</u> | <u>USDT</u> | <u>SFF/TW</u> |
|--------------------|-----------|-------------|---------------|
| Intel® Q87 Express | X         | X           | X             |

##### PROCESSOR

###### Intel® 4th Generation Core™ i7 Processors

###### Intel® Core™ i7-4790 Processor

Up to 4.0 GHz Max. Turbo Frequency (3.6 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

| <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|-----------|-------------|----------------|
|           |             | X              |

###### Intel® Core™ i7-4790S Processor

Up to 4.0 GHz Max. Turbo Frequency (3.2 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

X

###### Intel® Core™ i7-4785T Processor

Up to 3.2 GHz Max. Turbo Frequency (2.2 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel® HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

X

###### Intel® Core™ i7-4771 Processor

Up to 3.9 GHz Max. Turbo Frequency (3.5 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

X

###### Intel® Core™ i7-4770 Processor

Up to 3.9 GHz Max. Turbo Frequency (3.4 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

X

###### Intel® Core™ i7-4770S Processor

Up to 3.9 GHz Max. Turbo Frequency (3.1 GHz base frequency)

X

### Technical Specifications – Core vPro Processors

8 MB cache, 4 cores, 8 threads  
 Intel HD Graphics 4600  
 Supports DDR3 memory up to 1600 MT/s data rate  
 Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i7-4765T Processor

**X**

Up to 3.0 GHz Max. Turbo Frequency (2.0 GHz base frequency)  
 8 MB cache, 4 cores, 8 threads  
 Intel HD Graphics 4600  
 Supports DDR3 memory up to 1600 MT/s data rate  
 Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### **Intel® 4th Generation Core™ i5 Processors**

**DM**

**USDT**

**SFF/TWR**

#### Intel® Core™ i5-4690 Processor

**X**

Up to 3.9 GHz Max. Turbo Frequency (3.5 GHz base frequency)  
 6 MB cache, 4 cores, 4 threads  
 Intel HD Graphics 4600  
 Supports DDR3 memory up to 1600 MT/s data rate  
 Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4690S Processor

**X**

Up to 3.9 GHz Max. Turbo Frequency (3.2 GHz base frequency)  
 6 MB cache, 4 cores, 4 threads  
 Intel® HD Graphics 4600  
 Supports DDR3 memory up to 1600 MT/s data rate  
 Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4590 Processor

**X**

Up to 3.7 GHz Max. Turbo Frequency (3.3 GHz base frequency)  
 6 MB cache, 4 cores, 4 threads  
 Intel HD Graphics 4600  
 Supports DDR3 memory up to 1600 MT/s data rate  
 Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4590S Processor

**X**

Up to 3.7 GHz Max. Turbo Frequency (3.0 GHz base frequency)  
 6 MB cache, 4 cores, 4 threads  
 Intel HD Graphics 4600  
 Supports DDR3 memory up to 1600 MT/s data rate  
 Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4590T Processor

**X**

Up to 3.0 GHz Max. Turbo Frequency (2.0 GHz base frequency), 6 MB cache, 4 cores, 4 threads  
 Intel® HD Graphics 4600  
 Supports DDR3 memory up to 1600 MT/s data rate

### Technical Specifications – Core vPro Processors

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4670 Processor

**X**

Up to 3.8 GHz Max. Turbo Frequency (3.4 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4670S Processor

**X**

Up to 3.8 GHz Max. Turbo Frequency (3.1 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4570 Processor

**X**

Up to 3.6 GHz Max. Turbo Frequency (3.2 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4570S Processor

**X**

Up to 3.6 GHz Max. Turbo Frequency (2.9 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### Intel® Core™ i5-4570T Processor

**X**

Up to 3.6 GHz Max. Turbo Frequency (2.9 GHz base frequency)

4 MB cache, 2 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel® vPro™ Technology and Intel® Stable Image Platform Program (SIPP)

#### **Intel® 4th Generation Core™ i3 Processors**

**DM**

**USDT**

**SFF/TWR**

#### Intel® Core™ i3-4370 Processor

**X**

**X**

3.8 GHz base frequency

4 MB cache, 2 cores, 4 threads

Intel® HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Core™ i3-4360 Processor

**X**

**X**



### Technical Specifications – Core vPro Processors

3.7 GHz base frequency  
4 MB cache, 2 cores, 4 threads  
Intel® HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4350 Processor

**X**

**X**

3.6 GHz base frequency  
4 MB cache, 2 cores, 4 threads  
Intel® HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4350T Processor

**X**

3.1 GHz base frequency  
4 MB cache, 2 cores, 4 threads  
Intel® HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4360T Processor

**X**

3.2 GHz base frequency  
4 MB cache, 2 cores, 4 threads  
Intel® HD Graphics 4600  
Supports DDR3 and DDR3L memory up to 1333/1600 MT/s data rate

Intel® Core™ i3-4340 Processor

**X**

**X**

3.6 GHz base frequency  
4 MB cache, 2 cores, 4 threads  
Intel HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4330 Processor

**X**

**X**

3.5 GHz base frequency  
4 MB cache, 2 cores, 4 threads  
Intel HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4330T Processor

**X**

3.0 GHz base frequency  
4 MB cache, 2 cores, 4 threads  
Intel HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4170 Processor

**X**

**X**

3.7 GHz base frequency  
3 MB cache, 2 cores, 4 threads  
Intel® HD Graphics 4400  
Supports DDR3 memory up to 1600 MT/s data rate

### Technical Specifications – Core vPro Processors

|                                                              |           |             |
|--------------------------------------------------------------|-----------|-------------|
| <u>Intel® Core™ i3-4160 Processor</u>                        | X         | X           |
| 3.6 GHz base frequency                                       |           |             |
| 3 MB cache, 2 cores, 4 threads                               |           |             |
| Intel® HD Graphics 4400                                      |           |             |
| Supports DDR3 memory up to 1600 MT/s data rate               |           |             |
| <u>Intel® Core™ i3-4160 T Processor</u>                      | X         |             |
| 3.1 GHz base frequency                                       |           |             |
| 3 MB cache, 2 cores, 4 threads                               |           |             |
| Intel® HD Graphics 4400                                      |           |             |
| Supports DDR3 and DDR3 memory up to 1333/1600 MT/s data rate |           |             |
|                                                              | X         | X           |
| <u>Intel® Core™ i3-4150 Processor</u>                        |           |             |
| 3.5 GHz base frequency                                       |           |             |
| 3 MB cache, 2 cores, 4 threads                               |           |             |
| Intel® HD Graphics 4400                                      |           |             |
| Supports DDR3 memory up to 1600 MT/s data rate               |           |             |
| <u>Intel® Core™ i3-4150T Processor</u>                       | X         |             |
| 3.0 GHz base frequency                                       |           |             |
| 4 MB cache, 2 cores, 4 threads                               |           |             |
| Intel® HD Graphics 4400                                      |           |             |
| Supports DDR3 memory up to 1600 MT/s data rate               |           |             |
|                                                              | X         | X           |
| <u>Intel® Core™ i3-4130 Processor</u>                        |           |             |
| 3.4 GHz base frequency                                       |           |             |
| 3 MB cache, 2 cores, 4 threads                               |           |             |
| Intel HD Graphics 4400                                       |           |             |
| Supports DDR3 memory up to 1600 MT/s data rate               |           |             |
|                                                              | X         | X           |
| <u>Intel® Core™ i3-4130T Processor</u>                       | X         |             |
| 2.9 GHz base frequency                                       |           |             |
| 3 MB cache, 2 cores, 4 threads                               |           |             |
| Intel HD Graphics 4400                                       |           |             |
| Supports DDR3 ,memory up to 1600 MT/s Data Rate              |           |             |
| <u>Intel® Core™ i3-4160T</u>                                 | X         |             |
| 3.1 GHz base frequency, 3 MB cache, 2 cores, 4 threads       |           |             |
| Supports DDR3 memory 1600 MT/s data rate                     |           |             |
| Intel HD Graphics 4400                                       |           |             |
| <u>Intel® Core™ i3-4360T</u>                                 | X         |             |
| 3.2 GHz base frequency, 4 MB cache, 2 cores, 4 threads       |           |             |
| Supports DDR3 memory 1600 MT/s data rate                     |           |             |
| Intel HD Graphics 4600                                       |           |             |
| <b>Intel® 4th Generation Pentium™ Processors</b>             | <b>DM</b> | <b>USDT</b> |
| <u>Intel® Pentium G3470 Processor</u>                        |           |             |
| Up to 3.6 GHz Base Frequency                                 | X         | X           |
| 3 MB cache, 2 cores, 2 threads                               |           |             |

### Technical Specifications – Core vPro Processors

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Pentium G3460 Processor

X

X

Up to 3.5 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Pentium G3460T Processor

X

X

X

Up to 3 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 and DDR3L memory up to 1333/1600 MT/s data rate

#### Intel® Pentium G3450 Processor

X

X

Up to 3.4 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Pentium G3440 Processor

X

X

Up to 3.3 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Pentium™ G3440T Processor

X

2.8 GHz base frequency

3 MB cache, 2 cores, 2 threads

Intel® HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Pentium G3430 Processor

X

X

3.3 GHz base frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Pentium G3420 Processor

X

X

3.2 GHz base frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

### Technical Specifications – Core vPro Processors

|                                                |          |          |          |
|------------------------------------------------|----------|----------|----------|
| <u>Intel® Pentium™ G3420T Processor</u>        | <b>X</b> |          |          |
| 2.7 GHz base frequency                         |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |
| Intel HD Graphics                              |          |          |          |
| Supports DDR3 memory up to 1600 MT/s data rate |          |          |          |
| <u>Intel® Pentium G3260 Processor</u>          |          | <b>X</b> | <b>X</b> |
| Up to 3.3 GHz Base Frequency                   |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |
| Intel HD Graphics                              |          |          |          |
| Supports DDR3 memory up to 1333 MT/s data rate |          |          |          |
| <u>Intel® Pentium G3250 Processor</u>          |          | <b>X</b> | <b>X</b> |
| Up to 3.2 GHz Base Frequency                   |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |
| Intel HD Graphics                              |          |          |          |
| Supports DDR3 memory up to 1333 MT/s data rate |          |          |          |
| <u>Intel® Pentium G3250T Processor</u>         | <b>X</b> | <b>X</b> | <b>X</b> |
| Up to 2.8 GHz Base Frequency                   |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |
| Intel HD Graphics                              |          |          |          |
| Supports DDR3 memory up to 1333 MT/s data rate |          |          |          |
| <u>Intel® Pentium G3240 Processor</u>          |          |          |          |
| Up to 3.1 GHz Base Frequency                   |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |
| Intel HD Graphics                              |          |          |          |
| Supports DDR3 memory up to 1333 MT/s data rate |          |          |          |
| <u>Intel® Pentium™ G3240T Processor</u>        | <b>X</b> |          |          |
| 2.7 GHz base frequency                         |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |
| Intel® HD Graphics                             |          |          |          |
| Supports DDR3 memory up to 1600 MT/s data rate |          |          |          |
| <u>Intel® Pentium™ G3220 Processor</u>         |          | <b>X</b> | <b>X</b> |
| 3.0 GHz base frequency                         |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |
| Intel HD Graphics                              |          |          |          |
| Supports DDR3 memory up to 1333 MT/s data rate |          |          |          |
| <u>Intel® Pentium™ G3220T Processor</u>        | <b>X</b> |          |          |
| 2.6 GHz base frequency                         |          |          |          |
| 3 MB cache, 2 cores, 2 threads                 |          |          |          |

### Technical Specifications – Core vPro Processors

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

Intel® Pentium® G3250T

**X**

2.8 GHz base frequency, 3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory 1333 MT/s data rate

Intel® Pentium® G3450T

**X**

2.9 GHz base frequency, 3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory 1600 MT/s data rate

#### Intel® 4th Generation Celeron™ Processors

**DM**

**USDT**

**SFF/TWR**

Intel® Celeron™ G1840T Processor

**X**

2.5 GHz base frequency

2 MB cache, 2 cores, 2 threads

Intel® HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

Max Resolution (DP) 2560x1600@60Hz

Intel® Celeron™ G1820T Processor

**X**

2.4 GHz base frequency

2 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

Max Resolution (DP) 2560x1600@60Hz

### GRAPHICS\*

**\*NOTE:** AMD and NVIDIA graphics cards are not available on configurations with the preinstalled Windows 10 operating system. Configurations with the Windows 10 downgrade to Windows 7 operating system will allow for upgrading to Windows 10 with AMD and NVIDIA graphics cards through graphics driver installation from hp.com.

#### System Integrated Graphics

**DM**

**USDT**

**SFF/TWR**

Intel HD Graphics on all models (integrated on processor)

**X**

**X**

**X**

**DM**

**USDT**

**SFF/TWR**

#### Optional Discrete Graphics Solutions

AMD Radeon HD 7650A (MXM)

**X**

**NOTE:** When this MXM graphics card is installed in the USDT all three monitor ports are active. The discrete ATI graphics will operate the top DisplayPort while the Intel integrated graphics will operate the bottom Multi-Stream DisplayPort and the VGA output.

AMD Radeon HD 8350 (1GB) PCIe x16

**X**

AMD Radeon HD 8490 (1GB) PCIe x 16

**X**

### Technical Specifications – Core vPro Processors

|                                         |          |
|-----------------------------------------|----------|
| AMD Radeon R7 240 2GB FH PCIe x16 GFX   | X        |
| AMD Radeon R9 255 2GB FH PCIe x16 GFX   | TWR only |
| NVIDIA NVS 310 (512 MB) PCIe x16        | X        |
| NVIDIA NVS 315 (1GB) PCIe x 16          | X        |
| NVIDIA GeForce GT630 (2 GB) FH PCIe x16 | TWR only |

### Adapters and Cables

|                                     | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|-------------------------------------|-----------|-------------|----------------|
| HP DMS-59 to Dual DisplayPort Cable |           |             | X              |
| HP DMS-59 to Dual DVI Cable         |           |             | X              |
| HP DMS-59 to Dual VGA Cable         |           |             | X              |
| HP DisplayPort to DisplayPort Cable | X         | X           | X              |
| HP DisplayPort to DVI-D Adapter     | X         | X           | X              |
| HP DisplayPort to HDMI Adapter      | X         | X           | X              |
| HP DisplayPort To HDMI 1.4 Adapter  | X         | X           | X              |
| HP DisplayPort to VGA Adapter       | X         | X           | X              |
| HP Serial Port Adapter              |           |             | X              |
| HP Parallel Port Adapter            |           |             | X              |

### STORAGE\*

#### Hard Disk Drives (HDD)

|                         | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|-------------------------|-----------|-------------|----------------|
| 320 GB 7200 rpm HDD     |           | X           |                |
| 500 GB 7200 rpm HDD     | X         | X           | X              |
| 500 GB 7200 rpm SED HDD | X         | X           | X              |
| 500 GB 10K rpm HDD      |           |             | X              |
| 1 TB 7200 rpm HDD       |           |             | X              |
| 1 TB 10K rpm HDD        |           |             | X              |
| 2 TB 7200 rpm HDD       |           |             | X              |

#### Solid State Hybrid Drives (SSHD)

|                           | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|---------------------------|-----------|-------------|----------------|
| 500 GB SSHD (8 GB cache)  | X         | X           | X              |
| 500GB SATA 6G 2.5 8G SSHD | X         |             |                |
| 1 TB SSHD (8 GB cache)    | X         | X           | X              |
| 1TB SATA 6G 2.5 8G SSHD   | X         |             |                |

#### Solid State Drives (SSD) & Self-encrypting Solid State Drives (SED)

|                               | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|-------------------------------|-----------|-------------|----------------|
| 120 GB SATA 2.5 Non-SED SSD   | X         |             |                |
| 180 GB SATA 2.5 Non-SED SSD   | X         |             |                |
| 120 GB SATA 2.5 Opal2 SED SSD | X         |             |                |
| 180 GB SATA 2.5 Opal2 SED SSD | X         |             |                |

### Technical Specifications – Core vPro Processors

|                                                                |   |   |   |
|----------------------------------------------------------------|---|---|---|
| 120 GB Opal SED                                                | X | X | X |
| Intel Pro 1500 120gb SSD Opal 1 SED drive SRP                  | X |   |   |
| 120 GB SATA 2.5 2nd Opal1 SED SSD                              | X |   |   |
| 128 GB SSD Non-SED                                             |   | X | X |
| 128 GB Opal SED                                                | X | X | X |
| 128 GB Turbo Drive SSD (M.2 PCIe card)                         | X |   | X |
| 128 GB SATA 2.5 2nd Opal2 SED SSD                              | X |   |   |
| 180 GB Opal SED                                                | X | X | X |
| Intel Pro 1500 180gb SSD Opal 1 SED drive                      | X |   |   |
| 256 GB SED                                                     |   | X | X |
| 256 GB Opal SED                                                | X | X | X |
| 256 GB SATA 2.5 SSD (Non-SED)                                  | X |   | X |
| 120GB SATA 2.5 Non-SED SSD (with 3.5" adapter when needed)     | X | X | X |
| 180GB SATA 2.5 Non-SED SSD (with 3.5" adapter when needed)     | X | X | X |
| 120GB SATA 2.5 Opal2 SED SSD (with 3.5" adapter when needed)   | X | X | X |
| 180GB SATA 2.5 Opal2 SED SSD (with 3.5" adapter when needed)   | X | X | X |
| 128GB SATA 2.5 SSD TLC Non-SED (with 3.5" adapter when needed) | X | X | X |
| 256GB SATA 2.5 SSD TLC Non-SED (with 3.5" adapter when needed) | X | X | X |
| 512GB SATA 2.5 SSD Non-SED (with 3.5" adapter when needed)     | X | X | X |

**\*NOTE:** For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

### Optical Disc Drives

|                            | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|----------------------------|-----------|-------------|----------------|
| Slim DVD-ROM               |           | X           | X              |
| Slim BDXL Blu-ray Writer   |           | X           | X              |
| Slim SuperMulti DVD Writer |           | X           | X              |
| HH Supermulti ODD          |           |             | TWR only       |

### Removable

|                                          |   |   |
|------------------------------------------|---|---|
| HP Slim Removable SATA HDD Frame/Carrier | X | X |
| HP 3.5 Removable HDD Frame/Carrier       |   | X |

### MEMORY

| Form Factor  | Type                               | Maximum | # of Slots |
|--------------|------------------------------------|---------|------------|
| Desktop Mini | DDR3 non-ECC<br>Up to 1600<br>MT/s | 16 GB   | 2 SODIMM   |

### Technical Specifications – Core vPro Processors

|                    |                                    |       |          |
|--------------------|------------------------------------|-------|----------|
| Ultra-slim Desktop | DDR3 non-ECC<br>Up to 1600<br>MT/s | 16 GB | 2 SODIMM |
| Small Form Factor  | DDR3 non-ECC<br>Up to 1600<br>MT/s | 32 GB | 4 DIMM   |
| Tower              | DDR3 non-ECC<br>Up to 1600<br>MT/s | 32 GB | 4 DIMM   |

**NOTE:** For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Memory modules support data transfer rates up to 1600 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

### PERFORMANCE

| Intel® Smart Response Technology Disk Cache Modules | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|-----------------------------------------------------|-----------|-------------|----------------|
| 2.5" Solid State Disk Cache                         |           |             | X              |
| mSATA Solid State Disk Cache                        |           | X           |                |

### NETWORKING/COMMUNICATIONS

| Ethernet (RJ-45)                                                                                            | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|-------------------------------------------------------------------------------------------------------------|-----------|-------------|----------------|
| Intel I217LM Gigabit Network Connection (standard)                                                          | X         | X           | X              |
| Intel Ethernet I210-T1 PCIe x1 Gb Network Interface Card (optional)                                         |           |             | X              |
| <b>Wireless</b>                                                                                             |           |             |                |
| Intel 7260 802.11 ac PCIe x1 BT NIC                                                                         | X         |             | X (TWR)        |
| HP WLAN 802.11 a/g/n 2x2 DualBand PCIe x1 Card (optional)                                                   |           |             | X              |
| HP Wireless 802.11 a/b/g/n 2x2 Dual Band Mini Card with Bluetooth NIC (optional)                            |           | X           |                |
| Intel Centrino Advanced-N 6205 802.11 a/b/g/n PCI Express x1 Wireless Network Connection (optional)         |           |             | X              |
| Intel Centrino Advanced-N 6205 802.11 a/b/g/n PCI Express Mini Card Wireless Network Connection (optional)  |           | X           |                |
| Intel 7260 802.11 a/b/g/n M.2 BT NIC Wireless Network Connection (optional)                                 | X         |             |                |
| Intel Wireless-N 7260 802.11 M.2 a/b/g/n NIC Card Wireless Network Connection (optional)                    | X         |             |                |
| Intel Wireless-N 7260 802.11 a/b/g/n Mini PCIe NIC Card (USDT Only) Wireless Network Connection (optional)  |           |             |                |
| Intel Wireless-N 7260 802.11 a/b/g/n PCIe- Clink Card (SFF/TWR Only) Wireless Network Connection (optional) |           |             |                |



### Technical Specifications – Core vPro Processors

**NOTE:** Either the integrated network connection or the Intel Centrino wireless NIC is required to support Intel vPro Technology features.

#### Audio/Multimedia

|                                                           | <u>DM</u>     | <u>USDT</u> | <u>SFF/TWR</u> |
|-----------------------------------------------------------|---------------|-------------|----------------|
| HD audio with Realtek ALC221 codec (all ports are stereo) | X             | X           | X              |
| DTS Studio Sound audio management technology              | X             | X           | X              |
| Microphone* and headphone front ports (3.5mm)             | X             | X           | X              |
| Line-out and Line-In rear Ports* (3.5mm)                  | Line out only | X           | X              |
| Multi-streaming capable*                                  | X             | X           | X              |
| Internal speaker (standard)                               | X             | X           | X              |

\* The front microphone port is re-taskable as a Line-in, Microphone-in or Headphone-out port. Rear audio input ports are re-taskable as a Line-in or Microphone-in port. External speakers must be powered externally. Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks. This allows for different audio applications to use separate audio ports on the system. For example, the front jacks could be used with a headset for a communications application while the rear jacks are being used with external speakers and a multimedia application.

#### KEYBOARDS AND POINTING DEVICES

| <b>Keyboard</b>                       | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|---------------------------------------|-----------|-------------|----------------|
| HP PS/2 Keyboard                      | X         | X           | X              |
| HP USB Keyboard                       | X         | X           | X              |
| USB Smart Card (CCID) Keyboard        | X         | X           | X              |
| HP USB and PS/2 Washable Keyboard     | X         | X           | X              |
| HP Wireless Keyboard and Mouse Combo* | X         | X           | X              |
| HP USB Antimicrobial Keyboard         | X         | X           | X              |

\*Keyboard contains 25% post-consumer recycled plastic material.

| <b>Mice</b>                    | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|--------------------------------|-----------|-------------|----------------|
| HP PS/2 Mouse                  | X         | X           | X              |
| HP USB Mouse                   | X         | X           | X              |
| HP USB 1000dpi Laser Mouse     | X         | X           | X              |
| HP USB and PS/2 Washable Mouse | X         | X           | X              |
| HP USB Antimicrobial Mouse     | X         | X           | X              |

#### HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP EliteDesk 800 G1 Business PC into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.

### Technical Specifications – Core vPro Processors

- Select models feature either Intel Standard Manageability or Intel Core vPro Processor Technology.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- UEFI specification 2.1
- Absolute Persistence agent – For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery. In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

#### Additional HP BIOS Features

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Elite models use ACPI to provide power conservation features.

S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W in S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.

### SECURITY

|                                                                   | <u>USDT/DM</u>   | <u>SFF/TWR</u>  |
|-------------------------------------------------------------------|------------------|-----------------|
| Common Criteria Certified, Infineon TPM SLB9656TT1.2- 4.32 FW     | X                | X               |
| SATA port disablement (via BIOS)                                  | X                | X               |
| Drive lock                                                        | X                | X               |
| RAID configurations                                               |                  | X               |
| Intel® Identify Protection Technology (IPT) <sup>1</sup>          | X                | X               |
| Serial, parallel, USB enable/disable (via BIOS)                   | X                | X               |
| Optional USB Port Disable at factory (user configurable via BIOS) | X                | X               |
| Removable media write/boot control                                | X                | X               |
| Power-On password (via BIOS)                                      | X                | X               |
| Setup password (via BIOS)                                         | X                | X               |
| HP Chassis (1 bay) Security Kit                                   |                  | <b>TWR only</b> |
| Solenoid Hood Lock / Sensor                                       | X                | X               |
|                                                                   | <b>USDT only</b> |                 |

### Technical Specifications – Core vPro Processors

Support for chassis padlocks and cable lock devices

**X**

**X**

<sup>1</sup>Models configured with Intel Core processors have the ability to utilize advanced security protection for online transactions. IPT, used in conjunction with participating web sites, provides double identity authentication by adding a hardware component in addition to the usual user name and password. IPT is initialized through an HP Client Security module

### ENVIRONMENTAL & REGULATORY

ENERGY STAR® qualified models available

EPEAT® registered where applicable/supported. See <http://www.epeat.net> for registration status by country.

Low halogen (chassis, all internal components and modules)

TAA compliant

### PORTS

#### I/O Ports – Standard

|                 | <u>DM</u>                                        | <u>USDT</u>                                      | <u>SFF/TWR</u>                                   |
|-----------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| USB 2.0         | N/A                                              | 2 (front); 4 (rear)                              | 2 (front); 4 (rear)                              |
| USB 3.0         | 2 (front); 4 (rear)                              | 2 (front); 2 (rear)                              | 2 (front); 2 (rear)                              |
| Serial (RS-232) | N/A                                              | N/A                                              | 1                                                |
| PS/2            | N/A                                              | 1 keyboard (purple)<br>1 mouse (green)           | 1 keyboard (purple)<br>1 mouse (green)           |
| Video           | 1 ea. VGA<br>2 ea. DisplayPort with multi-stream | 1 ea. VGA<br>2 ea. DisplayPort with multi-stream | 1 ea. VGA<br>2 ea. DisplayPort with multi-stream |

**NOTE:** When configured with an Intel Celeron, Pentium or 4th generation Intel Core i3 CPU only two of the available video output ports are active

|                   |                                                             |                                                             |                                                             |
|-------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| Audio             | Front: headphone/mic<br>Rear: line in/out<br>3.5mm diameter | Front: headphone/mic<br>Rear: line in/out<br>3.5mm diameter | Front: headphone/mic<br>Rear: line in/out<br>3.5mm diameter |
| Network Interface | RJ-45                                                       | RJ-45                                                       | RJ-45                                                       |

#### I/O Ports – Optional

|                     | <u>DM</u> | <u>USDT</u> | <u>SFF/TWR</u> |
|---------------------|-----------|-------------|----------------|
| 2nd Serial (RS-232) | N/A       | N/A         | 1              |
| Parallel            | N/A       | N/A         | 1              |

### SLOTS

|                       | <u>DM</u> | <u>USDT</u> | <u>SFF</u> | <u>TWR</u> |
|-----------------------|-----------|-------------|------------|------------|
| PCI Express Mini Card | N/A       | 1           | N/A        | N/A        |
| MXM Graphics          | N/A       | 1           | N/A        | N/A        |
| mSATA                 | N/A       | 1           | N/A        | N/A        |

### Technical Specifications – Core vPro Processors

|                                           |                                         |     |                                                            |                                                            |
|-------------------------------------------|-----------------------------------------|-----|------------------------------------------------------------|------------------------------------------------------------|
| Turbo Drive (M.2 PCIe)                    | 1 ea. M.2 PCIe x4-2230<br>(for WLAN)    | N/A | N/A                                                        | N/A                                                        |
|                                           | 1 ea. M.2 PCIe x4-2280<br>(for storage) |     |                                                            |                                                            |
| PCI Express x1 (v2.0)                     | N/A                                     | N/A | 2 ea.<br>2.5" low profile<br>6.6" length<br>10W max. power | 2 ea.<br>4.2" full height<br>6.6" length<br>10W max. power |
| PCI Express x16 (v2.0)<br>(wired as a x4) | N/A                                     | N/A | 1 ea.<br>2.5" low profile<br>6.6" length<br>35W max. power | 1 ea.<br>4.2" full height<br>6.6" length<br>35W max. power |
| PCI Express x16 (v3.0)                    | N/A                                     | N/A | 1 ea.<br>2.5" low profile<br>6.6" length<br>35W max. power | 1 ea.<br>4.2" full height<br>6.6" length<br>75W max. power |
| Optional PCI (v2.3)                       | N/A                                     | N/A | N/A                                                        | 1 ea.<br>4.2" full height<br>6.6" length                   |

**NOTE:** The TWR can support a single graphics card up to 75W. When configured with dual graphics cards support is limited to 35W for each.

### BAYS

|                             | <u>DM</u> | <u>USDT</u> | <u>SFF</u> | <u>TWR</u> |
|-----------------------------|-----------|-------------|------------|------------|
| 3.5" Media Card Reader      | N/A       | N/A         | 1 ea.      | 1 ea.      |
| 5.25" Half Height ODD       | N/A       | N/A         | N/A        | 1 ea.      |
| 5.25" Slim ODD              | N/A       | 1 ea.       | 1 ea.      | 1 ea.      |
| Secure Digital (SD) Reader  | N/A       | 1 ea.       | N/A        | N/A        |
| 2.5" internal storage drive | 1 ea.     | 1 ea.       | 1 ea.      | 1 ea.      |
| 3.5" internal storage drive | N/A       | N/A         | 1 ea.      | 2 ea.      |

### SERVICE AND SUPPORT

On-site Warranty 1: Three-year (3-3-3) limited warranty delivers three years of on-site, next business day 2 service for parts and labor and includes free telephone support 3 24 x 7. Three-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing a Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: [www.hp.com/go/cpc](http://www.hp.com/go/cpc)

**NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

**NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

### Technical Specifications – Core vPro Processors

**NOTE 3:** Technical telephone support applies only to HP-configured and third-party HP qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

## OPERATING SYSTEMS

### Preinstalled

Windows 10 Pro 64\*

Windows 10 Home 64\*

Windows 8.1 Pro 64\*

Windows 8.1 64\*

Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)\*\*

Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro)\*\*

Windows 7 Professional 64 (available through downgrade rights from Windows 8.1 Pro)\*\*\*

Windows 7 Professional 32 (available through downgrade rights from Windows 8.1 Pro)\*\*\*

Windows 7 Professional 64\*

Windows 7 Professional 32\*

### Pre-installed (Other)

FreeDOS 2.0

Novell SUSE Linux Enterprise Desktop 11

### Web-supported

Windows 10 Pro 64

Windows 10 Home 64

Windows 8.1 Pro 64

Windows 8.1 64

Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)

Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro)

Windows 7 Professional 64 (available through downgrade rights from Windows 8.1 Pro)

Windows 7 Professional 32 (available through downgrade rights from Windows 8.1 Pro)

Windows 7 Professional 64

Windows 7 Professional 32

Windows 10 Enterprise 64

Windows 8.1 Enterprise 64

Windows 7 Enterprise 64

Windows 7 Enterprise 32

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

**\*\*This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 10 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.**

### Technical Specifications – Core vPro Processors

\*\*\*This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

| SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Included                                          | Windows 7                                                                                                                                                                                                                                                               | Windows 8.1                                                                                                                                                                                                                                                                                                                                      | Windows 10                                                                                                                                                                                                                                                                                                         |
| <b>BIOS</b>                                       | HP BIOSphere <sup>1</sup><br>HP DriveLock<br>HP BIOS Protection <sup>3</sup><br><br>BIOS Update via Network<br>Master Boot Record Security<br>Power On Authentication<br>Pre-Boot Security<br>Secure Erase <sup>6</sup><br><br>Absolute Persistence Module <sup>7</sup> | HP BIOSphere <sup>1</sup><br>HP DriveLock<br>HP BIOS Protection <sup>3</sup><br>HP Disk Sanitizer <sup>4</sup><br>BIOS Update via Network<br>Master Boot Record Security<br>Power On Authentication<br>Pre-Boot Security<br>Secure Erase <sup>6</sup><br>Hybrid Boot<br>Measured Boot<br>Secure Boot<br>Absolute Persistence Module <sup>7</sup> | HP BIOSphere <sup>1</sup><br>HP DriveLock<br>HP BIOS Protection <sup>3</sup><br><br>BIOS Update via Network<br>Master Boot Record Security<br>Power On Authentication<br>Pre-Boot Security<br>Secure Erase <sup>6</sup><br>Hybrid Boot<br>Measured Boot<br>Secure Boot<br>Absolute Persistence Module <sup>7</sup> |
| <b>Multimedia</b>                                 | CyberLink Power DVD, BD<br>CyberLink Power2Go (Secure Burn)<br>CyberLink YouCam BE                                                                                                                                                                                      | CyberLink Power DVD, BD<br>CyberLink Power2Go (Secure Burn)                                                                                                                                                                                                                                                                                      | CyberLink Power DVD, BD<br>CyberLink Power2Go (Secure Burn)                                                                                                                                                                                                                                                        |

|                             | Windows 7                                                                                                   | Windows 8.1                                                                                                 | Windows 10                                                                                                                         |
|-----------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Communication</b>        | Intel® Wireless Display (WiDi)<br>Software for Windows <sup>5</sup><br>Native Miracast Support <sup>8</sup> | Intel® Wireless Display (WiDi)<br>Software for Windows <sup>5</sup><br>Native Miracast Support <sup>8</sup> | Intel® Wireless Display (WiDi)<br>Software for Windows <sup>5</sup><br>Native Miracast Support <sup>8</sup>                        |
| <b>HP Value Add</b>         | HP ePrint Driver <sup>9</sup><br>HP Recovery Manager<br>HP Support Assistant<br>HP Recovery Disk Creator    | HP ePrint Driver <sup>9</sup><br>HP Recovery Manager<br>HP Support Assistant<br>HP Recovery Disk Creator    | HP ePrint Driver <sup>9</sup><br>HP Recovery Manager<br>HP Support Assistant<br>Windows 10 Welcome App<br>HP Recovery Disk Creator |
| <b>3<sup>rd</sup> Party</b> | Foxit PhantomPDF Express for HP                                                                             | Foxit PhantomPDF Express for HP                                                                             | Foxit PhantomPDF Express for HP                                                                                                    |
| <b>Microsoft Products</b>   | Buy Office<br>Bing Search                                                                                   | Buy Office<br>Bing Search                                                                                   | Buy Office<br>Bing Search                                                                                                          |

### Technical Specifications – Core vPro Processors

|                      | Skype                                                                                                                                                                                                                                                                               | Skype                                                                                                                                                                                                                                                                               | Skype                                                                                                                                                                                                                                                                                                                 |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Manageability</b> | HP Drive Packs <sup>10</sup><br>HP SoftPaq Download Manager (SDM)<br>HP System Software Manager (SSM) <sup>10</sup><br>HP Client Catalog <sup>10</sup><br>HP CIK for Microsoft SCCM <sup>10</sup><br>LANDESK Management <sup>11</sup><br>HP BIOS Config Utility (BCU) <sup>10</sup> | HP Drive Packs <sup>10</sup><br>HP SoftPaq Download Manager (SDM)<br>HP System Software Manager (SSM) <sup>10</sup><br>HP Client Catalog <sup>10</sup><br>HP CIK for Microsoft SCCM <sup>10</sup><br>LANDESK Management <sup>11</sup><br>HP BIOS Config Utility (BCU) <sup>10</sup> | HP Drive Packs <sup>10</sup><br>HP SoftPaq Download Manager (SDM)<br>HP System Software Manager (SSM) <sup>10</sup><br>HP Client Catalog <sup>10</sup><br>HP CIK for Microsoft SCCM <sup>10</sup><br>LANDESK Management <sup>11</sup><br>HP BIOS Config Utility (BCU) <sup>10</sup><br>Discover HP Touchpoint Manager |

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

|                 | Windows 7                                                                                                                                                                                                             | Windows 8.1                                                                                                                                                                                  | Windows 10                                                                                                                                                       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Security</b> | Absolute Persistence Module <sup>7</sup><br>HP Device Access Manager<br>HP Drive Encryption <sup>12</sup><br>HP Disk Sanitizer External Edition<br>HP Security Manager<br>Microsoft Security Essentials <sup>14</sup> | Absolute Persistence Module <sup>7</sup><br>HP Device Access Manager<br>HP Drive Encryption <sup>12</sup><br>HP Disk Sanitizer External Edition<br>HP Security Manager<br>Microsoft Defender | Absolute Persistence Module <sup>7</sup><br>HP Drive Encryption <sup>12</sup><br>HP Disk Sanitizer External Edition<br>HP Security Manager<br>Microsoft Defender |
| <b>Standard</b> | Smart Card Reader<br>Security lock slot<br>PrebootAuthentication                                                                                                                                                      | Smart Card Reader<br>Security lock slot<br>Preboot Authentication                                                                                                                            | Smart Card Reader<br>Security lock slot<br>Preboot Authentication                                                                                                |

**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:

1 Available only on business PCs with HP BIOS.

3 May require a manual recovery step if all copies of BIOS are compromised or deleted

4 For the use cases outlined in the DOD 5220.22-M Supplement. Only supports traditional Hard Drives.

5 Integrated Intel® Wi-Di Display is available on select configurations only and requires a separate projector, TV or monitor with an integrated or external Wi-Di receiver. For more information on Intel® Wi-Di Display visit

<http://www.intel.com/go/wirelessdisplay>

6 For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.

7 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:

### Technical Specifications – Core vPro Processors

<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.

8 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>

9 Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see <http://www.hp.com/go/eprintcenter>). Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.

10 Not preinstalled, however available on manageability website.

11 Subscription required.

12 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.

14 Opt in and internet connection required for updates.

### CORE VPRO PROCESSORS

#### INTEL 4th GENERATION CORE vPRO PROCESSORS

All HP EliteDesk 800 G1 Business PC models featuring this technology include processors that are part of the Intel 2013 Stable Image Platform Program (SIPP) designed to ensure the stability promise inherent in the value proposition of the HP EliteDesk 800 G1 Business PC, thus making these models the most stable, secure, and manageable platforms available to enterprises today.

**Intel® Advanced Management Technology (AMT) v9.0** – An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 9.0 includes the following advanced management functions:

- Power Management (on, off, reset)
- Hardware Inventory (includes BIOS and firmware revisions)
- Hardware Alerting
- Agent Presence
- System Defense Filters
- SOL/IDER
- Cisco NAC/SDN Support
- ME Wake-on-LAN
- DASH 1.1 compliance
- IPv6 Support
- Fast Call for Help - a client inside or outside the firewall may initiate a call for help via BIOS screen, periodic connections, or alert triggered connection
- Remote Scheduled Maintenance - pre-schedule when the PC connects to the IT or service provider console for maintenance. Remote PCs can get required patches, be inventoried, etc by connecting to their IT console or Service Provider when it's convenient.
- Remote Alerts - automatically alert IT or service provider if issues arise
- Access Monitor - Provides oversight into Intel® AMT actions to support security requirements
- PC Alarm Clock



### Technical Specifications – Core vPro Processors

- Microsoft NAP Support
- Host Base set-up and configuration
- Management Engine (ME) firmware roll back
- Wireless AMT functionality on Desktop (WoDT)
- Enhanced KVM resolution

### Technical Specifications - Graphics

#### GRAPHICS

| Intel HD Graphics          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| VGA Controller             | Integrated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |
| DisplayPort                | Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays (including the integrated panel)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |
| Bus Type                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |
| RAMDAC                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |
| Memory                     | <p>Intel graphics do not have dedicated memory but utilizes some of the computer's system memory. The amount of memory used for graphics depends on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content.</p> <p>Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.</p>                                                                                                                                                                                                                                                                                                                                                                |             |
| Maximum Graphics Memory    | Microsoft Windows 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Windows 8.1 |
|                            | Up to 1.7GB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Up to 1.8GB |
|                            | <b>NOTE:</b> the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |
| Maximum Color Depth        | 32 bits/pixel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |
| Graphics/Video API Support | <p>4th Generation Core processors:</p> <ul style="list-style-type: none"> <li>The Processor Graphics contains a refresh of the seventh generation graphics core enabling substantial gains in performance and lower power consumption. Up to 16 EU support.</li> <li>Next Generation Intel Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience               <ul style="list-style-type: none"> <li>Encode/transcode HD content</li> <li>Playback of high definition content including Blu-ray Disc</li> <li>Superior image quality with sharper, more colorful images</li> </ul> </li> <li>DirectX Video Acceleration (DXVA) support for accelerating video processing               <ul style="list-style-type: none"> <li>Full AVC/VC1/MPEG2 HW Decode</li> </ul> </li> <li>Advanced Scheduler 2.0, 1.0</li> <li>Windows 7, Windows 8, Linux OS Support</li> <li>DirectX 11.1</li> <li>OpenGL 4.3</li> <li>Open CL 1.2</li> </ul> |             |

## Technical Specifications - Graphics

## Supported Display Resolutions and Refresh Rates

**NOTE:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

| Resolution | Refresh Rates |
|------------|---------------|
| 800x600    | 60 Hz         |
| 1024x768   | 60 Hz         |
| 1152x864   | 60 Hz         |
| 1280x600   | 60 Hz         |
| 1280x720   | 60 Hz         |
| 1280x800   | 60 Hz         |
| 1280x960   | 60 Hz         |
| 1280x1024  | 60 Hz         |
| 1360x768   | 60 Hz         |
| 1366x768   | 60 Hz         |
| 1400x1050  | 60 Hz         |
| 1440x900   | 60 Hz         |
| 1600x900   | 60 Hz         |
| 1600x1200* | 60 Hz         |
| 1680x1050  | 60 Hz         |
| 1920x1080  | 60 Hz         |
| 1920x1200* | 60 Hz         |
| 1920x1440* | 60 Hz         |
| 2560x1440* | 60 Hz         |
| 2560x1600* | 60 Hz         |
| 3840x2160* | 60 Hz         |

\* Only supported on displays connected to the external DisplayPort connector.

## AMD Radeon HD 7650A Graphics Card

|                      |                         |
|----------------------|-------------------------|
| Form Factor          | MXM 3.0                 |
| Graphics Controller  | AMD Radeon HD 7650A     |
| Core Clock           | 600MHz                  |
| Memory Clock         | 800MHz                  |
| Memory               | 2GB, DDR3, 128-bit wide |
| Bus Type             | MXM                     |
| Max. Power           | 35W                     |
| Power Source Support | 12V and 19V             |
| 3D API Support       | DX11, SMS               |

### Technical Specifications - Graphics

|                                |                                                                                           |
|--------------------------------|-------------------------------------------------------------------------------------------|
| <b>HDCP Support</b>            | Yes                                                                                       |
| <b>Display Max. Resolution</b> | Digital 2560 x 1600<br>Analog 2048 x 1536                                                 |
| <b>Supported Graphics APIs</b> | DX11, OpenGL, full 1080p BD (H264) playback in hardware, Multi-Stream DisplayPort support |

#### Supported Display Resolutions and Refresh Rates

**NOTE:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

| Resolution  | Refresh Rates |
|-------------|---------------|
| 800 x 600   | 60 Hz         |
| 1024 x 768  | 60 Hz         |
| 1280 x 720  | 60 Hz         |
| 1280 x 768  | 60 Hz         |
| 1280 x 1024 | 60 Hz         |
| 1360 x 768  | 60 Hz         |
| 1440 x 900  | 60 Hz         |
| 1600 x 900  | 60 Hz         |
| 1680 x 1050 | 60 Hz         |
| 1920 x 1080 | 60 Hz         |

### NVIDIA NVS 310 Graphics Card

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Introduction</b>             | <p>The NVIDIA® NVS™ 310 Graphics Card is a PCI Express low profile form factor graphics add-in card targeted as an active low cost graphics solution for the corporate business and enterprise markets.</p> <p>The NVIDIA® NVS 310 graphics card is an ideal solution for customers requiring a small form factor graphics add-in card for either standard or small form factor PC designs.</p>                        |
| <b>Performance and Features</b> | <p>The NVIDIA® NVS 310 Graphics Card offers 512 MB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.</p> <p>DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.</p> <p>For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.</p> |
| <b>Form Factor</b>              | Low Profile: 2.713 × 6.15 in                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Graphics Controller</b>      | NVIDIA® NVS 310                                                                                                                                                                                                                                                                                                                                                                                                        |

## Technical Specifications - Graphics

|                                |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Memory Clock</b>            | 875MHz                                           |                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Memory Size</b>             | 512 MB DDR3                                      |                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Memory Bandwidth</b>        | 14 GB/s                                          |                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Max. Power</b>              | 19.5W                                            |                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Display Max. Resolution</b> | Up to 2560 x 1600 (digital display) per display  |                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Display Output</b>          | Up to 2 displays in the following configurations |                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                | DisplayPort output:                              | <ul style="list-style-type: none"> <li>• Drives two DisplayPort enabled digital display at resolutions up to 2560 x 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card</li> <li>• Supports 2 monitors up to resolution of 1920 x 1200 at 60 Hz with reduced blanking using DisplayPort Multi-Stream topology technology.</li> </ul> |
|                                | DVI-D output:                                    | <ul style="list-style-type: none"> <li>• Drives two digital display at resolutions up to 1920 x 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors</li> <li>• Drives two digital display at resolutions up to 2560 x 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors</li> </ul>                                                |
|                                | HDMI output:                                     | <ul style="list-style-type: none"> <li>• NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 x 1080P at 60 Hz using DisplayPort to HDMI cable adaptors</li> </ul>                                                                                                                                                                                                         |
|                                | VGA display output:                              | <ul style="list-style-type: none"> <li>• Drives two analog display at resolutions up to 1920 x 1200 at 60 Hz using DisplayPort to VGA cable adaptors</li> </ul>                                                                                                                                                                                                                                               |

**Supported Display Resolutions and Refresh Rates**

**NOTE:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

| Resolution  | Maximum Refresh Rates (Hz) by Connection |                      |                     |             |
|-------------|------------------------------------------|----------------------|---------------------|-------------|
|             | DisplayPort to VGA                       | DisplayPort to DVI-D | DisplayPort to HDMI | DisplayPort |
| 640 x 480   | 85                                       | 60                   | 60                  | 60          |
| 800 x 600   | 85                                       | 60                   | 60                  | 60          |
| 1024 x 768  | 85                                       | 60                   | 60                  | 60          |
| 1280 x 720  | 85                                       | 60                   | 60                  | 60          |
| 1280 x 1024 | 85                                       | 60                   | 60                  | 60          |
| 1440 x 900  | 75                                       | 60                   | 60                  | 60          |
| 1600 x 1200 | 60                                       | 60                   | 60                  | 60          |

### Technical Specifications - Graphics

|             |      |      |    |    |
|-------------|------|------|----|----|
| 1680 x 1050 | 60   | 60   | 60 | 60 |
| 1920 x 1080 | 60-R | 60-R | 60 | 60 |
| 1920 x 1200 | 60-R | 60-R |    | 60 |
| 1920 x 1440 |      |      |    | 60 |
| 2048 x 1536 |      |      |    | 60 |
| 2560 x 1600 |      |      |    | 60 |

### NVIDIA GeForce GT630 Graphics Card

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Introduction</b>             | <p>The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card Graphics Card provides a full height, PCI Express x16 graphics add-in card solution based on the NVIDIA Kepler Architecture GPU. The card is designed to support three display connections through its DVII, and two DisplayPort connectors.</p> <p>An ideal solution for desktop PC customers seeking enhanced 2D and advanced 3D graphics performance, the NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards are an excellent choice for business users who want run multiple displays from a single graphics board. Engage in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.</p> |
| <b>Performance and Features</b> | <p>The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards deliver superior PCI Express (PCIe) Gen 3 features including:</p> <ul style="list-style-type: none"> <li>• Unprecedented flexibility for new applications and enhanced performance</li> <li>• Support for NVIDIA surround technology</li> <li>• Run multiple displays from a single graphics card</li> <li>• Full 16 lane PCIe Generation 3 bus support with peak bandwidth support</li> <li>• Wireless Display ready for future support</li> </ul>                                                                                                                                                                                                                                        |
| <b>Form Factor</b>              | PCIe x16 Card                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Graphics Controller</b>      | NVIDIA Kepler Architecture GPU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Core Clock</b>               | 875 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Memory Clock</b>             | 891 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Memory Size</b>              | 2 GB DDR3 128 bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Memory Bandwidth</b>         | 28.5 GB/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Display Max. Resolution</b>  | 2560 x 1600 digital, 2048 x 1536 analog                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

### Technical Specifications - Graphics

|                                                                                                                       |                            |                    |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------|
| Display Support                                                                                                       | Integrated 400 MHz RAMDAC  |                    |
| Supported Display Resolutions and Refresh Rates                                                                       |                            |                    |
| NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP |                            |                    |
| Resolution                                                                                                            | Maximum Refresh Rates (Hz) |                    |
|                                                                                                                       | Analog Connection          | Digital Connection |
| 640 x 480                                                                                                             | 85                         | 60                 |
| 800 x 600                                                                                                             | 85                         | 60                 |
| 1024 x 768                                                                                                            | 85                         | 60                 |
| 1280 x 720                                                                                                            | 85                         | 60                 |
| 1280 x 1024                                                                                                           | 85                         | 60                 |
| 1440 x 900                                                                                                            | 75                         | 60                 |
| 1600 x 1200                                                                                                           | 85                         | 60                 |
| 1680 x 1050                                                                                                           | 75                         | 60                 |
| 1920 x 1080                                                                                                           | 85                         | 60-R               |
| 1920 x 1200                                                                                                           | 85                         | 60-R               |
| 1920 x 1440                                                                                                           | 85                         | 60                 |
| 2048 x 1536                                                                                                           | 75                         | 60                 |
| 2560 x 1600                                                                                                           | N/A                        | 60                 |

### NVIDIA NVS 315 1GB PCIe x 16 Graphics Card

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Introduction</b>             | Get efficient dual-display graphics performance in a PCI Express low-profile graphics card with the NVIDIA NVS 315 PCIe x16 1 GB Graphics Card, an ideal desktop graphics solution for professional business and commercial applications.                                                                                                                                                                            |
| <b>Performance and Features</b> | <p>The NVIDIA® NVS 315 Graphics Card offers 1 GB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.</p> <p>DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.</p> <p>For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.</p> |
| <b>Form Factor</b>              | Low Profile: 2.713 × 6.15 in                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Graphics Controller</b>      | NVIDIA® NVS 315                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Memory Clock</b>             | 875MHz                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Memory Size</b>              | 512 MB DDR3                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Memory Bandwidth</b>         | 14 GB/s                                                                                                                                                                                                                                                                                                                                                                                                              |

### Technical Specifications - Graphics

|                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Connectors                                                                                                                   | DMS-59 , with support for dual VGA, dual DVI or dual Display Port with the appropriate adapter cable                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Display Max. Resolution                                                                                                      | Up to 2048 x 1536 VGA; 1920 x 1200 DVI; 2560 x 1600 DisplayPort                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| Display Output                                                                                                               | Up to 2 displays in the following configurations                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
|                                                                                                                              | <ul style="list-style-type: none"><li>• Dual DVI :<ul style="list-style-type: none"><li>○ Drives two DVI displays using optional HP DMS59 DVI Dual-head Connector Cable DL139A</li></ul></li><li>• Dual DisplayPort :<ul style="list-style-type: none"><li>○ Drives two DisplayPort using optional HP DMS-59 to Dual DisplayPort kit XP688AA</li></ul></li><li>• Dual VGA :<ul style="list-style-type: none"><li>○ Drives two analog using the included HP DMS-59 to Dual VGA Cable</li></ul></li></ul> |                     |
| <b>Supported Display Resolutions and Refresh Rates</b>                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| <b>NOTE:</b> other resolutions may be available but are not recommended as they may not have been tested and qualified by HP |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| Resolution                                                                                                                   | Maximum Refresh Rates (Hz) by Connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |
|                                                                                                                              | Analog Connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Digital Connection  |
| 640 x 480                                                                                                                    | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 720 x 480                                                                                                                    | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 720 x 576                                                                                                                    | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 800 x 600                                                                                                                    | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1024 x 768                                                                                                                   | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1280 x 720                                                                                                                   | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1280 x 768                                                                                                                   | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1280 x 1024                                                                                                                  | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1440 x 900                                                                                                                   | 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1600 x 1024                                                                                                                  | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1600 x 1200                                                                                                                  | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1680 x 1050                                                                                                                  | 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                  |
| 1920 x 1080                                                                                                                  | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60-R                |
| 1920 x 1200                                                                                                                  | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60-R                |
| 1920 x 1440                                                                                                                  | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | N/A                 |
| 2048 x 1536                                                                                                                  | 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | N/A                 |
| 2560 x 1440                                                                                                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 60*                 |
| 2560 x 1600                                                                                                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 60*                 |
|                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | * Display Port Only |



### Technical Specifications - Graphics

| AMD Radeon R7 240 2GB PCIe x16                                                                                        |                                                                                                                                                                 |       |      |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| Memory                                                                                                                | 2048MB DDR3 128-bit wide frame buffer running at 1800MHz.                                                                                                       |       |      |
| Controller Clock Speed                                                                                                | AMD R14D-M2-70 GPU engine running at 730 MHz.                                                                                                                   |       |      |
| Multidisplay Support                                                                                                  | Yes (2)                                                                                                                                                         |       |      |
| Graphics /API support                                                                                                 | Supports Microsoft DirectX 11.1, OpenGL 4.3 and OpenCL 1.2 APIs. DX 11.1, Shader Model 5, UVD 4.2, VCE 2.0, OpenGL 4.2 (4.1+), OpenCL 1.2, and DirectCompute 11 |       |      |
| Output Connectors                                                                                                     | 1 x of each DVI-I (VGA via dongle output), and HDMI connectors.                                                                                                 |       |      |
| Supported Display Resolutions and Refresh Rates                                                                       |                                                                                                                                                                 |       |      |
| NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP |                                                                                                                                                                 |       |      |
| Resolution                                                                                                            | VGA                                                                                                                                                             | DVI-D | HDMI |
| 640x480                                                                                                               | 85                                                                                                                                                              | 60    | 60   |
| 720x480                                                                                                               | 85                                                                                                                                                              | 60    | 60   |
| 720x576                                                                                                               | 85                                                                                                                                                              | 60    | 60   |
| 800x600                                                                                                               | 85                                                                                                                                                              | 60    | 60   |
| 1024x768                                                                                                              | 85                                                                                                                                                              | 60    | 60   |
| 1280x720                                                                                                              | 85                                                                                                                                                              | 60    | 60   |
| 1280x768                                                                                                              | 85                                                                                                                                                              | 60    | 60   |
| 1280x1024                                                                                                             | 85                                                                                                                                                              | 60    | 60   |
| 1440x900                                                                                                              | 85                                                                                                                                                              | 60    | 60   |
| 1600x1024                                                                                                             | 85                                                                                                                                                              | 60    | 60   |
| 1600x1200                                                                                                             | 85                                                                                                                                                              | 60    | 60   |
| 1680x1050                                                                                                             | 75                                                                                                                                                              | 60    | 60   |
| 1920x1080                                                                                                             | 85                                                                                                                                                              | 60*   | 60   |
| 1920x1200                                                                                                             | 85                                                                                                                                                              | 60*   | NA   |
| 1920x1440                                                                                                             | 85                                                                                                                                                              | NA    | NA   |
| 2048x1536                                                                                                             | 75                                                                                                                                                              | NA    | NA   |
| 2560x1440                                                                                                             | NA                                                                                                                                                              | NA    | NA   |
| 2560x1600                                                                                                             | NA                                                                                                                                                              | NA    | NA   |
| * Requires display with support for reduced blanking timing                                                           |                                                                                                                                                                 |       |      |

| AMD Radeon R9 255 2GB PCIe x16 |                                                                                                                                                                 |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Memory                         | 2GB 128-bit wide frame buffer operating at 1150MHz.                                                                                                             |
| Controller Clock Speed         | AMD Cape Verde GPU engine operating at 900 MHz.                                                                                                                 |
| Multidisplay Support           | Yes (2)                                                                                                                                                         |
| Graphics /API support          | Supports Microsoft DirectX 11.1, OpenGL 4.3 and OpenCL 1.2 APIs. DX 11.1, Shader Model 5, UVD 4.2, VCE 2.0, OpenGL 4.2 (4.1+), OpenCL 1.2, and DirectCompute 11 |

### Technical Specifications - Graphics

|                                                                                                                                                                                        |                                                                                                                                                          |                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Output Connectors                                                                                                                                                                      | 1 x of each Dual-Link DVI-I, DisplayPort 1.2 and HDMI 1.4 output connectors.<br>DisplayPort and HDMI outputs support audio<br>1 VGA and 1 DisplayPort1.2 |                       |
| <b>Supported Display Resolutions and Refresh Rates</b><br><b>NOTE:</b> other resolutions may be available but are not recommended as they may not have been tested and qualified by HP |                                                                                                                                                          |                       |
| SUPPORTED DVI-D (DIGITAL) AND<br>DISPLAYPORT DISPLAY MODES<br>Resolution                                                                                                               | Depth (BPP)                                                                                                                                              | Refresh Rate (Hz)     |
| 320x200                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 320x240                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 400x300                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 480x360                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 512x384                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 640x350                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 640x400                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 640x480                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 720x480                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 720x576                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 800x600                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60                    |
| 1024x768                                                                                                                                                                               | 8, 16, 32                                                                                                                                                | 60                    |
| 1152x864                                                                                                                                                                               | 8, 16, 32                                                                                                                                                | 60                    |
| 1280x720                                                                                                                                                                               | 8, 16, 32                                                                                                                                                | 60                    |
| 0.98M9 (1280x768)                                                                                                                                                                      | 8, 16, 32                                                                                                                                                | 60                    |
| 1280x960                                                                                                                                                                               | 8, 16, 32                                                                                                                                                | 60                    |
| 1280x1024                                                                                                                                                                              | 8, 16, 32                                                                                                                                                | 60                    |
| 1.30MA (1440x900)                                                                                                                                                                      | 8, 16, 32                                                                                                                                                | 60, 75                |
| 1600x900                                                                                                                                                                               | 8, 16, 32                                                                                                                                                | 60                    |
| 1.64MA (1600x1024)                                                                                                                                                                     | 8, 16, 32                                                                                                                                                | 60                    |
| 1600x1200                                                                                                                                                                              | 8,16, 32                                                                                                                                                 | 60                    |
| 1.76MA (1680x1050)                                                                                                                                                                     | 8, 16, 32                                                                                                                                                | 60                    |
| 1.76MA-R (1680x1050)                                                                                                                                                                   | 8, 16, 32                                                                                                                                                | 75-R                  |
| 2.07M9-R (1920x1080)                                                                                                                                                                   | 8, 16, 32                                                                                                                                                | 60-R                  |
| 2.30MA-R (1920x1200)                                                                                                                                                                   | 8, 16, 32                                                                                                                                                | 60-R                  |
| 2560x1440                                                                                                                                                                              | 8, 16, 32                                                                                                                                                | 60                    |
| 2560x1600                                                                                                                                                                              | 8, 16, 32                                                                                                                                                | 60                    |
|                                                                                                                                                                                        |                                                                                                                                                          |                       |
| <b>VGA AND DVI-A (ANALOG) DISPLAY MODES</b>                                                                                                                                            |                                                                                                                                                          |                       |
| Resolution                                                                                                                                                                             | Depth (bpp)                                                                                                                                              | CRT Refresh Rate (Hz) |
|                                                                                                                                                                                        |                                                                                                                                                          |                       |
| 320x200                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |
| 320x240                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |
| 400x300                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |
| 480x360                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |
| 512x384                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |
| 640x350                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |
| 640x400                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |
| 640x480                                                                                                                                                                                | 8, 16, 32                                                                                                                                                | 60, 75, 85            |

### Technical Specifications - Graphics

|                    |           |                |
|--------------------|-----------|----------------|
| 720x480            | 8, 16, 32 | 60, 75, 85     |
| 720x576            | 8, 16, 32 | 50, 60, 75, 85 |
| 800x600            | 8, 16, 32 | 60, 75, 85     |
| 1024x768           | 8, 16, 32 | 60, 75, 85     |
| 1152x864           | 8, 16, 32 | 60, 75, 85     |
| 1280x720           | 8, 16, 32 | 60, 75, 85     |
| 0.98M9 (1280x768)  | 8, 16, 32 | 60, 75, 85     |
| 1280x960           | 8, 16, 32 | 60, 75, 85     |
| 1280x1024          | 8, 16, 32 | 60, 75, 85     |
| 1.30MA (1440x900)  | 8, 16, 32 | 60, 75         |
| 1600x900           | 8, 16, 32 | 60, 75, 85     |
| 1.64MA (1600x1024) | 8, 16, 32 | 60, 75, 85     |
| 1600x1200          | 8, 16, 32 | 60, 75, 85     |
| 1.76MA (1680x1050) | 8, 16, 32 | 60, 75         |
| 1920x1080          | 8, 16, 32 | 60, 75, 85     |
| 2.30MA (1920x1200) | 8, 16, 32 | 60, 75, 85     |
| 1920x1440          | 8, 16, 32 | 60, 75, 85     |
| 2048x1536          | 8, 16, 32 | 60, 75         |

### AMD Radeon HD 8350 1GB PCIe x16 DH Graphics Card

|                                |                                                                                                                                                                                                                                                                |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Introduction</b>            | Get stable 2D and advanced 3D graphics performance from the AMD Radeon HD 8350 1 GB PCIe x16 DH Graphics Card, a low profile, PCI Express x16 graphics add-in card based on the AMD Radeon HD 8350 GPU, great for Web conferencing or video and photo editing. |
| <b>Form Factor</b>             | PCIe x16                                                                                                                                                                                                                                                       |
| <b>Graphics Controller</b>     | AMD Radeon HD 8350                                                                                                                                                                                                                                             |
| <b>Core Clock</b>              | GPU engine operates at 523 MHz                                                                                                                                                                                                                                 |
| <b>Memory</b>                  | 1GB, DDR3, SDRAM                                                                                                                                                                                                                                               |
| <b>Memory Clock</b>            | 875 MHz                                                                                                                                                                                                                                                        |
| <b>HDCP Support</b>            | Yes                                                                                                                                                                                                                                                            |
| <b>Display Max. Resolution</b> | Digital 1920 x 1200<br>Analog 2048 x 1536                                                                                                                                                                                                                      |

#### Supported Display Resolutions and Refresh Rates

**NOTE:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

|           | Analog Connection | Digital Connection |
|-----------|-------------------|--------------------|
| 640 x 480 | 85                | 60                 |

### Technical Specifications - Graphics

|             |     |      |
|-------------|-----|------|
| 720 x 480   | 85  | 60   |
| 720 x 576   | 85  | 60   |
| 800 x 600   | 85  | 60   |
| 1024 x 768  | 85  | 60   |
| 1280 x 720  | 85  | 60   |
| 1280 x 768  | 85  | 60   |
| 1280 x 1024 | 85  | 60   |
| 1440 x 900  | 75  | 75   |
| 1600 x 1024 | 85  | 60   |
| 1600 x 1200 | 85  | 60   |
| 1680 x 1050 | 75  | 75-R |
| 1920 x 1080 | 85  | 60-R |
| 1920 x 1200 | 85  | 60-R |
| 1920 x 1440 | 85  | N/A  |
| 2048 x 1536 | 75  | N/A  |
| 2560 x 1440 | N/A | N/A  |
| 2560 x 1600 | N/A | N/A  |

### AMD Radeon HD 8490 1GB PCIe x16 Graphics Card

|                                |                                                                                                                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Introduction</b>            | Get impressive graphics and high resolution dual-display performance in a low profile, PCI Express x16 graphics add-in card based on the AMD Radeon HD 8490 Graphics Processor. Improve your everyday PC, Web conferencing, and video or photo editing. |
| <b>Form Factor</b>             | PCIe x16                                                                                                                                                                                                                                                |
| <b>Graphics Controller</b>     | AMD Radeon HD 8490                                                                                                                                                                                                                                      |
| <b>Core Clock</b>              | GPU engine operates at 875 MHz                                                                                                                                                                                                                          |
| <b>Memory</b>                  | 1GB, DDR3, SDRAM                                                                                                                                                                                                                                        |
| <b>Memory Clock</b>            | 900 MHz                                                                                                                                                                                                                                                 |
| <b>HDCP Support</b>            | Yes                                                                                                                                                                                                                                                     |
| <b>Display Max. Resolution</b> | Digital 2560 x 1600<br>Analog 2048 x 1536                                                                                                                                                                                                               |

#### Supported Display Resolutions and Refresh Rates

**NOTE:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

### Technical Specifications - Graphics

|             | Analog Connection | Digital Connection |
|-------------|-------------------|--------------------|
| 300 x 200   | 85                | 60                 |
| 320 x 240   | 85                | 60                 |
| 400 x 300   | 85                | 60                 |
| 640 x 480   | 85                | 60                 |
| 720 x 480   | 85                | 60                 |
| 720 x 576   | 85                | 60                 |
| 800 x 600   | 85                | 60                 |
| 1024 x 768  | 85                | 60                 |
| 1280 x 720  | 85                | 60                 |
| 1280 x 768  | 85                | 60                 |
| 1280 x 1024 | 85                | 60                 |
| 1440 x 900  | 75                | 75                 |
| 1600 x 900  | 85                | 60                 |
| 1600 x 1024 | 85                | 60                 |
| 1600 x 1200 | 85                | 60                 |
| 1680 x 1050 | 75                | 75-R               |
| 1920 x 1080 | 85                | 60-R               |
| 1920 x 1200 | 85                | 60-R               |
| 1920 x 1440 | 85                | N/A                |
| 2048 x 1536 | 75                | N/A                |
| 2560 x 1440 | N/A               | 60                 |
| 2560 x 1600 | N/A               | 60                 |

### Technical Specifications – Hard Disk and Solid State Storage

#### HARD DISK AND SOLID STATE STORAGE

##### Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP EliteDesk 800 G1 Series Business PC supports the latest SATA 6.0Gb/s specification.

##### HP Drive Lock

HP Serial ATA Hard Drives offer enhanced security via a new Drive Lock. When enabled, this ATA security feature set prevents software access to user data on the drive until one or two user-defined passwords are provided.

##### SMART IV Technology

Self-Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables the intelligent manageability or management software to generate a fault alert. While the current versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has promoted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a 2 byte parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This unique parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.

Smart IV is also known as IOEDC: I/O Error Detection Code.

##### Native Command Queuing

NCQ or Native Command Queuing is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), which allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. Enabling NCQ features in the hard drive requires AHCI support from the host system BIOS, controller, and driver. AHCI support is typically implemented in RAID configurations.

**NOTE:** GB = 1 billion bytes. Actual available capacity is less.

## Technical Specifications – Hard Disk and Solid State Storage

**Redundant Array of Independent Drives (RAID)**

Flexible implementation:

- DriveLock is supported while in RAID mode. Users can manage the DriveLock password from within F10 Setup. Locked drives will be displayed as such in the RAID option ROM interface.
- Hard drive information can be viewed within F10 Setup while in RAID mode. Previously, the hard drives will not appear in Drive Configuration when switching to RAID mode.
- DPS Self-Test can be executed on physical hard drives while in RAID mode.
- The RAID Setup Utility (accessed through CTRL-I) can be protected by the F10 Setup password.

**NOTE:**

RAID 1 is the only RAID configuration offered via factory configurations. The pre-configured systems:

- Are only available on the SFF and TWR form factors. The USDT and DM form factors do not support RAID as they do not allow for multiple common storage drives.
- Are complete RAID systems and have both drives installed. If the TWR is configured with three hard disk drives, the third drive is would be un-partitioned and not part of the RAID array
- Have the necessary Option ROM configuration.
- Are pre-loaded and pre-installed with all required Intel software.
- Include a preinstalled operating system that is mirrored mode out of the box.

**HP 256 GB\* (non-SED) TLC Solid State Drive**

|                               |                                                 |                |
|-------------------------------|-------------------------------------------------|----------------|
| <b>Unformatted Capacity</b>   | 256 GB*                                         |                |
| <b>Architecture</b>           | Triple Level Cell (TLC) NAND                    |                |
| <b>Interface</b>              | SATA 6 GB/sec                                   |                |
| <b>Dimensions (W x H x D)</b> | 2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm) |                |
| <b>Weight</b>                 | 0.1 lb (45 g)                                   |                |
| <b>Bandwidth Performance</b>  | Sustained Sequential Read:                      | Up to 510 MB/s |
|                               | Sustained Sequential Write:                     | Up to 280 MB/s |
|                               | Random Read (4KB):                              | up to 90K IOPs |
|                               | Random Write (4KB):                             | up to 70K IOPs |
| <b>Latency</b>                | Read:                                           | 55ms (TYP)     |
|                               | Write:                                          | 55ms (TYP)     |

### Technical Specifications – Hard Disk and Solid State Storage

|                                                   |                                                                                                              |                                  |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------|
| Power                                             | DC power requirement:                                                                                        | Min 4.75 V; Max 5.25 V           |
|                                                   | Total power consumption:                                                                                     | 160 mW (Active) ; <85 mW; (Idle) |
| Useful Drive Life                                 | 1.2 million device hours**                                                                                   |                                  |
| Environmental<br>(all conditions, non-condensing) | Operating Temperature:                                                                                       | 32° to 158° F (0° to 70° C)      |
|                                                   | Relative Humidity (operating):                                                                               | 5% to 95%                        |
|                                                   | Shock:                                                                                                       | 1,500 G/1.0 msec                 |
| Regulations                                       | UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS<br>CISPR 22:2002 Class B, Korea KCC, CE Mark |                                  |

\* For solid state disk drives, GB means 1 billion bytes. Actual formatted capacity is less. Up to 16GB for Windows 7 and up to 36GB for Windows 8.1 is reserved for system recovery software.\*\* The product achieves a mean time between failure (MTBF) based on population statistics not relevant to individual units.

| <b>HP 128 GB* (non-SED) TLC Solid State Drive</b> |                                                 |                                  |
|---------------------------------------------------|-------------------------------------------------|----------------------------------|
| <b>Unformatted Capacity</b>                       | 128 GB*                                         |                                  |
| <b>Architecture</b>                               | Triple Level Cell (TLC) NAND                    |                                  |
| <b>Interface</b>                                  | SATA 6 GB/sec                                   |                                  |
| <b>Dimensions (W x H x D)</b>                     | 2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm) |                                  |
| <b>Weight</b>                                     | 0.1 lb (45 g)                                   |                                  |
| <b>Bandwidth Performance</b>                      | Sustained Sequential Read:                      | Up to 510 MB/ss                  |
|                                                   | Sustained Sequential Write:                     | Up to 140 MB/s                   |
|                                                   | Random Read (4KB):                              | up to 90K IOPs                   |
|                                                   | Random Write (4KB):                             | up to 36K IOPs                   |
| <b>Latency</b>                                    | Read:                                           | 55ms (TYP)                       |
|                                                   | Write:                                          | 55ms (TYP)                       |
| <b>Power</b>                                      | DC power requirement:                           | Min 4.75 V; Max 5.25 V           |
|                                                   | Total power consumption:                        | 160 mW (Active) ; <85 mW; (Idle) |
| <b>Useful Drive Life</b>                          | 1.2 million device hours**                      |                                  |



### Technical Specifications – Hard Disk and Solid State Storage

|                                                                                                                                                                                                                                                                                                                                 |                                                                 |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------|
| <b>Environmental</b><br>(all conditions, non-condensing)                                                                                                                                                                                                                                                                        | Operating Temperature:                                          | 32° to 158° F (0° to 70° C) |
|                                                                                                                                                                                                                                                                                                                                 | Relative Humidity (operating):                                  | 5% to 95%                   |
|                                                                                                                                                                                                                                                                                                                                 | Shock:                                                          | 1,500 G/1.0 msec            |
| <b>Regulations</b>                                                                                                                                                                                                                                                                                                              | UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS |                             |
|                                                                                                                                                                                                                                                                                                                                 | CISPR 22:2002 Class B, Korea KCC, CE Mark                       |                             |
| <b>* For solid state disk drives, GB means 1 billion bytes. Actual formatted capacity is less. Up to 16GB for Windows 7 and up to 36GB for Windows 8.1 is reserved for system recovery software.** The product achieves a mean time between failure (MTBF) based on population statistics not relevant to individual units.</b> |                                                                 |                             |

| HP 512 GB* (non-SED) TLC Solid State Drive |                                                 |                                  |
|--------------------------------------------|-------------------------------------------------|----------------------------------|
| <b>Unformatted Capacity</b>                | 512 GB*                                         |                                  |
| <b>Architecture</b>                        | Triple Level Cell (TLC) NAND                    |                                  |
| <b>Interface</b>                           | SATA 6 GB/sec                                   |                                  |
| <b>Dimensions (W x H x D)</b>              | 2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm) |                                  |
| <b>Weight</b>                              | 54 g                                            |                                  |
| <b>Bandwidth Performance</b>               | Sustained Sequential Read:                      | Up to 510 MB/ss                  |
|                                            | Sustained Sequential Write:                     | Up to 455 MB/s                   |
|                                            | Random Read (4KB):                              | up to 90K IOPs                   |
|                                            | Random Write (4KB):                             | up to 60K IOPs                   |
| <b>Latency</b>                             | Read:                                           | 55ms (TYP)                       |
|                                            | Write:                                          | 55ms (TYP)                       |
| <b>Power</b>                               | DC power requirement:                           | Min 4.75 V; Max 5.25 V           |
|                                            | Total power consumption:                        | 250 mW (Active) ; <50 mW; (Idle) |
| <b>Useful Drive Life</b>                   | 1.2 million device hours**                      |                                  |
|                                            | Operating Temperature:                          | 32° to 158° F (0° to 70° C)      |

### Technical Specifications – Hard Disk and Solid State Storage

|                                                          |                                                                                                              |                  |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------|
| <b>Environmental</b><br>(all conditions, non-condensing) | Relative Humidity (operating):                                                                               | 5% to 95%        |
|                                                          | Shock:                                                                                                       | 1,500 G/1.0 msec |
| <b>Regulations</b>                                       | UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS<br>CISPR 22:2002 Class B, Korea KCC, CE Mark |                  |

| HP Turbo Drive 128 GB PCIe SSD                                                                                                                                                                                                                |                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>Capacity</b>                                                                                                                                                                                                                               | 128 GB SSD*                |
| <b>NAND Type</b>                                                                                                                                                                                                                              | MLC                        |
| <b>Read Bandwidth (128KB)</b>                                                                                                                                                                                                                 | 1.00 GB/s                  |
| <b>Write Bandwidth (1MB)</b>                                                                                                                                                                                                                  | 450 MB/s                   |
| <b>Random Read IOPS (4KB)</b>                                                                                                                                                                                                                 | 110K                       |
| <b>Random Write IOPS (4KB)</b>                                                                                                                                                                                                                | 40K                        |
| <b>Endurance (Total Bytes Written)</b>                                                                                                                                                                                                        | 73 TB                      |
| <b>Weight</b>                                                                                                                                                                                                                                 | 1.8oz (51g)                |
| <b>Form Factor</b>                                                                                                                                                                                                                            | Half-height, half-length** |
| <b>Endurance (Total Bytes Written)</b>                                                                                                                                                                                                        | 73 TB                      |
| *For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1) of system disk is reserved for the system recovery software. |                            |
| **Roughly, actual length is 4 inches (100cm)                                                                                                                                                                                                  |                            |

| HP 1TB 10K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive |                       |
|--------------------------------------------------|-----------------------|
| <b>Unformatted Capacity</b>                      | 1 TB                  |
| <b>Rotational Speed</b>                          | 10,000 rpm            |
| <b>Interface</b>                                 | Serial ATA (6.0 Gb/s) |

### Technical Specifications – Hard Disk and Solid State Storage

|                                                                                    |                                |        |
|------------------------------------------------------------------------------------|--------------------------------|--------|
| <b>Synchronous Transfer Rate</b><br>(Maximum)                                      | Up to 600 MB/s                 |        |
| <b>Buffer Size</b>                                                                 | 64 MB                          |        |
| <b>Cache</b>                                                                       | Adaptive                       |        |
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | Single Track:                  | 1.2 ms |
|                                                                                    | Average:                       | 3.6 ms |
|                                                                                    | Full-Stroke:                   | 9.0 ms |
| <b>Height</b> (nominal)                                                            | 0.6 in/1.53 mm                 |        |
| <b>Width</b> (nominal)                                                             | Media diameter: 2.5 in/63.6 mm |        |
|                                                                                    | Physical size: 2.75 in/69.9 mm |        |
| <b>Operating Temperature</b>                                                       | 41° to 131° F (5° to 55° C)    |        |

### Technical Specifications – Hard Disk and Solid State Storage

| HP 500 GB 10K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive                         |                                |        |
|-----------------------------------------------------------------------------|--------------------------------|--------|
| Unformatted Capacity                                                        | 500 GB                         |        |
| Rotational Speed                                                            | 10,000 rpm                     |        |
| Interface                                                                   | Serial ATA (6.0 Gb/s)          |        |
| Synchronous Transfer Rate (Maximum)                                         | Up to 600 MB/s                 |        |
| Buffer Size                                                                 | 64 MB                          |        |
| Cache                                                                       | Adaptive                       |        |
| Seek Time (typical reads, includes controller overhead, including settling) | Single Track:                  | 1.2 ms |
|                                                                             | Average:                       | 3.6 ms |
|                                                                             | Full-Stroke:                   | 9.0 ms |
| Height (nominal)                                                            | 0.6 in/1.53 mm                 |        |
| Width (nominal)                                                             | Media diameter: 2.5 in/63.6 mm |        |
|                                                                             | Physical size: 2.75 in/69.9 mm |        |
| Operating Temperature                                                       | 41° to 131° F (5° to 55° C)    |        |

| HP 320-GB 7.2K SATA 6.0Gb/s 2.5” Hard Disk Drive |                           |        |
|--------------------------------------------------|---------------------------|--------|
| Capacity                                         | 320,072,933,376 bytes     |        |
| Rotational Speed                                 | 7,200 rpm                 |        |
| Interface                                        | Serial ATA 2.0 (6.0 Gb/s) |        |
| Buffer Size                                      | 16 MB                     |        |
| Logical Blocks                                   | 488,397,168               |        |
|                                                  | Single Track:             | 2.0 ms |
|                                                  | Average:                  | 12 ms  |

### Technical Specifications – Hard Disk and Solid State Storage

|                                                                                    |                                |       |
|------------------------------------------------------------------------------------|--------------------------------|-------|
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | Full-Stroke:                   | 22 ms |
| <b>Height</b> (nominal)                                                            | 0.374 in/9.5 mm                |       |
| <b>Width</b> (nominal)                                                             | Media diameter: 2.5 in/63.5 mm |       |
|                                                                                    | Physical size: 2.75 in/70 mm   |       |
| <b>Operating Temperature</b>                                                       | 41° to 131° F (5° to 55° C)    |       |

| HP 500-GB 7200 RPM SATA 2.5” Self-Encrypting (SED) Hard Disk Drive |                                                           |        |
|--------------------------------------------------------------------|-----------------------------------------------------------|--------|
| <b>Capacity</b>                                                    | 500,107,862,016 bytes                                     |        |
| <b>Rotational Speed</b>                                            | 7,200 rpm                                                 |        |
| <b>Drive Type</b>                                                  | Self-Encrypting Drive (SED) with SATA interface           |        |
| <b>Interface</b>                                                   | SATA 6 Gb/s                                               |        |
| <b>Segmented Buffer with write cache</b>                           | 32768 KB - A portion of buffer capacity used for firmware |        |
| <b>Number of Sectors</b>                                           | 976,773,168                                               |        |
| <b>Seek Time</b> (typical reads)                                   | Single Track:                                             | 1.0 ms |
|                                                                    | Average:                                                  | 13 ms  |
|                                                                    | Full-Stroke:                                              | 25 ms  |
| <b>Media Diameter</b>                                              | 2.5 in/63.5 mm                                            |        |
| <b>Height</b>                                                      | 0.267 in/6.8 mm, ±0.2mm                                   |        |
| <b>Width</b>                                                       | 2.75 in/69.85 mm, ±0.25mm                                 |        |
| <b>Length</b>                                                      | 3.945 in/100.2 mm, ±0.25mm                                |        |
| <b>Weight</b>                                                      | 3.35 oz/95 g (max)                                        |        |
| <b>Operating Temperature</b>                                       | 32° to 140° F (0° to 60° C)                               |        |

### Technical Specifications – Hard Disk and Solid State Storage

| HP 500-GB 7.2K SATA 6.0Gb/s 2.5” Hard Disk Drive                            |                                |        |
|-----------------------------------------------------------------------------|--------------------------------|--------|
| Capacity                                                                    | 500,107,862,016 bytes          |        |
| Rotational Speed                                                            | 7,200 rpm                      |        |
| Interface                                                                   | Serial ATA 2.0 (6.0 Gb/s)      |        |
| Buffer Size                                                                 | 16 MB                          |        |
| Logical Blocks                                                              | 976,773,168                    |        |
| Seek Time (typical reads, includes controller overhead, including settling) | Single Track:                  | 2.0 ms |
|                                                                             | Average:                       | 12 ms  |
|                                                                             | Full-Stroke:                   | 25 ms  |
| Height (nominal)                                                            | 0.374 in/9.5 mm                |        |
| Width (nominal)                                                             | Media diameter: 2.5 in/63.5 mm |        |
|                                                                             | Physical size: 2.75 in/70 mm   |        |
| Operating Temperature                                                       | 41° to 131° F (5° to 55° C)    |        |

| HP 1-TB SATA 6G 2.5” 8GB Solid State Hybrid Drive (SSHD) |                                                            |        |
|----------------------------------------------------------|------------------------------------------------------------|--------|
| Formatted Capacity                                       | 1 TB                                                       |        |
| Spindle Speed                                            | 5,400 rpm +/- 0.2%                                         |        |
| Drive Type                                               | Solid State Hybrid Drive (SSHD) technology with NAND Flash |        |
| Interface                                                | Serial ATA (SATA)                                          |        |
| Cache Buffer                                             | 64 MB                                                      |        |
| NAND Flash<br>Commercial Multilevel Cell (cMLC)          | 8 GB                                                       |        |
| Number of Sectors                                        | 976,773,168                                                |        |
| Seek Time (typical reads)                                | Single Track:                                              | 2.0 ms |

### Technical Specifications – Hard Disk and Solid State Storage

|                              |                                                    |       |
|------------------------------|----------------------------------------------------|-------|
|                              | Average:                                           | 12 ms |
| <b>Height</b>                | 0.374 +/- .008 in (9.5 +/- 0.2 mm)                 |       |
| <b>Width</b>                 | 2.750 +/- 0.010 in (69.85 +/- 0.25 mm)             |       |
| <b>Length</b>                | 3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm) |       |
| <b>Weight</b>                | 0.254 lb/115 g (max)                               |       |
| <b>Operating Temperature</b> | 32° to 140° F (0° to 60° C)                        |       |

### Technical Specifications – Hard Disk and Solid State Storage

| HP 500 GB SATA 6G 2.5” 8GB Solid State Hybrid Drive (SSHD) |                                                            |        |
|------------------------------------------------------------|------------------------------------------------------------|--------|
| Formatted Capacity                                         | 500 GB                                                     |        |
| Spindle Speed                                              | 5,400 rpm +/- 0.2%                                         |        |
| Drive Type                                                 | Solid State Hybrid Drive (SSHD) technology with NAND Flash |        |
| Interface                                                  | Serial ATA (SATA)                                          |        |
| Cache Buffer                                               | 64 MB                                                      |        |
| NAND Flash<br>Commercial Multilevel Cell<br>(cMLC)         | 8 GB                                                       |        |
| Number of Sectors                                          | 976,773,168                                                |        |
| Seek Time (typical reads)                                  | Single Track:                                              | 2.0 ms |
|                                                            | Average:                                                   | 12 ms  |
| Height                                                     | 0.268 +/- .008 in (6.8 +/- 0.2 mm)                         |        |
| Width                                                      | 2.750 +/- 0.010 in (69.85 +/- 0.25 mm)                     |        |
| Length                                                     | 3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)         |        |
| Weight                                                     | 0.209 lb/95 g (max)                                        |        |
| Operating Temperature                                      | 32° to 140° F (0° to 60° C)                                |        |

| HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive |                           |        |
|------------------------------------------------------|---------------------------|--------|
| Capacity                                             | 500,107,862,016 bytes     |        |
| Rotational Speed                                     | 7,200 rpm                 |        |
| Interface                                            | Serial ATA 3.0 (6.0 Gb/s) |        |
| Buffer Size                                          | 16 MB                     |        |
| Logical Blocks                                       | 976,773,168               |        |
|                                                      | Single Track:             | 2.0 ms |
|                                                      | Average:                  | 11 ms  |



### Technical Specifications – Hard Disk and Solid State Storage

|                                                                                    |                                |       |
|------------------------------------------------------------------------------------|--------------------------------|-------|
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Full-Stroke:</b>            | 21 ms |
| <b>Height</b> (nominal)                                                            | 1 in/2.54 cm                   |       |
| <b>Width</b> (nominal)                                                             | Media diameter: 3.5 in/8.89 cm |       |
|                                                                                    | Physical size: 4 in/10.2 cm    |       |
| <b>Operating Temperature</b>                                                       | 41° to 131° F (5° to 55° C)    |       |

### HP 120 GB Solid State Drive

|                                                          |                                                                            |                               |
|----------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------|
| <b>Unformatted Capacity</b>                              | 120 GB                                                                     |                               |
| <b>Architecture</b>                                      | Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller |                               |
| <b>Interface</b>                                         | Serial ATA 2.0 (3.0 Gb/s)                                                  |                               |
| <b>Dimensions (W x H x D)</b>                            | 2.74 x 0.37 x 4 in (6.98 x 0.95 x 10.2 cm)                                 |                               |
| <b>Weight</b>                                            | 0.18 lb (80 g)                                                             |                               |
| <b>Bandwidth Performance</b>                             | Sustained Sequential Read:                                                 | Up to 250 MB/s                |
|                                                          | Sustained Sequential Write:                                                | Up to 70 MB/s                 |
|                                                          | Random Read:                                                               | Up to 35K IOPs                |
|                                                          | Random Write:                                                              | Up to 6.6K IOPs               |
| <b>Latency</b>                                           | Read:                                                                      | 65-ms                         |
|                                                          | Write:                                                                     | 85-ms                         |
| <b>Power</b>                                             | DC power requirement:                                                      | 5 VDC 5%-100 mV ripple p-p    |
|                                                          | Total power consumption:                                                   | 0.15W (active); 0.075W (idle) |
| <b>Useful Drive Life</b>                                 | 35TB written, up to 20GB/day for 5 years                                   |                               |
| <b>Environmental</b><br>(all conditions, non-condensing) | Operating Temperature:                                                     | 32° to 158° F (0° to 70° C)   |
|                                                          | Relative Humidity:                                                         | 5% to 95%                     |
|                                                          | Maximum Wet Bulb Temperature (operating):                                  | 84° F (29° C)                 |

### Technical Specifications – Hard Disk and Solid State Storage

|                                                                                                                                                                                                                                                                                                                                                                  |        |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------|
|                                                                                                                                                                                                                                                                                                                                                                  | Shock: | 1,500 G/0.5-ms |
| <p>* For solid state disk drives, GB means 1 billion bytes. 128GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity will vary by content</p> <p>** The product achieves a mean time between failure (MTBF) based on population statistics not relevant to individual units.</p> |        |                |

| HP 128 GB Solid State Drive                                                                                                                                                                                            |                                                                                                              |                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------|
| Unformatted Capacity                                                                                                                                                                                                   | 128 GB*                                                                                                      |                                  |
| Architecture                                                                                                                                                                                                           | Multi Level Cell (MLC) NAND                                                                                  |                                  |
| Interface                                                                                                                                                                                                              | SATA 6 GB/sec                                                                                                |                                  |
| Dimensions (W x H x D)                                                                                                                                                                                                 | 2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm)                                                              |                                  |
| Weight                                                                                                                                                                                                                 | 0.16 lb (73 g)                                                                                               |                                  |
| Bandwidth Performance                                                                                                                                                                                                  | Sustained Sequential Read:                                                                                   | Up to 450 MB/ss                  |
|                                                                                                                                                                                                                        | Sustained Sequential Write:                                                                                  | Up to 260 MB/s                   |
|                                                                                                                                                                                                                        | Random Read (4KB):                                                                                           | up to 46K IOPs                   |
|                                                                                                                                                                                                                        | Random Write (4KB):                                                                                          | up to 56K IOPs                   |
| Latency                                                                                                                                                                                                                | Read:                                                                                                        | 55ms (TYP)                       |
|                                                                                                                                                                                                                        | Write:                                                                                                       | 55ms (TYP)                       |
| Power                                                                                                                                                                                                                  | DC power requirement:                                                                                        | Min 4.5 V; Max 5.5 V             |
|                                                                                                                                                                                                                        | Total power consumption:                                                                                     | 160 mW (Active) ; <85 mW; (Idle) |
| Useful Drive Life                                                                                                                                                                                                      | 1.2 million device hours**                                                                                   |                                  |
| Environmental<br>(all conditions, non-condensing)                                                                                                                                                                      | Operating Temperature:                                                                                       | 32° to 158° F (0° to 70° C)      |
|                                                                                                                                                                                                                        | Relative Humidity (operating):                                                                               | 5% to 95%                        |
|                                                                                                                                                                                                                        | Shock:                                                                                                       | 1,500 G/1.0 msec                 |
| Regulations                                                                                                                                                                                                            | UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS<br>CISPR 22:2002 Class B, Korea KCC, CE Mark |                                  |
| * For solid state disk drives, GB means 1 billion bytes. 128GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity will vary by content |                                                                                                              |                                  |
| ** The product achieves a mean time between failure (MTBF) based on population statistics not relevant to individual units.                                                                                            |                                                                                                              |                                  |

### Technical Specifications – Hard Disk and Solid State Storage

| HP 256 GB SATA 2.5” Self-Encrypting (SED) Solid State Drive |                                                                                     |                                                |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------|
| Unformatted Capacity                                        | 256,186,209,271 bytes                                                               |                                                |
| Architecture                                                | Self-Encrypting (SED) Solid State Drive with 25nm MLC NAND Flash and SATA interface |                                                |
| Interface                                                   | Serial ATA 2.0 (3.0 Gb/s)                                                           |                                                |
| NAND Flash                                                  | 25nm MLC NAND Flash                                                                 |                                                |
| Height                                                      | .275 in/7mm                                                                         |                                                |
| Width                                                       | 2.75 in/69.85 mm                                                                    |                                                |
| Length                                                      | 3.95 in/100.5 mm                                                                    |                                                |
| Weight                                                      | 0.161 lb (73 g)                                                                     |                                                |
| Bandwidth Performance                                       | Sustained Sequential 128k Read:                                                     | Up to 450 MB/s                                 |
|                                                             | Sustained Sequential 128k Write:                                                    | Up to 260 MB/s                                 |
|                                                             | Random 4k Read:                                                                     | Up to 46K IOPs                                 |
|                                                             | Random 4k Write:                                                                    | Up to 56K IOPs                                 |
| Latency                                                     | Read:                                                                               | 55 µs                                          |
|                                                             | Write:                                                                              | 55 µs                                          |
| Power                                                       | SATA power consumption:                                                             | 160 mW (active average); <85 mW (idle average) |
| Useful Drive Life                                           | 72TB written, up to 40GB/day for 5 years                                            |                                                |
| Environmental<br>(all conditions, non-condensing)           | Operating Temperature:                                                              | 32° to 158° F (0° to 70° C)                    |
|                                                             | Relative Humidity:                                                                  | 5% to 95%                                      |
|                                                             | Shock:                                                                              | 1,500 G/1 ms                                   |

| HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive |                       |
|------------------------------------------------------|-----------------------|
| Capacity                                             | 500,107,862,016 bytes |
| Rotational Speed                                     | 7,200 rpm             |

### Technical Specifications – Hard Disk and Solid State Storage

|                                                                                    |                                |        |
|------------------------------------------------------------------------------------|--------------------------------|--------|
| <b>Interface</b>                                                                   | Serial ATA 3.0 (6.0 Gb/s)      |        |
| <b>Buffer Size</b>                                                                 | 16 MB                          |        |
| <b>Logical Blocks</b>                                                              | 976,773,168                    |        |
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | Single Track:                  | 2.0 ms |
|                                                                                    | Average:                       | 11 ms  |
|                                                                                    | Full-Stroke:                   | 21 ms  |
| <b>Height</b> (nominal)                                                            | 1 in/2.54 cm                   |        |
| <b>Width</b> (nominal)                                                             | Media diameter: 3.5 in/8.89 cm |        |
|                                                                                    | Physical size: 4 in/10.2 cm    |        |
| <b>Operating Temperature</b>                                                       | 41° to 131° F (5° to 55° C)    |        |

| HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive                                 |                                |        |
|------------------------------------------------------------------------------------|--------------------------------|--------|
| <b>Capacity</b>                                                                    | 1,000,204,886,016 bytes        |        |
| <b>Rotational Speed</b>                                                            | 7,200 rpm                      |        |
| <b>Interface</b>                                                                   | Serial ATA 3.0 (6.0 Gb/s)      |        |
| <b>Buffer Size</b>                                                                 | 16 MB                          |        |
| <b>Logical Blocks</b>                                                              | 1,953,525,168                  |        |
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | Single Track:                  | 2.0 ms |
|                                                                                    | Average:                       | 11 ms  |
|                                                                                    | Full-Stroke:                   | 21 ms  |
| <b>Height</b> (nominal)                                                            | 1 in/2.54 cm                   |        |
| <b>Width</b> (nominal)                                                             | Media diameter: 3.5 in/8.89 cm |        |
|                                                                                    | Physical size: 4 in/10.2 cm    |        |
| <b>Operating Temperature</b>                                                       | 41° to 131° F (5° to 55° C)    |        |

### Technical Specifications – Hard Disk and Solid State Storage

| HP 2-TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive |                             |         |
|----------------------------------------------------|-----------------------------|---------|
| Unformatted Capacity                               | 2 TB                        |         |
| Rotational Speed                                   | 7,200 rpm                   |         |
| Interface                                          | SATA 6Gb/s NCQ              |         |
| Cache, Multisegmented (MB)                         | 64 MB                       |         |
| Seek Time (average)                                | Read                        | <8.5 ms |
|                                                    | Write                       | <9.5 ms |
| Height                                             | 1.028 in/26.11 mm           |         |
| Width                                              | 4.0 in/101.6 mm             |         |
| Depth                                              | 5.787 in/146.99 mm          |         |
| Weight                                             | 1.38 lb/626 g               |         |
| Operating Temperature                              | 32° to 140° F (0° to 60° C) |         |

## Technical Specifications – Memory

## MEMORY

| HP Slim SuperMulti DVD Writer Drive                |                                                         |                                                     |
|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|
| Height                                             | 12.7mm height                                           |                                                     |
| Orientation                                        | Either horizontal or vertical                           |                                                     |
| Interface type                                     | SATA/ATAPI                                              |                                                     |
| Disc recording capacity                            | Up to 8.5 GB DL or 4.7 GB standard                      |                                                     |
| Dimensions (W x H x D)                             | 5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel |                                                     |
| Weight (max)                                       | 0.42 lb (190 g)                                         |                                                     |
| Write speeds                                       | DVD-RAM                                                 | Up to 5X                                            |
|                                                    | DVD-R DL                                                | Up to 6X                                            |
|                                                    | DVD+R                                                   | Up to 8X                                            |
|                                                    | DVD+RW                                                  | Up to 8X                                            |
|                                                    | DVD+R DL                                                | Up to 6X                                            |
|                                                    | DVD-R                                                   | Up to 8X                                            |
|                                                    | DVD-RW                                                  | Up to 6X                                            |
|                                                    | CD-R                                                    | Up to 24X                                           |
|                                                    | CD-RW                                                   | Up to 24X                                           |
| Read speeds                                        | DVD-RAM                                                 | Up to 5X                                            |
|                                                    | DVD-RW, DVD+RW                                          | Up to 8X                                            |
|                                                    | DVD-R DL, DVD+R DL                                      | Up to 8X                                            |
|                                                    | DVD+R, DVD-R                                            | Up to 8X                                            |
|                                                    | DVD-ROM DL, DVD-ROM                                     | Up to 8X                                            |
|                                                    | CD-ROM, CD-R                                            | Up to 24X                                           |
|                                                    | CD-RW                                                   | Up to 24X                                           |
| Access time<br>(typical reads, including settling) | Random                                                  | DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) |
|                                                    | Full Stroke                                             | DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) |
|                                                    | Stop Time                                               | 6 seconds (typical)                                 |
| Power                                              | Source                                                  | Slimline SATA DC power receptacle                   |
|                                                    | DC Power Requirement                                    | 5 VDC $\pm$ 5%-100 mV ripple p-p                    |
|                                                    | DC Current                                              | 5 VDC (< 1000 mA typical, 1600 mA maximum)          |

### Technical Specifications – Memory

|                                                                 |                              |                             |
|-----------------------------------------------------------------|------------------------------|-----------------------------|
| <b>Environmental conditions</b><br>(operating - non-condensing) | Temperature                  | 41° to 122° F (5° to 50° C) |
|                                                                 | Relative Humidity            | 10% to 80%                  |
|                                                                 | Maximum Wet Bulb Temperature | 84° F (29° C)               |

### HP Slim Blu-ray BDXL Drive

|                                |                                                           |                     |                        |
|--------------------------------|-----------------------------------------------------------|---------------------|------------------------|
| <b>Height</b>                  | 12.7mm height                                             |                     |                        |
| <b>Orientation</b>             | Either horizontal or vertical                             |                     |                        |
| <b>Interface type</b>          | SATA/ATAPI                                                |                     |                        |
| <b>Disc recording capacity</b> | Up to 128 GB QL, 100 GB TL, 50 GB DL or 25 GB standard SL |                     |                        |
| <b>Dimensions (W x H x D)</b>  | 5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel   |                     |                        |
| <b>Weight (max)</b>            | Up to 0.37 lb (170 g) without bezel                       |                     |                        |
| <b>Write speeds</b>            |                                                           | <b>Triple-layer</b> | <b>Quadruple-layer</b> |
|                                | BD-R                                                      | Up to 4X            | Up to 4X               |
|                                | BD-RE                                                     | Up to 2X            | Not supported          |
|                                |                                                           | <b>Single-layer</b> | <b>Double-layer</b>    |
|                                | BD-R                                                      | Up to 6X            | Up to 6X               |
|                                | BD-RE                                                     | Up to 2X            | Up to 2X               |
|                                | DVD-R                                                     | Up to 8X            | Up to 6X               |
|                                | DVD-RW                                                    | Up to 6X            | Not supported          |
|                                | DVD+R                                                     | Up to 8X            | Up to 6X               |
|                                | DVD+RW                                                    | Up to 8X            | Not supported          |
|                                | DVD-RAM                                                   | Up to 5X            |                        |
|                                | CD-R                                                      | Up to 24X           |                        |
|                                | CD-RW                                                     | Up to 24X           |                        |
|                                |                                                           | <b>Triple-layer</b> | <b>Quadruple-layer</b> |
|                                | BD-R                                                      | Up to 4X            | Up to 4X               |
|                                | BD-RE                                                     | Up to 4X            | Not supported          |
|                                |                                                           | <b>Single-layer</b> | <b>Double-layer</b>    |
|                                | BD-ROM                                                    | Up to 6X            | Up to 6X               |
|                                | BD-R                                                      | Up to 6X            | Up to 6X               |

### Technical Specifications – Memory

|                                                                 |                                |                                                                               |          |
|-----------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------|----------|
| <b>Read speeds</b>                                              | BD-RE                          | Up to 6X                                                                      | Up to 6X |
|                                                                 | DVD-ROM                        | Up to 8X                                                                      | Up to 8X |
|                                                                 | DVD-R                          | Up to 8X                                                                      | Up to 8X |
|                                                                 | DVD-RW                         | Up to 8X                                                                      |          |
|                                                                 | DVD+R                          | Up to 8X                                                                      | Up to 8X |
|                                                                 | DVD+RW                         | Up to 8X                                                                      |          |
|                                                                 | BDMV (AACs Compliant Disc)     | Up to 6X/2X (Read/Play)                                                       |          |
|                                                                 | DVD-RAM                        | Up to 5X                                                                      |          |
|                                                                 | DVD-Video (CSS Compliant Disc) | Up to 8X/4X (Read/Play)                                                       |          |
|                                                                 | CD-R/RW/ROM                    | Up to 24X                                                                     |          |
|                                                                 | CD-DA(DAE)                     | Up to 20X/10X (Read/Play)                                                     |          |
| <b>Access time</b><br>(typical reads, including settling)       | Random                         | BD-ROM: 205 ms (typical), DVD-ROM: 185 ms (typical), CD-ROM: 165 ms (typical) |          |
|                                                                 | Full Stroke                    | BD-ROM: 350 ms (typical), DVD-ROM: 345 ms (typical), CD-ROM: 340 ms (typical) |          |
| <b>Power</b>                                                    | Source                         | Slimline SATA DC power receptacle                                             |          |
|                                                                 | DC Power Requirement           | 5 VDC $\pm$ 5%-100 mV ripple p-p                                              |          |
|                                                                 | DC Current                     | 5 VDC -1200 mA typical, 2000 mA maximum                                       |          |
| <b>Environmental conditions</b><br>(operating - non-condensing) | Temperature                    | 41° to 122° F (5° to 50° C)                                                   |          |
|                                                                 | Relative Humidity              | 10% to 80%                                                                    |          |
|                                                                 | Maximum Wet Bulb Temperature   | 84° F (29° C)                                                                 |          |

### HP Slim DVD-ROM Drive

|                               |                                                         |          |  |
|-------------------------------|---------------------------------------------------------|----------|--|
| <b>Height</b>                 | 12.7mm                                                  |          |  |
| <b>Orientation</b>            | Either horizontal or vertical                           |          |  |
| <b>Interface type</b>         | SATA/ATAPI                                              |          |  |
| <b>Dimensions</b> (W x H x D) | 5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel |          |  |
| <b>Weight</b> (max)           | Up to 0.37 lb (170 g) without bezel                     |          |  |
| <b>Read speeds</b>            | DVD+R/-R/+RW/-RW/+R DL /-R DL                           | Up to 8X |  |
|                               | DVD-ROM                                                 | Up to 8X |  |



### Technical Specifications – Memory

|                                                           |                                          |                                                     |
|-----------------------------------------------------------|------------------------------------------|-----------------------------------------------------|
|                                                           | CD-ROM, CD-R                             | Up to 24X                                           |
|                                                           | CD-RW                                    | Up to 24X                                           |
| <b>Access time</b><br>(typical reads, including settling) | Random                                   | DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) |
|                                                           | Full Stroke                              | DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) |
| <b>Power</b>                                              | Source                                   | Slimline SATA DC power receptacle                   |
|                                                           | DC Power Requirement                     | 5 VDC $\pm$ 5%-100 mV ripple p-p                    |
|                                                           | DC Current                               | 5 VDC - <1000 mA typical, < 1600 mA maximum         |
| <b>Environmental</b> (all conditions non-condensing)      | Temperature                              | 41° to 122° F (5° to 50° C)                         |
|                                                           | Relative Humidity                        | 10% to 80%                                          |
|                                                           | Maximum Wet Bulb Temperature (operating) | 84° F (29° C)                                       |

### System Memory Support

The HP EliteDesk 800 G1 Business PC supports the 4<sup>th</sup> generation Intel® Core™ processor family. Based on a new PC micro-architecture, the processor is designed for a two-chip platform consisting of a processor and Platform Controller Hub (PCH). Unlike previous generations, the 4<sup>th</sup> generation Intel® Core™ processor includes an Integrated Memory Controller (IMC). The IMC supports DDR3/DDR3L protocols with two independent, 64-bit wide channels each accessing one or two DIMMs.

- Two channels of non-ECC DDR3/DDR3L unbuffered dual in-line memory modules (UDIMM) or DDR3/DDR3L unbuffered small outline dual in-line memory modules (SO-DIMM) with a maximum of two DIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- Memory data transfer rates of up to 1600 MT/s; actual supported data transfer rate determined by the configured processor.
- 64-bit wide channels
- DDR3/DDR3L system memory I/O voltage of 1.5V
- Theoretical maximum memory bandwidth of:
  - 21.3 GB/s in dual-channel mode assuming 1333 MT/s
  - 25.6 GB/s in dual-channel mode assuming 1600 MT/s

### Platform Memory Support

- The Small Form Factor (SFF) and Tower (TWR) platforms support up to four (4) industry-standard DDR3-SDRAM DIMMs.
- The Ultra-slim Desktop (USDT) and Desktop Mini (DM) support up to two (2) industry-standard DDR3-SDRAM SO-DIMMs.

**CAUTION:** You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

### Technical Specifications – Memory

**NOTE:** For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

### Technical Specifications – Networking and Communications

#### NETWORKING AND COMMUNICATIONS

| HP WLAN 802.11 a/b/g/n 2x2 Dual Band PCIe x1 WLAN/Bluetooth Card |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                       |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Wireless LAN Standards                                           | IEEE 802.11a/b/g/n                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                       |
| Interoperability                                                 | Wi-Fi certification                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                       |
|                                                                  | BQE certification of the Bluetooth component                                                                                                                                                                                                                                                                                                                                               |                                                                                                       |
|                                                                  | CCXv1, v2, v3, v4, v5 CCX certified (Cisco Client Extensions)                                                                                                                                                                                                                                                                                                                              |                                                                                                       |
|                                                                  | <b>NOTE:</b> 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.                                                                           |                                                                                                       |
| Frequency Band                                                   | 802.11b/g/n                                                                                                                                                                                                                                                                                                                                                                                | 2.402-2.482 GHz                                                                                       |
|                                                                  | 802.11a/n                                                                                                                                                                                                                                                                                                                                                                                  | 4.9 - 4.95 GHz (Japan)<br>5.15 - 5.25 GHz<br>5.25 - 5.35 GHz<br>5.47 - 5.725 GHz<br>5.825 - 5.850 GHz |
| Antenna Structure                                                | 2 transmit; 2 receive (2x2)<br>Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications.                                                                                                                                                                                                                        |                                                                                                       |
| Data Rates                                                       | <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: 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.</li> </ul>                                            |                                                                                                       |
| Security                                                         | <ul style="list-style-type: none"> <li>IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>AES-CCMP: 128 bit in hardware</li> <li>802.1x authentication</li> <li>WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>WPA2 certification</li> <li>IEEE 802.11i</li> <li>Cisco Certified Extensions, all versions through V5</li> <li>WAPI</li> </ul> |                                                                                                       |
|                                                                  | <b>NOTE:</b> Check latest software/driver release for updates on supported security features.                                                                                                                                                                                                                                                                                              |                                                                                                       |
| Roaming                                                          | IEEE 802.11 compliant roaming between band Access Points                                                                                                                                                                                                                                                                                                                                   |                                                                                                       |
| Output Power                                                     | <ul style="list-style-type: none"> <li>+13.5 dBm minimum</li> <li>Maximum output power must be able to achieve modular regulatory certification peak gain of +3dBi at 2.4GHz and +5dBi at 5GHz</li> </ul>                                                                                                                                                                                  |                                                                                                       |

### Technical Specifications – Networking and Communications

|                                    |                                                                                                                                                                                                    |             |                            |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------|
|                                    | <b>NOTE:</b> Maximum output power may vary by country according to local regulations.                                                                                                              |             |                            |
| <b>Power Consumption</b>           | Transmit: 2.0 Watts                                                                                                                                                                                |             |                            |
|                                    | Receive: 1.6 Watts                                                                                                                                                                                 |             |                            |
|                                    | Idle mode: 250 mW (WLAN associated)                                                                                                                                                                |             |                            |
|                                    | Idle mode: 100 mW (WLAN unassociated)                                                                                                                                                              |             |                            |
|                                    | Radio off: 75 mW (WLAN unassociated)                                                                                                                                                               |             |                            |
| <b>Bluetooth Power Consumption</b> | Peak operating: 330 mW                                                                                                                                                                             |             |                            |
|                                    | Receive: 230 mW                                                                                                                                                                                    |             |                            |
|                                    | USB selective suspend: 17 mW                                                                                                                                                                       |             |                            |
| <b>Power Management</b>            | ACPI and PCI Express bus compliant power management<br>802.11 compliant power saving mode<br>Supports USB selective suspend and resume of the Bluetooth component through the USB control signals. |             |                            |
| <b>Receiver Sensitivity</b>        | 802.11b                                                                                                                                                                                            |             |                            |
|                                    | Sensitivity (dBm)                                                                                                                                                                                  | Rate (Mbps) | Modulation and Coding Rate |
|                                    | -95                                                                                                                                                                                                | 1           | BPSK                       |
|                                    | -93                                                                                                                                                                                                | 2           | QPSK                       |
|                                    | -91                                                                                                                                                                                                | 5.5         | CCK                        |
|                                    | -88                                                                                                                                                                                                | 11          | CCK                        |
|                                    |                                                                                                                                                                                                    |             |                            |
| <b>Receiver Sensitivity</b>        | 802.11a/g                                                                                                                                                                                          |             |                            |
|                                    | Sensitivity (dBm)                                                                                                                                                                                  | Rate (Mbps) | Modulation and Coding Rate |
|                                    | -90                                                                                                                                                                                                | 6           | BPSK – 1/2                 |
|                                    | -89                                                                                                                                                                                                | 9           | BPSK – 3/4                 |
|                                    | -87                                                                                                                                                                                                | 12          | QPSK – 1/2                 |
|                                    | -85                                                                                                                                                                                                | 18          | QPSK – 3/4                 |
|                                    | -82                                                                                                                                                                                                | 24          | 16 QAM – 1/2               |
|                                    | -79                                                                                                                                                                                                | 36          | 16 QAM – 3/4               |
|                                    | -76                                                                                                                                                                                                | 48          | 64 QAM – 2/3               |
|                                    | -74                                                                                                                                                                                                | 54          | 64 QAM – 3/4               |
|                                    |                                                                                                                                                                                                    |             |                            |
|                                    |                                                                                                                                                                                                    |             |                            |
| <b>Receiver Sensitivity</b>        | 802.11n                                                                                                                                                                                            |             |                            |
|                                    | Sensitivity (dBm)                                                                                                                                                                                  | Rate (Mbps) | Modulation and Coding Rate |
|                                    | -69                                                                                                                                                                                                | 150         | 64 QAM – 5/6               |
|                                    | -66                                                                                                                                                                                                | 300         | 64 QAM – 5/6               |
|                                    |                                                                                                                                                                                                    |             |                            |
| <b>Form Factors</b>                | PCI-Express Half-MiniCard                                                                                                                                                                          |             |                            |
| <b>Weight</b>                      | 0.1133 oz (3.212 g)                                                                                                                                                                                |             |                            |

### Technical Specifications – Networking and Communications

|                          |                                                   |                                                                 |
|--------------------------|---------------------------------------------------|-----------------------------------------------------------------|
| <b>Dimensions</b>        | 1.04 x 1.17 x 0.042 in (26.65 x 29.85 x 1.067 mm) |                                                                 |
| <b>Operating Voltage</b> | 3.3V +/- 9%                                       |                                                                 |
| <b>Temperature</b>       | <b>Operating:</b><br><b>Non-operating:</b>        | 14° to 158° F (-10° to 70° C)<br>-40° to 176° F (-40° to 80° C) |
| <b>Humidity</b>          | <b>Operating:</b><br><b>Non-operating:</b>        | 10% to 90% (non-condensing)<br>5% to 95% (non-condensing)       |
| <b>Altitude</b>          | <b>Operating:</b><br><b>Non-operating:</b>        | 0 to 10,000 ft (3,048 m)<br>0 to 50,000 ft (15,240 m)           |

| HP WLAN 802.11a/b/g/n Wireless 2x2 Dual-Band Minicard with Bluetooth Combo* |                                                                                                                                                               |                          |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Dimensions (L x H)</b>                                                   | 1.18 x 1.06 in (30 x 26.8 mm)                                                                                                                                 |                          |
| <b>Chipset</b>                                                              | Atheros AR9462                                                                                                                                                |                          |
| <b>System interface</b>                                                     | PCI-Express Mini Card                                                                                                                                         |                          |
| <b>Network standard</b>                                                     | 802.11 a/b/g/n                                                                                                                                                |                          |
| <b>Frequency band</b>                                                       | Bluetooth: 2.402 - 2.480 GHz                                                                                                                                  |                          |
|                                                                             | Wi-Fi:<br>802.11a/n – 4.9 – 4.95 GHz (Japan), 5.15 – 5.25 GHz, 5.25 – 5.35 GHz, 5.47 – 5.725 GHz,<br>5.825 – 5.850 GHz                                        |                          |
|                                                                             | 802.11b/g/n 2.402-2.482 GHz                                                                                                                                   |                          |
| <b>Bluetooth</b>                                                            | The WLAN + Bluetooth Combo Mini Card meets all of the requirements to support Bluetooth 4.0 and is backwards compatible with 2.1 with EDR and 3.0 High speed. |                          |
| <b>Operating temperature</b>                                                | 14° to 158°F, operating (-10° to 70°C, operating)                                                                                                             |                          |
| <b>Storage temperature</b>                                                  | -40° to 176°F, non-operating (-40° to 80°C, non-operating)                                                                                                    |                          |
| <b>Humidity</b>                                                             | 10-90% operating<br>5-95% non-operating                                                                                                                       |                          |
| <b>Operating voltage</b>                                                    | 3.3 V ±9% I/O supply voltage                                                                                                                                  |                          |
| <b>Power Consumption</b>                                                    | <b>Platform/WLAN Mode</b>                                                                                                                                     | <b>Power Consumption</b> |
|                                                                             | <b>Wi-Fi</b>                                                                                                                                                  |                          |
|                                                                             | Transmit Mode                                                                                                                                                 | 2 W                      |

### Technical Specifications – Networking and Communications

|                                                                                                                                |                                                                         |                        |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------|
|                                                                                                                                | Receive Mode                                                            | 1.6 W                  |
|                                                                                                                                | Idle mode (PSP)<br>(WLAN Associated)                                    | 250mW                  |
|                                                                                                                                | Idle mode<br>(WLAN unassociated)                                        | 100mW                  |
|                                                                                                                                | Radio disabled                                                          | 75mW                   |
|                                                                                                                                | Bluetooth                                                               |                        |
|                                                                                                                                | Peak Operating                                                          | 330 mW                 |
|                                                                                                                                | Receive                                                                 | 230 mW                 |
|                                                                                                                                | USB Selective Suspend                                                   | 17 mW                  |
|                                                                                                                                | Output Power                                                            | 2.4G: +13.5dBm minimum |
| 5G: +12dBm minimum                                                                                                             |                                                                         |                        |
| Security                                                                                                                       | IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only |                        |
|                                                                                                                                | 802.1x authentication                                                   |                        |
|                                                                                                                                | WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES                     |                        |
|                                                                                                                                | IEEE 802.11i                                                            |                        |
|                                                                                                                                | Cisco Certified Extensions, all versions through V5                     |                        |
|                                                                                                                                | WAPI                                                                    |                        |
| Antenna                                                                                                                        | Dual antenna connectors                                                 |                        |
| * Wireless access point and Internet service required and not included. Availability of public wireless access points limited. |                                                                         |                        |

### Intel® 7260 802.11ac PCIe x1 BT

|                               |                                                                               |
|-------------------------------|-------------------------------------------------------------------------------|
| <b>Wireless LAN Standards</b> | IEEE 802.11a<br>IEEE 802.11b<br>IEEE 802.11g<br>IEEE 802.11n<br>IEEE 802.11ac |
| <b>Interoperability</b>       | Wi-Fi certified                                                               |

### Technical Specifications – Networking and Communications

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency Band</b>              | <p>802.11b/g/n</p> <ul style="list-style-type: none"> <li>2.402 – 2.482 GHz</li> </ul> <p><b>NOTE:</b><br/>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.</p> <p>802.11a/n</p> <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> <p><b>NOTE:</b> Indonesia no support this band)</p> |
| <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>                  | <p>Direct Sequence Spread Spectrum</p> <p>BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Security<sup>1</sup></b>        | <ul style="list-style-type: none"> <li>IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>AES-CCMP: 128 bit in hardware</li> <li>802.1x authentication</li> <li>WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>WPA2 certification</li> <li>IEEE 802.11i</li> <li>Cisco Certified Extensions, all versions through CCX4 and CCX Lite</li> <li>WAPI</li> </ul>                                                                                                                                                                                 |
| <b>Network Architecture Models</b> | <p>Ad-hoc (Peer to Peer)</p> <p>Infrastructure (Access Point Required)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <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>           | <p>Transmit: 2.0 W (max)</p> <p>Receive: 1.6 W (max)</p> <p>Idle mode (PSP): 180 mW (WLAN Associated)</p> <p>Idle mode: 60 mW (WLAN unassociated)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### Technical Specifications – Networking and Communications

|                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
|                                                                                                                                                                                                                                                                                                                                     | Radio disabled: 30 mW                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                |
| Power Management                                                                                                                                                                                                                                                                                                                    | ACPI and PCI Express compliant power management<br>802.11 compliant power saving mode                                                                                                                                                                                                                                                                                                                                                                       |                                |
| Receiver Sensitivity <sup>3</sup>                                                                                                                                                                                                                                                                                                   | 802.11b, 1Mbps : -94dBm maximum<br>802.11b, 11Mbps : -86dBm maximum<br>802.11g, 6Mbps : -88dBm maximum<br>802.11g, 54Mbps : -74dBm maximum<br>802.11a, 6Mbps : -86dBm maximum<br>802.11a, 54Mbps : -72dBm maximum<br>802.11n, MCS07 : -69dBm maximum<br>802.11n, MCS15 : -66dBm maximum<br>802.11ac, 1SS, MCS-0 : -86dBm maximum<br>802.11ac, 1SS, MCS-9 : -61dBm maximum<br>802.11ac, 2SS, MCS-0 : -83dBm maximum<br>802.11ac, 2SS, MCS-9 : -58dBm maximum |                                |
| Antenna type                                                                                                                                                                                                                                                                                                                        | High efficiency antenna with spatial diversity, mounted in the display enclosure<br>Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications                                                                                                                                                                                                                                     |                                |
| Form Factor                                                                                                                                                                                                                                                                                                                         | PCI-Express M.2 MiniCard                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |
| Dimensions                                                                                                                                                                                                                                                                                                                          | Type 2230 : 2.3 x 22.0 x 30.0 mm<br>Or<br>Type 1630 : 2.3 x 16.0 x 30.0 mm                                                                                                                                                                                                                                                                                                                                                                                  |                                |
| Weight                                                                                                                                                                                                                                                                                                                              | Type 2230 : 2.8g<br>Or<br>Type 1630 : 2g                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |
| Operating Voltage                                                                                                                                                                                                                                                                                                                   | 3.3v +/- 9%                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |
| Temperature                                                                                                                                                                                                                                                                                                                         | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 14° to 158° F (–10° to 70° C)  |
|                                                                                                                                                                                                                                                                                                                                     | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                               | –40° to 176° F (–40° to 80° C) |
| Humidity                                                                                                                                                                                                                                                                                                                            | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10% to 90% (non-condensing)    |
|                                                                                                                                                                                                                                                                                                                                     | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5% to 95% (non-condensing)     |
| Altitude                                                                                                                                                                                                                                                                                                                            | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0 to 10,000 ft (3,048 m)       |
|                                                                                                                                                                                                                                                                                                                                     | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0 to 50,000 ft (15,240 m)      |
| LED Activity                                                                                                                                                                                                                                                                                                                        | LED Amber – Radio OFF; LED White – Radio ON                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |
| 1. Check latest software/driver release for updates on supported security features.<br>2. Maximum output power may vary by country according to local regulations.<br>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). |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                |

|                                                          |                                     |
|----------------------------------------------------------|-------------------------------------|
| <b>Wireless LAN</b>                                      |                                     |
|                                                          | Intel 7260 802.11 a/b/g/nM.2 BT NIC |
| <b>Intel® I217LM GbE Network Connection (integrated)</b> |                                     |
| <b>Connector</b>                                         | RJ-45                               |
| <b>System Interface</b>                                  | Integrated on PCA                   |



### Technical Specifications – Networking and Communications

|                              |                                                                                                                           |             |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Controller</b>            | Intel I217LM GbE platform LAN connect networking controller                                                               |             |
| <b>Memory</b>                | 24 KB FIFO packet buffer memory                                                                                           |             |
| <b>Data rates supported</b>  | 10/100/1000 Mbps                                                                                                          |             |
| <b>IEEE Compliance</b>       | 802.1P<br>802.1Q<br>802.2<br>802.3<br>802.3ab<br>802.3az<br>802.3u                                                        |             |
| <b>Bus architecture</b>      | PCI Express and SMBus                                                                                                     |             |
| <b>Data transfer mode</b>    | PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state) |             |
| <b>Power requirement</b>     | Requires 3.3V and 0.9V or just 3.3V with integrated regulators<br>Power consumption 0.733 Watts                           |             |
| <b>Boot ROM support</b>      | Yes                                                                                                                       |             |
| <b>Network transfer mode</b> | Full-duplex                                                                                                               |             |
|                              | Half-duplex (not supported for the 1000BASE-T transceiver)                                                                |             |
| <b>Network transfer rate</b> | 10BASE-T (half-duplex) 10 Mbps                                                                                            |             |
|                              | 10BASE-T (full-duplex) 20 Mbps                                                                                            |             |
|                              | 100BASE-TX (half-duplex) 100 Mbps                                                                                         |             |
|                              | 100BASE-TX (full-duplex) 200 Mbps                                                                                         |             |
|                              | 1000BASE-T (full-duplex) 2000 Mbps                                                                                        |             |
| <b>Environmental</b>         | Operating Temperature:                                                                                                    | 0° to 85° C |
|                              | Operating Humidity:                                                                                                       | 60% RH      |
| <b>Management</b>            | WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostic, WFM 2.0                                 |             |
| <b>Alerting</b>              | ASF 2.0 support; AMT 9.0 support                                                                                          |             |

### Intel® Ethernet I210-T1 Gigabit Network Adapter

### Technical Specifications – Networking and Communications

|                                |                                                                                        |                             |
|--------------------------------|----------------------------------------------------------------------------------------|-----------------------------|
| <b>Connector</b>               | RJ-45                                                                                  |                             |
| <b>System Interface</b>        | PCI Express x1                                                                         |                             |
| <b>Controller</b>              | Intel® I210 Gigabit Ethernet Controller                                                |                             |
| <b>Memory</b>                  | Integrated Dual 48K configurable transmit receive FIFO Buffers                         |                             |
| <b>Data rates supported</b>    | 10/100/1000 Mbps                                                                       |                             |
| <b>IEEE Compliance</b>         | 802.1P<br>802.1Q<br>802.2<br>802.3<br>802.3AB<br>802.3u<br>802.3x flow control         |                             |
| <b>Bus architecture</b>        | PCI-E 2.1                                                                              |                             |
| <b>Data path width</b>         | X1, 250 MB/s, Bi-directional interface                                                 |                             |
| <b>Data transfer mode</b>      | Bus-master DMA                                                                         |                             |
| <b>Hardware certifications</b> | FCC, B, CE, TUV-c, TUVus Mark Canada and United States, TUV-GS Mark for European Union |                             |
| <b>Power requirement</b>       | Aux 3.3 V, 3.0 Watts in 1000 base-T and 1.0 Watts in 100 Base-T                        |                             |
| <b>Boot ROM support</b>        | Yes<br>10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps                |                             |
| <b>Network transfer rate</b>   | 10BASE-T (half-duplex) 10 Mbps                                                         |                             |
|                                | 10BASE-T (full-duplex) 20 Mbps                                                         |                             |
|                                | 100BASE-TX (half-duplex) 100 Mbps                                                      |                             |
|                                | 100BASE-TX (full-duplex) 200 Mbps                                                      |                             |
|                                | 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI bus)                    |                             |
| <b>Environmental</b>           | Operating Temperature:                                                                 | 32° to 132° F (0° to 55° C) |
|                                | Operating Humidity:                                                                    | 85% at 131° F (55° C)       |
| <b>Management</b>              | WOL, PXE, DMI, WFM 2.0                                                                 |                             |

### Technical Specifications – Networking and Communications

| <b>Intel Centrino Advance-N 6205 Wireless Network Interface Connection</b> |                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wireless LAN Standards</b>                                              | IEEE 802.11a/b/g/n                                                                                                                                                                                                                           |
|                                                                            | IEEE 802.11 e, 802.11i, 802.11d, 802.11d, 802.11h                                                                                                                                                                                            |
| <b>Interoperability</b>                                                    | Wi-Fi certified (802.11 a/b/g/n WMM, WPA, WPA2 and WPS)                                                                                                                                                                                      |
|                                                                            | Tested with wireless access points from several major manufacturers                                                                                                                                                                          |
|                                                                            | OS compatible with Microsoft Windows, Win7 and XP                                                                                                                                                                                            |
|                                                                            | Cisco Compatible Extensions Program compliant (802.11a/b/g only) with Microsoft Windows XP and Windows 7                                                                                                                                     |
| <b>Frequency Band</b>                                                      | 2.4 GHz and 5 GHz                                                                                                                                                                                                                            |
| <b>Antenna Structure</b>                                                   | 2 transmit; 2 receive (2x2)                                                                                                                                                                                                                  |
| <b>Data Rates</b>                                                          | 802.11b: 1, 2, 5.5, 11 Mbps                                                                                                                                                                                                                  |
|                                                                            | 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps                                                                                                                                                                                                 |
|                                                                            | 802.11n: 66 possible data rates, ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification                                     |
| <b>Modulation</b>                                                          | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM                                                                                                                                                       |
| <b>Security</b>                                                            | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128bits), TKIP, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP, MSCHAP, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM, EAP-AKA PAP, CHAP, TLS, GTC |
|                                                                            | Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows XP only.                                              |
| <b>Sub-channels</b>                                                        | Multinational support with frequency bands and channels compliant to local regulations.                                                                                                                                                      |
| <b>Media Access Protocol</b>                                               | CSMA/CA (Collision Avoidance) with ACK                                                                                                                                                                                                       |
| <b>Network Architecture Models</b>                                         | Ad-hoc (Peer to Peer)<br>Infrastructure (Access Point Required)<br>Intel® My Wifi Technology (iPAN)                                                                                                                                          |
| <b>Roaming</b>                                                             | Provide seamless roaming between like access points (same frequency band)                                                                                                                                                                    |
| <b>Output Power (for CCK)</b>                                              | 15 dBm                                                                                                                                                                                                                                       |
| <b>Output Power (for OFDM; power varies by data rate)</b>                  | 15 dBm                                                                                                                                                                                                                                       |
| <b>Power Consumption</b>                                                   | Transmit: 2.3 Watts (average, with one spatial streams)                                                                                                                                                                                      |

### Technical Specifications – Networking and Communications

|                              |                                                                                                                                                                                                              |                                                                                |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|                              | Receive: 1.9 Watts (average with two receive chains)                                                                                                                                                         |                                                                                |
|                              | Idle mode: 30mW – 40mW (average)                                                                                                                                                                             |                                                                                |
|                              | Radio off: 20 mW (max)                                                                                                                                                                                       |                                                                                |
| <b>Power Management</b>      | ACPI compliant power management<br>802.11 compliant power saving mode                                                                                                                                        |                                                                                |
| <b>Antenna Connections</b>   | 3 U.FL type connectors, 50 ohm nominal impedance                                                                                                                                                             |                                                                                |
| <b>Range</b>                 | 802.11 a - Typical (@6 Mbps)                                                                                                                                                                                 | 600 feet - Outdoor Open Area<br>150 feet - Indoor, Office environment          |
|                              | 802.11 b - Typical (@1 Mbps)                                                                                                                                                                                 | 1200 feet - Outdoor Open Area<br>300 feet - Indoor, Office environment         |
|                              | 802.11 g - Typical (@1 Mbps)                                                                                                                                                                                 | 1200 feet - Outdoor Open Area<br>300 feet - Indoor, Office environment         |
| <b>Form Factors</b>          | USDT:                                                                                                                                                                                                        | MiniPCI-Express                                                                |
|                              | CMIT & SFF:                                                                                                                                                                                                  | PCIe                                                                           |
| <b>Weight</b>                | 0.013 lb (4.0 g)                                                                                                                                                                                             |                                                                                |
| <b>Dimensions</b>            | 1.1 x 1.2 in (26.8 x 30.0 mm)                                                                                                                                                                                |                                                                                |
| <b>Operating Voltage</b>     | 3.3V +/- 9%, 1.5V +/- 5%                                                                                                                                                                                     |                                                                                |
| <b>Temperature</b>           | <b>Operating:</b>                                                                                                                                                                                            | 32° to 176° F (0° to 80° C)                                                    |
|                              | <b>Non-operating:</b>                                                                                                                                                                                        | -40° to 176° F (-40° to 80° C)                                                 |
| <b>Humidity</b>              | <b>Operating:</b>                                                                                                                                                                                            | 10% to 90% (non-condensing)                                                    |
|                              | <b>Non-operating:</b>                                                                                                                                                                                        | 5% to 90% (non-condensing)                                                     |
|                              | Microsoft Windows XP                                                                                                                                                                                         | Microsoft Windows Win 7                                                        |
| <b>Configuration Utility</b> | <ul style="list-style-type: none"> <li>Microsoft Windows XP Wireless Network Connection Manager</li> <li>Intel PROSet for Microsoft Windows XP (required for Cisco Compatible Extensions support)</li> </ul> | Intel IHV extensions for Win7 available to support Cisco Compatible Extensions |

### Technical Specifications - Audio

#### AUDIO

| High Definition Audio      |                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                       | Integrated                                                                                                                                                                                                                                                                                                                                                                           |
| HD Stereo Codec            | Realtek 2-channel ALC221 codec                                                                                                                                                                                                                                                                                                                                                       |
| Audio I/O Ports            | Front microphone-In (150-K ohm Input Impedance)                                                                                                                                                                                                                                                                                                                                      |
|                            | Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver)                                                                                                                                                                                                                                                                                  |
|                            | Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load)                                                                                                                                                                                                                                                                                                         |
|                            | Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load)<br>Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. |
|                            | All ports are 3.5mm                                                                                                                                                                                                                                                                                                                                                                  |
| Internal Speaker Amplifier | 1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.                                                                                                                                                                                                               |
| Multi-streaming Capable    | Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.                                                                                                                                                                                                                                          |
| Sampling                   | 8 kHz - 192 kHz                                                                                                                                                                                                                                                                                                                                                                      |
| Wavetable Syntheses        | Yes – Uses OS soft wavetable                                                                                                                                                                                                                                                                                                                                                         |
| Analog Audio               | Yes                                                                                                                                                                                                                                                                                                                                                                                  |
| # of Channels on Line-Out  | Stereo (Left & Right channels)                                                                                                                                                                                                                                                                                                                                                       |
| Internal Speaker           | Yes                                                                                                                                                                                                                                                                                                                                                                                  |
| External Speaker Jack      | Yes                                                                                                                                                                                                                                                                                                                                                                                  |

### Technical Specifications - Input/Output Devices

#### INPUT/OUTPUT DEVICES

| HP USB Keyboard          |                           |                                                         |
|--------------------------|---------------------------|---------------------------------------------------------|
| Physical characteristics | Keys                      | 104, 105, 106, 107, 109 layout (depending upon country) |
|                          | Dimensions (L x W x H)    | 18.12 x 6.47 x 0.96 in (46.03 x 16.43 x 2.44 cm)        |
|                          | Weight                    | 2 lb (0.9 kg)                                           |
| Electrical               | Operating voltage         | + 5VDC $\pm$ 5%                                         |
|                          | Power consumption         | 50-mA maximum (with three LEDs ON)                      |
|                          | System interface          | USB Type A plug connector                               |
|                          | ESD                       | CE level 4, 15-kV air discharge                         |
|                          | EMI - RFI                 | Conforms to FCC rules for a Class B computing device    |
|                          | Microsoft® PC 99 - 2001   | Functionally compliant                                  |
| Mechanical               | Keycaps                   | Low-profile design                                      |
|                          | Switch actuation          | 55-g nominal peak force with tactile feedback           |
|                          | Switch life               | 20 million keystrokes (using Hasco modified tester)     |
|                          | Switch type               | Contamination-resistant switch membrane                 |
|                          | Key-leveling mechanisms   | For all double-wide and greater-length keys             |
|                          | Cable length              | 6 ft (1.8 m)                                            |
|                          | Microsoft PC 99 - 2001    | Mechanically compliant                                  |
| Environmental            | Acoustics                 | 43-dBA maximum sound pressure level                     |
|                          | Operating temperature     | 50° to 122° F (10° to 50° C)                            |
|                          | Non-operating temperature | -22° to 140° F (-30° to 60° C)                          |
|                          | Operating humidity        | 10% to 90% (non-condensing at ambient)                  |
|                          | Non-operating humidity    | 20% to 80% (non-condensing at ambient)                  |
|                          | Operating shock           | 40 g, six surfaces                                      |

### Technical Specifications - Input/Output Devices

|                             |                                                            |                                               |
|-----------------------------|------------------------------------------------------------|-----------------------------------------------|
|                             | Non-operating shock                                        | 80 g, six surfaces                            |
|                             | Operating vibration                                        | 2-g peak acceleration                         |
|                             | Non-operating vibration                                    | 4-g peak acceleration                         |
|                             | Drop (out of box)                                          | 26 in (66 cm) on carpet, six-drop sequence    |
|                             | Drop (in box)                                              | 30 in (76.2 cm) on concrete, 16-drop sequence |
| <b>Approvals</b>            | UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, KC |                                               |
| <b>Ergonomic compliance</b> | ANSI HFS 100, ISO 9241-4, and TUVGS                        |                                               |
| <b>Kit contents</b>         | Keyboard                                                   | Installation Guide                            |
|                             | Warranty Card                                              | Safety and Comfort Guide                      |

### HP PS/2 Keyboard

|                                 |                         |                                                         |
|---------------------------------|-------------------------|---------------------------------------------------------|
| <b>Physical Characteristics</b> | Keys                    | 104, 105, 106, 107, 109 layout (depending upon country) |
|                                 | Dimensions (L x W x H)  | 18.22 x 6.47 x 1.1 in (46.28 x 16.43 x 2.79 cm)         |
|                                 | Weight                  | 2 lb (0.9 kg) minimum                                   |
| <b>Electrical</b>               | Operating voltage       | + 5VDC $\pm$ 10%                                        |
|                                 | Power consumption       | 50-mA maximum (with three LEDs ON)                      |
|                                 | System interface        | PS/2 6-pin mini din connector                           |
|                                 | ESD                     | CE level 4, 15-kV air discharge                         |
|                                 | EMI - RFI               | Conforms to FCC rules for a Class B computing device    |
|                                 | Microsoft PC 99 - 2001  | Functionally compliant                                  |
|                                 | Keycaps                 | Low-profile design                                      |
|                                 | Switch actuation        | 55-g nominal peak force with tactile feedback           |
|                                 | Switch life             | 20 million keystrokes (using Hasco modified tester)     |
|                                 | Switch type             | Contamination-resistant switch membrane                 |
|                                 | Key-leveling mechanisms | For all double-wide and greater-length keys             |

### Technical Specifications - Input/Output Devices

|                             |                                                                     |                                                                                                                                         |
|-----------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                             | Cable length                                                        | 6 ft (1.8 m)                                                                                                                            |
|                             | Microsoft PC 99 - 2001                                              | Mechanically compliant                                                                                                                  |
| <b>Environmental</b>        | Acoustics                                                           | 50-dBA maximum sound pressure level                                                                                                     |
|                             | Operating temperature                                               | 32° to 104° F (0° to 40° C)                                                                                                             |
|                             | Non-operating temperature                                           | -22° to 149° F (-30° to 65° C)                                                                                                          |
|                             | Operating humidity                                                  | 15% to 80% (non-condensing at ambient)                                                                                                  |
|                             | Non-operating humidity                                              | 15% to 90% (non-condensing at ambient)                                                                                                  |
|                             | Operating shock                                                     | N/A                                                                                                                                     |
|                             | Non-operating shock                                                 | 65 inch 2.9 ms, six surface; 30g 266 inch/second; 50g 266 inch/second six surface                                                       |
|                             | Operating vibration                                                 | 2-g peak acceleration                                                                                                                   |
|                             | Non-operating vibration                                             | Starting at 5 Hz, vary the frequency of vibration from 5 to 500 Hz and back to 5 Hz at a Logarithmic sweep rate of 1 octave per minute. |
|                             | Drop (out of box)                                                   | 26 in (66 cm) on carpet, six-drop sequence                                                                                              |
|                             | Drop (in box)                                                       | 29.93 in (76 cm) on concrete, 16-drop sequence                                                                                          |
| <b>Approvals</b>            | CUL, ICES-003 Class B, FCC, CE Mark, TUV GS, VCCI, BSMI, C-Tick, KC |                                                                                                                                         |
| <b>Ergonomic compliance</b> | ANSI HFS 100, ISO 9241-4, and TUVGS                                 |                                                                                                                                         |

### HP USB Smart Card (CCID) Keyboard

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Key Benefits:</b> | <ul style="list-style-type: none"> <li>Protects against unauthorized access with smart card technology</li> <li>Delivers even greater security when combined with a HP Client Security smart card and the HP Client Security Security Software</li> <li>Combination of username and password or pin with a smart card or security token</li> <li>Secures online transactions using digital signatures and certificates</li> <li>Conforms to industry standards for ease of setup and use</li> <li>Delivers long product life and quiet operation with high-impact materials and lubricated keys</li> <li>Spill drain feature</li> </ul> |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



### Technical Specifications - Input/Output Devices

|                                 |                           |                                                         |
|---------------------------------|---------------------------|---------------------------------------------------------|
| <b>Physical Characteristics</b> | Keys                      | 104, 105, 106, 107, 109 layout (depending upon country) |
|                                 | Form factor               | USB basic smart card keyboard                           |
|                                 | Colors                    | Carbonite/Silver                                        |
|                                 | Dimensions (H x W x D)    | 18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)              |
|                                 | Weight                    | 2 lb (0.9 kg) minimum                                   |
| <b>Electrical</b>               | Operating voltage         | + 5VDC $\pm$ 5%                                         |
|                                 | Power consumption         | 100-mA maximum (with four LEDs ON)                      |
|                                 | System interface          | USB Type A plug connector                               |
|                                 | ESD                       | CE level 4, 15-kV air discharge                         |
|                                 | EMI - RFI                 | Conforms to FCC rules for a Class B computing device    |
|                                 | Microsoft PC 99 - 2001    | Functionally compliant                                  |
| <b>Mechanical</b>               | Languages                 | 30+ available                                           |
|                                 | Keycaps                   | Standard design                                         |
|                                 | Switch actuation          | 55 g nominal peak force with tactile feedback           |
|                                 | Switch life               | 20 million keystrokes (using Hasco modified tester)     |
|                                 | Switch type               | Contamination-resistant membrane                        |
|                                 | Key-leveling mechanisms   | For all double-wide and greater-length keys             |
|                                 | Cable length              | 6 ft (1.8 m)                                            |
|                                 | Microsoft PC 99 - 2001    | Mechanically compliant                                  |
| <b>Environmental</b>            | Acoustics                 | 43-dBA maximum sound pressure level                     |
|                                 | Operating temperature     | 50° to 122° F (10° to 50° C)                            |
|                                 | Non-operating temperature | -22° to 140° F (-30° to 60° C)                          |
|                                 | Operating humidity        | 10% to 90% (non-condensing at ambient)                  |
|                                 | Non-operating humidity    | 20% to 80% (non-condensing at ambient)                  |

### Technical Specifications - Input/Output Devices

|                           |                              |                                                                                                  |                                |
|---------------------------|------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------|
|                           | Operating shock              | 40 g, six surfaces                                                                               |                                |
|                           | Non-operating shock          | 80 g, six surfaces                                                                               |                                |
|                           | Operating vibration          | 2-g peak acceleration                                                                            |                                |
|                           | Non-operating vibration      | 4-g peak acceleration                                                                            |                                |
|                           | Drop (out of box)            | 26 in (66 cm) on carpet, six-drop sequence                                                       |                                |
|                           | Drop (in box)                | 42 in (107 cm) on concrete, 16-drop sequence                                                     |                                |
| <b>SmartCard Function</b> | Support                      | All ISO 7816 smart cards                                                                         |                                |
|                           | Interface                    | Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1) |                                |
|                           | Chipset                      | SCM STCII                                                                                        |                                |
|                           | Standard APIs supported      | PC/SC, EMV2000, SET                                                                              |                                |
|                           | Power                        | USB Port                                                                                         |                                |
|                           |                              | Short circuit detection (protects smart card and reader)                                         |                                |
|                           |                              | Power supply compliant with ISO7816 and EMV (5V, 60 mA)                                          |                                |
|                           |                              | Supports 3-V and 5-V cards                                                                       |                                |
|                           | Power consumption            | 100-mA maximum draw                                                                              |                                |
|                           | Communication                | From card                                                                                        | 9600 bps to 330,000 bps        |
|                           |                              | From computer                                                                                    | 12 Mbps (USB transfer speed)   |
|                           | Landing mechanism            | Contact device                                                                                   | Friction contact               |
|                           |                              | Card insertions rating                                                                           | Up to 100,000 insertion cycles |
|                           | Interface modes              | CCID protocol                                                                                    |                                |
|                           | Reader performance interface | USB connection                                                                                   |                                |
|                           | Electro-magnetic standards   | Europe                                                                                           | 2004/108/EC                    |

### Technical Specifications - Input/Output Devices

|                               |                                                                                       |                                                           |                |
|-------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------|
|                               |                                                                                       | USA                                                       | USAFCC part 15 |
| Approvals                     | CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF |                                                           |                |
| Ergonomic Compliance          | ISO 9241-4, TUVGS                                                                     |                                                           |                |
| Kit Contents                  | Keyboard, I/O Security and Documentation CD, warranty card                            |                                                           |                |
| HP USB PS/2 Washable Keyboard |                                                                                       |                                                           |                |
| Physical Characteristics      | Keys                                                                                  | 104 (US) Layout, 105 (EU) layout – depending upon country |                |
|                               | Dimensions (L x W x H)                                                                | 17.67x 6.62 x 1.38 in (449 x 168 x 35 mm)                 |                |
|                               | Weight                                                                                | 1.7 lb (0.77 kg) minimum                                  |                |
| Electrical                    | Operating voltage                                                                     | + 5VDC ±5%                                                |                |
|                               | Power consumption                                                                     | 50-mA maximum (with three LEDs ON)                        |                |
|                               | System interface                                                                      | USB Type A plug connector                                 |                |
|                               | ESD                                                                                   | CE level 4, 15-kV air discharge                           |                |
|                               | EMI - RFI                                                                             | Conforms to FCC rules for a Class B computing device      |                |
|                               | Microsoft PC 99 - 2001                                                                | Functionally compliant                                    |                |
| Mechanical                    | Keycaps                                                                               | Stepped -profile design                                   |                |
|                               | Switch actuation                                                                      | 55-g nominal peak force with tactile feedback             |                |
|                               | Switch life                                                                           | 20 million keystrokes                                     |                |
|                               | Switch type                                                                           | Contamination-resistant switch membrane                   |                |
|                               | Key-leveling mechanisms                                                               | For all double-wide and greater-length keys               |                |
|                               | Cable length                                                                          | 7 ft (2.2 m)                                              |                |
|                               | Microsoft PC 99 - 2001                                                                | Mechanically compliant                                    |                |
|                               | Acoustics                                                                             | 43-dBA maximum sound pressure level                       |                |
| Environmental                 | Operating temperature                                                                 | 50° to 122° F (10° to 50° C)                              |                |
|                               | Non-operating temperature                                                             | 4° to 149° F (-20° to 65° C)                              |                |
|                               | Operating humidity                                                                    | 10% to 95% (non-condensing at ambient)                    |                |
|                               | Non-operating humidity                                                                | 0% to 95% (non-condensing at ambient)                     |                |
|                               | Operating shock                                                                       | 40 g, six surfaces                                        |                |
|                               | Non-operating shock                                                                   | 80 g, six surfaces                                        |                |
|                               | Operating vibration                                                                   | 2-g peak acceleration                                     |                |
|                               | Non-operating vibration                                                               | 4-g peak acceleration                                     |                |

### Technical Specifications - Input/Output Devices

|                                 |                                                                                              |                                              |
|---------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------|
|                                 | Drop (out of box)                                                                            | 26 in (66 cm) on carpet, six-drop sequence   |
|                                 | Drop (in box)                                                                                | 42 in (107 cm) on concrete, 16-drop sequence |
| <b>Operating system support</b> | Windows® 7, Windows Vista, Windows XP Professional                                           |                                              |
| <b>Approvals</b>                | UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X |                                              |
| <b>Ergonomic compliance</b>     | ANSI HFS 100, ISO 9241-4, and TUVGS                                                          |                                              |

### HP Wireless Keyboard and Mouse

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Keyboard</b>            | Dimensions (H x L x W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.09 x 18.1 x 6.47 in (27.87 x 460.3 x 164.3 mm) |
|                            | Weight – Without Two AA Alkaline Batteries                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.94 lb (880 g)                                  |
| <b>Mouse</b>               | Dimensions (H x L x W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.46 x 4.53 x 2.47 in (37 x 115 x 62.9 mm)       |
|                            | Weight – Without Two AA Alkaline Batteries                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.15 lb (67 g)                                   |
| <b>Receiver</b>            | Dimensions (H x L x W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.33x 1.79 x 0.72 in (8.4 x 45.5 x 18.4 mm)      |
|                            | Weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.21 oz (5.9 g)                                  |
|                            | Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 32.8 ft (10 m)                                   |
| <b>System Requirements</b> | <p>Windows 10, Windows 8, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows Vista or Windows XP</p> <p>Available USB port for the receiver</p> <p>CD-ROM Drive</p> <p>* Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. See <a href="http://www.microsoft.com">http://www.microsoft.com</a>.</p> |                                                  |
| <b>Approvals</b>           | Product Safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UL; CSA /TUV (Europe only); CE Mark; CB Report   |
|                            | Ergonomics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ANSI; ISO (Europe only); GS Mark (Germany only)  |
|                            | EMC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FCC; CE; ACA (-tick); BSMI; KC ; VCCI            |
|                            | CE Mark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EN 55022:2010; EN 55024; EN 301489-1; EN 61000   |

### Technical Specifications - Input/Output Devices

|                      |                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | Design Guidelines for PCs                                     | PC 99 – connector overmold colors; PC 2001 – full functionality                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                      | Telecom                                                       | All local telecom requirements and approvals for intended markets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                      | USA                                                           | FCC Title 47 CFR, Par 15, Subpart C; other local requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                      | Country Support                                               | US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria, Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, Thailand, Canada, China, Japan, Korea, Taiwan, India, Venezuela, Ecuador, Russia, Ukraine, Israel, Croatia, United Arab Emirates, Peru, Brazil, Chile, Argentina, Mexico, South Africa, and up to 193 countries worldwide. |
| <b>Environmental</b> | Keyboard contains 25% post-consumer recycled plastic material |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Encryption</b>    | 128bit AES Encryption                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### HP PS/2 Mouse

|                                  |                                                |                                           |
|----------------------------------|------------------------------------------------|-------------------------------------------|
| <b>Dimensions</b><br>(H x L x W) | 1.46 x 2.48 x 4.53 in (3.70 x 6.29 x 11.50 cm) |                                           |
| <b>Weight</b>                    | 3.53 oz (100g; +10g/- 5 g)                     |                                           |
| <b>Environmental</b>             | Operating temperature                          | -32° to 104°F (0° to 40° C)               |
|                                  | Non-operating temperature                      | -4° to 140°F (-20° to 60° C)              |
|                                  | Operating humidity                             | 10% to 90%<br>(non condensing at ambient) |
|                                  | Non-operating humidity                         | 10% to 90%<br>(non condensing at ambient) |
|                                  | Operating shock                                | 40 g, 6 surfaces                          |

### Technical Specifications - Input/Output Devices

|                     |                         |                                                                                                         |
|---------------------|-------------------------|---------------------------------------------------------------------------------------------------------|
|                     | Non-operating shock     | 80 g, 6 surfaces                                                                                        |
|                     | Operating vibration     | 2 g peak acceleration                                                                                   |
|                     | Non-operating vibration | 4 g peak acceleration                                                                                   |
|                     | Drop<br>(out of box)    | 80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face |
| <b>Electrical</b>   | Operating voltage       | 5 VDC $\pm$ 10%                                                                                         |
|                     | Power consumption       | 100mA                                                                                                   |
|                     | System consumption      | PS/2 mini-din connector                                                                                 |
|                     | ESD                     | CE level 4, 15 kV air discharge                                                                         |
|                     | EMI-RFI                 | Conforms to FCC rules for a Class B computing device                                                    |
|                     | Microsoft PC99 - 2001   | Functionally compliant                                                                                  |
| <b>Mechanical</b>   | Resolution              | 800 DPI                                                                                                 |
|                     | Tracking speed          | 10 in/s (25.4 cm/s) maximum                                                                             |
|                     | Acceleration            | $\pm$ 15%                                                                                               |
|                     | Switch actuation        | 65 $\pm$ 20 gf                                                                                          |
|                     | Switch life             | 3,000,000 operations (using Hasco modified tester)                                                      |
|                     | Switch type             | Low force micro-switches                                                                                |
|                     | Tracking mechanism life | 80 km                                                                                                   |
|                     | Cable length            | 6 ft (1.8 m)                                                                                            |
|                     | Microsoft PC99 - 2001   | Mechanically compliant                                                                                  |
|                     |                         |                                                                                                         |
| <b>Scroll wheel</b> | Width                   | 6 mm                                                                                                    |
|                     | Diameter                | 22.5 $\pm$ 0.2 mm                                                                                       |
|                     | Maximum rotation force  | 50 gf-cm                                                                                                |
|                     | Switch type             | Light force micro-switch                                                                                |
|                     | Switch life             | 1 million operations                                                                                    |

### Technical Specifications - Input/Output Devices

|                             |                                                       |                             |
|-----------------------------|-------------------------------------------------------|-----------------------------|
|                             | Mechanical life                                       | Minimum 200,000 revolutions |
| <b>Regulatory Approvals</b> | UL/cUL, FCC, CE Mark, TUV/GS, VCCI, KCC, BSMI, C-Tick |                             |

#### HP USB Mouse

|                                  |                                          |
|----------------------------------|------------------------------------------|
| <b>Dimensions</b><br>(H x L x W) | 1.5 x 4.5 x 2.5 in (3.7 x 11.5 x 6.3 cm) |
| <b>Weight</b>                    | 0.22 lb (0.10 kg)                        |
| <b>Cable length</b>              | 70.9 in (180 cm)                         |
| <b>System requirements</b>       | Available USB port                       |

#### HP USB 1000dpi Laser Mouse

|                                  |                                                  |                                           |
|----------------------------------|--------------------------------------------------|-------------------------------------------|
| <b>Dimensions</b><br>(H x L x W) | 1.47 x 4.53 x 2.47 in (37.3 x 114.97 x 62.86 mm) |                                           |
| <b>Weight</b>                    | 3.360 oz (102g)                                  |                                           |
| <b>Cable length</b>              | 70.9 in (180 cm)                                 |                                           |
| <b>System requirements</b>       | Available USB port                               |                                           |
| <b>Environmental</b>             | Operating Temperature                            | 32° to 104° F (0° to 40° C)               |
|                                  | Non-operating Temperature                        | -4° to 140° F (-20° to 60° C)             |
|                                  | Operating Humidity                               | 10% to 90%<br>(non-condensing at ambient) |
| <b>Mechanical</b>                | Resolution                                       | 1000dpi                                   |
|                                  | Tracking Speed                                   | 45 cm/sec                                 |
|                                  | Cable Length                                     | 70.9 in (180 cm)                          |

#### HP USB PS/2 Washable Mouse

### Technical Specifications - Input/Output Devices

|                                  |                                               |                                                                                                         |
|----------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Dimensions</b><br>(H x L x W) | 1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm) |                                                                                                         |
| <b>Weight</b>                    | 4.44 oz (126 g)                               |                                                                                                         |
| <b>Environmental</b>             | Operating temperature                         | –32° to 104°F (0° to 40° C)                                                                             |
|                                  | Non-operating temperature                     | –4° to 140°F (–20° to 60° C)                                                                            |
|                                  | Operating humidity                            | 10% to 90% (non-condensing at ambient)                                                                  |
|                                  | Non-operating humidity                        | 10% to 90% non-condensing                                                                               |
|                                  | Operating shock                               | 40 g, 6 surfaces                                                                                        |
|                                  | Non-operating shock                           | 80 g, 6 surfaces                                                                                        |
|                                  | Operating vibration                           | 2 g peak acceleration                                                                                   |
|                                  | Non-operating vibration                       | 4 g peak acceleration                                                                                   |
|                                  | Drop<br>(out of box)                          | 80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face |
| <b>Electrical</b>                | Operating voltage                             | 5 VDC ± 10%                                                                                             |
|                                  | Power consumption                             | 100mA                                                                                                   |
|                                  | System consumption                            | PS/2 mini-din connector or USB                                                                          |
|                                  | ESD                                           | CE level 2 8 kV air discharge                                                                           |
|                                  | EMI-RFI                                       | Conforms to FCC rules for a Class B computing device                                                    |
|                                  | Microsoft PC99 - 2001                         | Functionally compliant                                                                                  |
| <b>Mechanical</b>                | Resolution                                    | 1000 ± 20% DPI                                                                                          |
|                                  | Tracking speed                                | 14 in/s ( 35.56 cm/s) maximum                                                                           |
|                                  | Acceleration                                  | 2 g                                                                                                     |
|                                  | Switch actuation                              | 70 g nominal peak force                                                                                 |
|                                  | Switch life                                   | 3,000,000 operations (using Hasco modified tester)                                                      |
|                                  | Switch type                                   | Low force micro-switches                                                                                |



### Technical Specifications - Input/Output Devices

|                             |                                       |                                  |
|-----------------------------|---------------------------------------|----------------------------------|
|                             | Tracking mechanism life               | 8.8 ft total 70 cm+ 2m extension |
|                             | Cable length                          | Mechanically compliant           |
|                             | Microsoft PC99 - 2001                 | 1000 ± 20% DPI                   |
| <b>Scroll wheel</b>         | Width                                 | 6 mm                             |
|                             | Diameter                              | 1 in (25.4 mm)                   |
|                             | Maximum rotation force                | 48 rats/sec                      |
|                             | Switch type                           | Light force micro-switch         |
|                             | Switch life                           | 3 million operations             |
|                             | Mechanical life                       | Minimum 200,000 revolutions      |
| <b>Regulatory Approvals</b> | FCC, CE Mark, ICES-003-B, IP66/NEMA4X |                                  |

### Technical Specifications – Power

#### POWER

#### Unit Environment and Operating Conditions

##### General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

|                                  |                                                                                                           |
|----------------------------------|-----------------------------------------------------------------------------------------------------------|
| Temperature Range                | Operating: 50° to 95° F (10° to 35° C)*<br>Non-operating: -22° to 140° F (-30° to 60° C)                  |
| Relative Humidity                | Operating: 10% to 90% (non-condensing at ambient)<br>Non-operating: 5% to 95% (non-condensing at ambient) |
| Maximum Altitude (unpressurized) | Operating: 10,000 ft (3048 m)<br>Non-operating: 30,000 ft (9144 m)                                        |

\*Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

| Power Supply            | DM                                                                                                  | USDT                                           | SFF                                                              | TWR                                                              |
|-------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|
| Standard Efficiency     | 65W active PFC<br>87% efficient<br>89% average efficiency at 230V<br>88% average efficiency at 115V | Integrated graphics:<br><br>Discrete graphics: | 135W active PFC<br>87% efficient                                 |                                                                  |
|                         |                                                                                                     |                                                | 180W active PFC<br>87% efficient                                 |                                                                  |
| 80 PLUS Gold            | N/A                                                                                                 | N/A                                            | 240W active PFC                                                  | 320W active PFC                                                  |
|                         |                                                                                                     |                                                | 240W active PFC                                                  | 320W active PFC                                                  |
| 80 PLUS Platinum        | N/A                                                                                                 | N/A                                            | 87/90/87% efficient at 20/50/100% load (115V)                    | 87/90/87% efficient at 20/50/100% load (115V)                    |
|                         |                                                                                                     |                                                | 89/91/90% efficient at 20/50/100% load (230V)<br>240W active PFC | 89/92/90% efficient at 20/50/100% load (230V)<br>320W active PFC |
| Operating Voltage Range | 90 - 264 VAC                                                                                        | 90 - 264 VAC                                   | 90/92/89% efficient at 20/50/100% load (115V)                    | 90/92/89% efficient at 20/50/100% load (115V)                    |
|                         |                                                                                                     |                                                | 90/93/91% efficient at 20/50/100% load (230V)                    | 90/94/91% efficient at 20/50/100% load (230V)                    |
| Rated Voltage Range     | 100 - 240 VAC                                                                                       | 100 - 240 VAC                                  | 100 - 240 VAC                                                    | 100 - 240 VAC                                                    |
| Rated Line Frequency    | 50/60 Hz                                                                                            | 50/60 Hz                                       | 50/60 Hz                                                         | 50/60 Hz                                                         |

### Technical Specifications – Power

|                                                         |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                     |
|---------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|
| Operating Line Frequency                                | 47 – 63 Hz                               | 47 – 63 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 47 – 63 Hz              | 47 – 63 Hz          |
| Rated Input Current                                     | N/A                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4A                      | 5.5A                |
| Rated Input Current with Energy Efficient* Power Supply |                                          | 135W: 2.4A<br>180W: 2.9A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4A                      | 5.5A                |
| DC Output                                               | +19.5V                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | N/A                     | N/A                 |
| Current Leakage (NFPA 99: 2102)                         |                                          | <p>Less than 500 microamps of leakage current at 120 Vac with the ground wire disconnected, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.</p> <p>Less than 100 microamps of leakage current at 120 Vac with the ground wire intact with normal polarity, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.</p> |                         |                     |
| Power Supply Fan                                        | N/A                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 92=>70mm variable speed | 92mm variable speed |
| Power cord length                                       | N/A                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6.0 ft. (1.83 m)        | 6.0 ft. (1.83 m)    |
| External Power Adapter                                  |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                     |
| Dimensions                                              | 2.2 x 1.2 x 4.5 in<br>55 x 30 x 113.5 mm | 2.8 x 1.7 x 6.6 in<br>70 x 42 x 167.5 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | N/A                     | N/A                 |
| Total Cord Length                                       | 12 ft 8 in                               | 12 ft 8 in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | N/A                     | N/A                 |

### Technical Specifications – Weights & Dimensions

#### WEIGHTS & DIMENSIONS

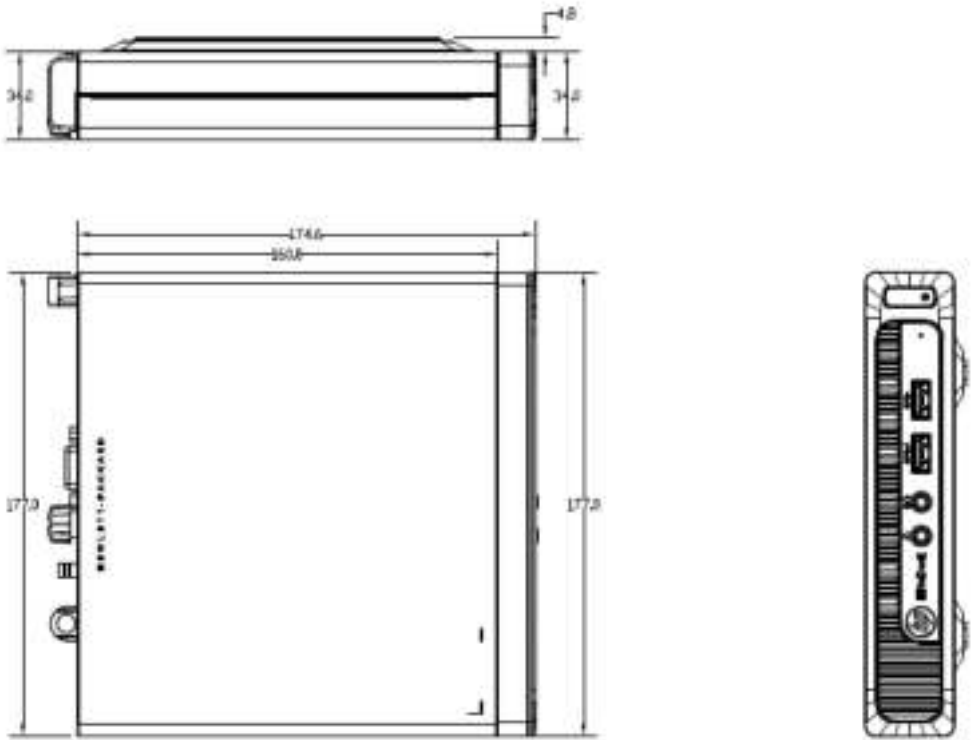
##### Weights & Dimensions

(configured with 1 HDD & 1 ODD; DM configured with 1 HDD only)

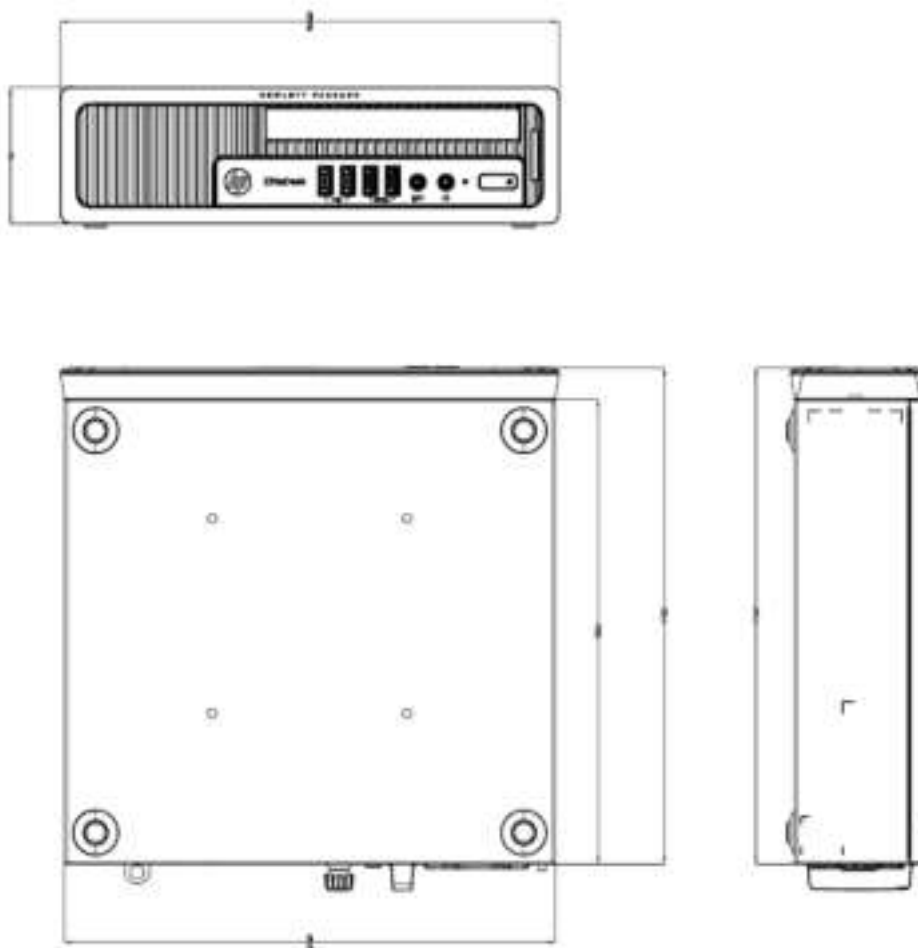
|                                                                                         | <u>DM</u>                                                                                                     | <u>USDT</u>                                                                                                    | <u>SFF</u>                                                                                                  | <u>TWR</u>                                                                                                 |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Chassis (W x H x D)                                                                     | 6.9 x 1.3 x 7.0 in<br>175 x 34 x 177 mm                                                                       | 9.9 x 2.6 x 10 in<br>251 x 66 x 254 mm                                                                         | 13.3 x 3.95 x 14.9 in<br>338 x 100 x 379 mm                                                                 | 6.7 x 15.7 x 17.4 in<br>170 x 399 x 442 mm                                                                 |
| System Volume                                                                           | 62.79 cu in<br>1.05 L                                                                                         | 257.5 cu in<br>4.2 L                                                                                           | 782.7 cu in<br>12.8 L                                                                                       | 1828 cu in<br>30 L                                                                                         |
| System Weight*                                                                          | 2.9 lb<br>1.3 kg                                                                                              | 6.8 lb<br>3.1 kg                                                                                               | 16.7 lb<br>7.6 kg                                                                                           | 20.5 lb<br>9.3 kg                                                                                          |
| Max Supported Weight (desktop orientation)                                              | 77.0 lb<br>35.0 kg                                                                                            | 77.0 lb<br>35.0 kg                                                                                             | 77.0 lb<br>35.0 kg                                                                                          | 77.0 lb<br>35.0 kg                                                                                         |
| Stand Dimensions                                                                        | 77x 4.6 x 6.3 in<br>19.5 x 117 x 160 mm<br>Weight: 47g/ .1 lbs.                                               | 1.1 x 4.9 x 6.7 in<br>27 x 125 x 170 mm                                                                        | 1.1 x 7.0 x 7.9 in<br>29 x 178 x 200 mm                                                                     | N/A                                                                                                        |
| Packaging (H x W x D)                                                                   | 7.8 x 11.4 x 19.7 in<br>198 x 290 x 500 mm                                                                    | 8.6 x 15.7 x 19.7 in<br>218 x 398 x 500 mm                                                                     | 9.0 x 19.7 x 23.4 in<br>229 x 500 x 594 mm                                                                  | 11.6 x 19.7 x 23.2 in<br>295 x 500 x 590 mm                                                                |
| Shipping Weight                                                                         | 9.0 lb.<br>4.1 kg                                                                                             | 14.4 lb<br>6.5 kg                                                                                              | 17.9 lb<br>8.1 kg                                                                                           | 28.8 lb<br>13.1 kg                                                                                         |
| Palletization Profile                                                                   | 8-units per layer<br>10/12 layer max<br>80/96 per pallet<br>47.126 x 39.291 x 99.252 in<br>(including pallet) | 6-units per layer<br>10-layer max.<br>60-units per pallet<br>47.126 x 39.291 x 91.535 in<br>(including pallet) | 4-units per layer<br>10-layer max.<br>40-units per pallet<br>47.126 x 39.291 x 88.858 in (including pallet) | 4-units per layer<br>8-layer max.<br>32-units per pallet<br>47.126 x 39.291 x 98.622 in (including pallet) |
| <i>Dependent on 40-Ft Stnd. Sea Container or 40-Ft High-cube Sea Container is used)</i> |                                                                                                               |                                                                                                                |                                                                                                             |                                                                                                            |

### Technical Specifications – Weights & Dimensions

Desktop  
Mini

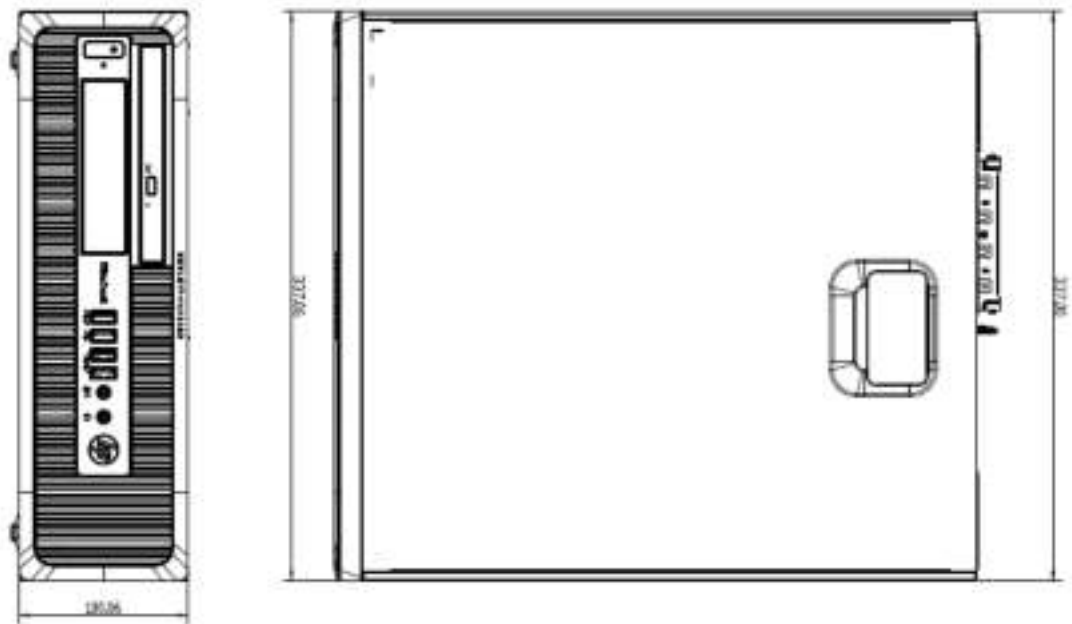


### Technical Specifications – Weights & Dimensions



**Ultra-slim  
Desktop**

### Technical Specifications – Weights & Dimensions

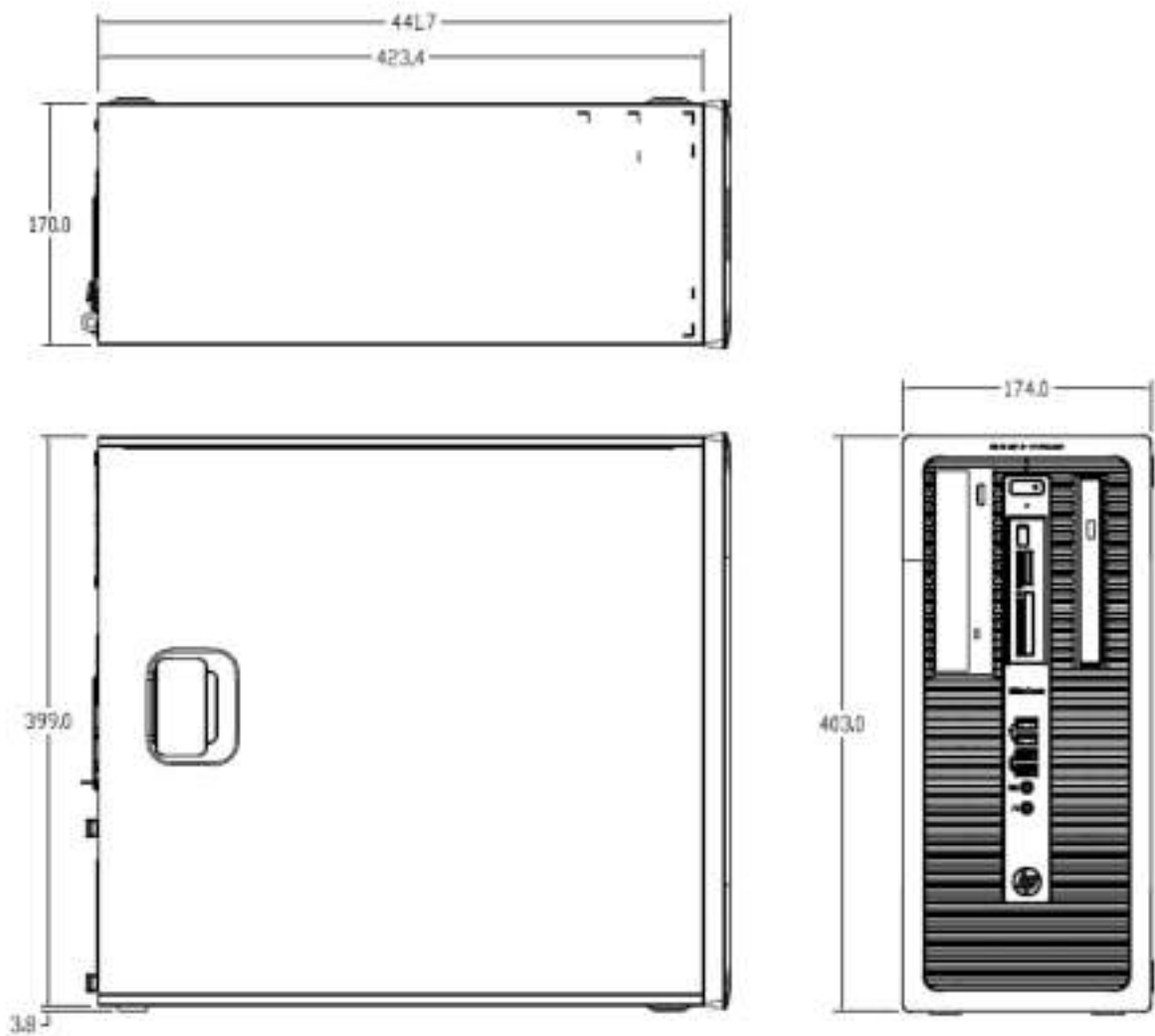


### Small Form Factor



Technical Specifications – Weights & Dimensions

Tower





### Technical Specifications – Miscellaneous Features

#### MISCELLANEOUS FEATURES

##### Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Intel Wired for Management support; industry wide initiative to make Intel architecture based PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

##### Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
    - 2 - processor thermal protection activated
    - 3 - processor not installed
    - 4 - power supply failure
    - 5 -- memory error
    - 6 - video error
    - 7 - PCA failure (ROM detected failure prior to video)
    - 8 - invalid ROM, boot block recovery mode
    - 9 - system not fetching code
    - 10 - system hang while loading an option ROM
- HP PC Hardware Diagnostics UEFI:
  - This utility enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

#### Additional Features

##### Description

##### Towerable Orientation

Product can be oriented as either a desktop (horizontal) or a tower (vertical)

### Technical Specifications – Miscellaneous Features

#### Drive Lock

Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.

DPS Access through F10 Setup during Boot

A diagnostic hard drive self-test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user

#### Drive Protection System

Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced

The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures

#### SMART Technology (Self-Monitoring, Analysis and Reporting Technology)

Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted

#### SMART I - Drive Failure Prediction

Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count

#### SMART II - Off-Line Data Collection

By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure

#### SMART III - Off-Line Read Scanning with Defect Reallocation

IOEDC: I/O Error Detection Circuitry

Detects errors in Read/Write buffers on HDD cache RAM

#### SMART IV - End-to-End CRC for hard drives

Interface in F10 setup provides confirmation of SMART IV support.

### Technical Specifications – Environmental Data

#### ENVIRONMENTAL DATA

##### Eco-Label Certifications & Declarations

This product series 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:

- US ENERGY STAR®
- IT ECO declaration
- EPEAT® Gold where HP registers commercial desktop products. 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 is based on a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

| Model        | Energy Consumption in<br>accordance with US ENERGY<br>STAR® test method<br>(typically configured) | 115 VAC | 230 VAC | 100 VAC |
|--------------|---------------------------------------------------------------------------------------------------|---------|---------|---------|
| <b>DM</b>    | Normal Operation (Short idle)                                                                     | 8.08 W  | 8.18 W  | 8.12 W  |
|              | Normal Operation (Long idle)                                                                      | 6.58 W  | 6.73 W  | 6.67 W  |
|              | Sleep                                                                                             | 1.61 W  | 1.57 W  | 1.64 W  |
|              | Off                                                                                               | 1.02 W  | 1.01 W  | 1.04 W  |
| <b>USDT</b>  | Normal Operation (Short idle)                                                                     | 13.14 W | 14.25 W | 13.21 W |
|              | Normal Operation (Long idle)                                                                      | 11.57 W | 12.25 W | 11.19 W |
|              | Sleep                                                                                             | 0.74 W  | 0.77 W  | 0.75 W  |
|              | Off                                                                                               | 0.54 W  | 0.57 W  | 0.54 W  |
| <b>SFF</b>   | Normal Operation (Short idle)                                                                     | 16.32 W | 16.04 W | 16.07 W |
|              | Normal Operation (Long idle)                                                                      | 14.23 W | 13.46 W | 14.25 W |
|              | Sleep                                                                                             | 1.56 W  | 1.64 W  | 1.56 W  |
|              | Off                                                                                               | 0.54 W  | 0.60 W  | 0.53 W  |
| <b>TOWER</b> | Normal Operation (Short idle)                                                                     | 17.62 W | 17.92 W | 17.21 W |
|              | Normal Operation (Long idle)                                                                      | 14.95 W | 16.28 W | 15.20 W |
|              | Sleep                                                                                             | 1.47 W  | 1.58 W  | 1.46 W  |
|              | Off                                                                                               | 0.51 W  | 0.60 W  | 0.50 W  |

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

### Technical Specifications – Environmental Data

| Model        | Heat Dissipation*             | 115 VAC   | 230 VAC   | 100 VAC   |
|--------------|-------------------------------|-----------|-----------|-----------|
| <b>DM</b>    | Normal Operation (Short idle) | 28 BTU/hr | 28 BTU/hr | 28 BTU/hr |
|              | Normal Operation (Long idle)  | 23 BTU/hr | 23 BTU/hr | 23 BTU/hr |
|              | Sleep                         | 6 BTU/hr  | 5 BTU/hr  | 6 BTU/hr  |
|              | Off                           | 3 BTU/hr  | 3 BTU/hr  | 4 BTU/hr  |
| <b>USDT</b>  | Normal Operation (Short idle) | 45 BTU/hr | 49 BTU/hr | 45 BTU/hr |
|              | Normal Operation (Long idle)  | 40 BTU/hr | 42 BTU/hr | 38 BTU/hr |
|              | Sleep                         | 3 BTU/hr  | 3 BTU/hr  | 3 BTU/hr  |
|              | Off                           | 2 BTU/hr  | 2 BTU/hr  | 2 BTU/hr  |
| <b>SFF</b>   | Normal Operation (Short idle) | 56 BTU/hr | 55 BTU/hr | 55 BTU/hr |
|              | Normal Operation (Long idle)  | 49 BTU/hr | 46 BTU/hr | 49 BTU/hr |
|              | Sleep                         | 5 BTU/hr  | 6 BTU/hr  | 5 BTU/hr  |
|              | Off                           | 2 BTU/hr  | 2 BTU/hr  | 2 BTU/hr  |
| <b>TOWER</b> | Normal Operation (Short idle) | 60 BTU/hr | 61 BTU/hr | 59 BTU/hr |
|              | Normal Operation (Long idle)  | 51 BTU/hr | 56 BTU/hr | 52 BTU/hr |
|              | Sleep                         | 5 BTU/hr  | 5 BTU/hr  | 5 BTU/hr  |
|              | Off                           | 2 BTU/hr  | 2 BTU/hr  | 2 BTU/hr  |

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

| Declared Noise Emissions<br>(in accordance with ISO 7779 and ISO 9296) |                            | Sound Power<br>(LWAd, bels) | Sound Pressure<br>(LpAm, decibels) |
|------------------------------------------------------------------------|----------------------------|-----------------------------|------------------------------------|
| Model                                                                  | (Typically configured)     |                             |                                    |
| <b>DM</b>                                                              | Idle                       | 3.6                         | 25                                 |
|                                                                        | Fixed Disk (random writes) | 3.6                         | 24                                 |
| <b>USDT</b>                                                            | Idle                       | 3.6                         | 27                                 |
|                                                                        | Fixed Disk (random writes) | 3.6                         | 27                                 |

### Technical Specifications – Environmental Data

|              |                            |     |    |
|--------------|----------------------------|-----|----|
| <b>SFF</b>   | Idle                       | 3.6 | 26 |
|              | Fixed Disk (random writes) | 3.6 | 26 |
| <b>TOWER</b> | Idle                       | 3.6 | 25 |
|              | Fixed Disk (random writes) | 3.6 | 26 |

**Longevity and** This product can be upgraded, possibly extending its useful life by several years.

**Upgrading** Upgradeable features and/or components contained in the product may include:

- 10 externally accessible USB ports
- DIMM memory slots
- 1 PCI Express x16 graphics slot
- 3 PCI Express x1 accessory slot
- 2 2.5" internal storage drive bay
- 1 2.5" internal storage drive bay
- 1 3.5" Media Card Reader bay
- 1 external slim optical drive bay
- 5.25" Half height optical drive bay

Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

This battery(s) in this product comply with EU Directive 2006/66/EC

### Batteries

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

### Model Additional Information

- DM**
- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/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 where HP registers commercial desktop products. See <http://www.epeat.net> for registration status in your country.
  - This product has obtained a Korea KCC EMC certificate.
  - Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
  - This product contains 16% post-consumer recycled plastic (by wt.)
  - This product is 91.3% recyclable when properly disposed of at end of life.

### Technical Specifications – Environmental Data

- **ALL Form Factors are UL Certified**

#### Packaging Materials

- External:
  - PAPER/Corrugated 852 g
- Internal:
  - PLASTIC/EPE (Expanded Polyethylene) 38 g
  - PLASTIC/Polyethylene low density 13 g
  - PLASTIC/Polypropylene 8 g
- The plastic packaging material contains at least 9.5 % recycled content.
- The corrugated paper packaging materials contains at least 42.3% recycled content.

#### USDT

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/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 where HP registers commercial desktop products. See <http://www.epeat.net> for registration status in your country.
- This product has obtained a Korea KCC EMC certificate.
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 12.2% post-consumer recycled plastic (by wt.)
- This product is 95.4% recyclable when properly disposed of at end of life.
- **ALL Form Factors are UL Certified**

#### Packaging Materials

- External:
  - PAPER/Corrugated 1526.2 g
- Internal:
  - PLASTIC/Polyethylene low density 177 g
- The PAPER/Corrugated material contains at least 49.42% recycled content.
- • The PLASTIC/Polyethylene low density material contains at least 60.42% recycled content.

#### SFF

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/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)
- This product has obtained a Korea KCC EMC certificate.
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.

### Technical Specifications – Environmental Data

- This product contains 14.8% post-consumer recycled plastic (by wt.)
- This product is 94.1% recycle-able when properly disposed of at end of life.

#### Packaging Materials

- External:
  - PAPER/Corrugated 2300 g
- Internal:
  - PLASTIC/EPE (Expanded Polystyrene) 110 g
  - PLASTIC/Polyethylene low density 56 g
  - PLASTIC/Polypropylene 15 g

The plastic packaging material contains at least 60.42 % recycled content.

The corrugated paper packaging materials contains at least 38.38% recycled content.

#### TOWER

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/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 where HP registers commercial desktop products. See <http://www.epeat.net> for registration status in your country.
- This product has obtained a Korea KCC EMC certificate.
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 14.9% post-consumer recycled plastic (by wt.)
- This product is 95.5% recyclable when properly disposed of at end of life.

#### Packaging Materials

- External:
  - PAPER/Corrugated 2280 g
- Internal:
  - PLASTIC/EPE (Expanded Polystyrene) 144 g
  - PLASTIC/Polyethylene low density 40 g
  - PLASTIC/Polypropylene 15 g

The PAPER/Corrugated material contains at least 53.5% recycled content.

The PLASTIC/Polyethylene low density material contains at least 60.42% recycled content.

The PLASTIC/EPE-Expanded Polyethylene material contains at least 60.42% recycled content.

The PLASTIC/Polypropylene materials contains at least 60.42% recycled content.

#### RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized

### Technical Specifications – Environmental Data

that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

#### 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/supplychain/gen\\_specifications.html](http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html)):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

#### Packaging

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)



### Technical Specifications – Environmental Data

**Hewlett-Packard  
Corporate  
Environmental  
Information**

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.

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>

ISO 14001 certificates:

<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

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

### Communication Devices

|                                                | DM | USDT | SFF/TWR | Part Number |
|------------------------------------------------|----|------|---------|-------------|
| Intel Ethernet I210 – T1 Gbe NIC               |    |      | X       | E0X95AA     |
| Intel 6205 802.11 a/b/g/n PCIe x1 NIC          |    |      | X       | E0X93AA     |
| HP WLAN 802.11 a/g/n 2x2 DualBand PCIe x1 Card |    |      | X       | J5C51AA     |

### Graphics Solutions

|                                           | DM | USDT | SFF/TWR | Part Number |
|-------------------------------------------|----|------|---------|-------------|
| AMD Radeon HD 8350 Graphics (PCIe x16)    |    |      | X       | E1C63AA     |
| AMD Radeon HD 8490 Graphics Card          |    |      | X       | E1C64AA     |
| Nvidia NVS 310 Graphics (PCIe x16)        |    |      | X       | A7U59AA     |
| Nvidia NVS 315 Graphics (PCIe x16)        |    |      | X       | E1C65AA     |
| HP USB Graphics Adapter                   |    | X    | X       | NL571AA     |
| HP DisplayPort Cable Kit                  | X  | X    | X       | VN567AA     |
| HP DisplayPort To Dual Link DVI-D Adapter | X  | X    | X       | NR078AA     |
| HP DisplayPort To DVI-D Adapter           | X  | X    | X       | FH973AA     |
| HP DisplayPort to HDMI Adapter            | X  | X    | X       | BP937AA     |
| HP DisplayPort to VGA Adapter             | X  | X    | X       | AS615AA     |
| HP DMS-59 to Dual DVI Cable               |    |      | X       | DL139A      |
| HP DMS-59 to Dual DisplayPort Adapter     |    |      | X       | XP688AA     |
| HP DisplayPort to HDMI 1.4 Adapter        | X  | X    | X       | K2K92AA     |

### Data Storage Drives and Accessories

|                                                               | DM | USDT | SFF/TWR  | Part Number |
|---------------------------------------------------------------|----|------|----------|-------------|
| HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive          |    |      | X        | QK554AA     |
| HP Desktop Mini DVD-Writer ODD                                | X  |      |          | K9Q83AA     |
| HP Desktop Mini I/O                                           | X  |      |          | K9Q82AA     |
| HP Desktop Mini Rack Mount                                    | X  |      |          | G1K21AA     |
| HP Desktop Mini Security/Dual Vesa Sleeve                     | X  |      |          | G1K22AA     |
| HP Desktop 65w Mini Power Supply Kit                          | X  |      |          | TBD         |
| HP Desktop 90w Mini Power Supply Kit                          | X  |      |          | TBD         |
| HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive            |    |      | X        | QK555AA     |
| HP 1-TB 10K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive             |    |      | X        | C2T91AA     |
| HP 128-GB SATA 3.0Gb/s Solid State Drive                      | X  | X    | X        | QV063AA     |
| HP 160-GB SATA 3.0Gb/s Solid State Drive                      | X  | X    | X        | QV064AA*    |
| HP 500-GB SATA 3.0Gb/s Solid State Hybrid Drive               | X  | X    | X        | E1C62AA     |
| HP 128-GB SED Opal 2 Solid State Drive                        | X  |      |          | G1K24AA     |
| 128 GB Turbo Drive SSD (PCIe card)                            |    |      | X        | J5V07AA     |
| HP Slim Removable SATA Hard Drive Enclosure (frame & carrier) |    | X    | X        | C1N41AA     |
| HP Slim Removable SATA Hard Drive Enclosure (carrier only)    |    | X    | X        | E3F39AA     |
| HP Removable SATA Hard Drive Enclosure (Frame & Carrier)      |    |      | TWR only | RY102AA     |
| HP Removable SATA Hard Drive Enclosure (Carrier Only)         |    |      | TWR only | RY103AA     |

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

|                                                             |   |          |         |
|-------------------------------------------------------------|---|----------|---------|
| HP Chassis (1bay) Security Kit                              |   | TWR only | AR639AA |
| HP Desktop Mini DVD Super Multi-Writer ODD Expansion Module | X |          | K9Q83AA |

\*Not available in all regions.

### Summary of Changes

#### Input Devices

|                                                      | DM | USDT | SFF/TWR | Part Number |
|------------------------------------------------------|----|------|---------|-------------|
| HP USB Keyboard                                      | X  | X    | X       | QY776AA     |
| HP USB Gray Keyboard                                 | X  | X    | X       | B6B64AA     |
| HP USB Smart Card (CCID) Keyboard                    | X  | X    | X       | BV813AA     |
| HP USB Keyboard and Mouse Kit                        | X  | X    | X       | B1T09AA     |
| HP USB Washable Keyboard                             | X  | X    | X       | VF097AA     |
| HP USB and PS/2 Washable Mouse                       | X  | X    | X       | BM866AA     |
| HP USB and PS/2 Washable Keyboard and Mouse Kit      | X  | X    | X       | BU207AA     |
| HP USB Grey Mouse                                    | X  | X    | X       | K7W54AA     |
| HP PS/2 Mouse                                        | X  | X    | X       | QY775AA     |
| HP USB Mouse                                         | X  | X    | X       | QY777AA     |
| HP USB 1000dpi Laser Mouse                           | X  | X    | X       | QY778AA     |
| HP USB Gray Mouse                                    | X  |      |         | K7W54AA     |
| HP Wireless Keyboard and Mouse Combination*          | X  | X    | X       | QY449AA     |
| HP USB Antimicrobial Keyboard and Mouse (China Only) | X  | X    | X       | K7X25AA     |
| HP Desktop Mini I/O Expansion Module                 | X  |      |         | K9Q84AA     |

\*Keyboard contains 25% post-consumer recycled plastic material

#### System Memory

|                                     | DM | USDT | SFF/TWR | Part Number |
|-------------------------------------|----|------|---------|-------------|
| HP 4GB DDR3-1600 (PC3-12800) DIMM   |    |      | X       | B4U36AA     |
| HP 8GB DDR3-1600 (PC3-12800) DIMM   |    |      | X       | B4U37AA     |
| HP 4GB DDR3-1600 (PC3-12800) SODIMM | X  | X    |         | B4U39AA     |
| HP 8GB DDR3-1600 (PC3-12800) SODIMM | X  | X    |         | B4U40AA     |

#### Multimedia Devices

|                                     | DM | USDT | SFF/TWR | Part Number |
|-------------------------------------|----|------|---------|-------------|
| HP Slim DVD-ROM Drive               |    | X    | X       | VP033AA     |
| HP Slim SuperMulti DVD Writer Drive |    | X    | X       | QS209AA     |
| HP USB HD 720P v2 Business Webcam   | X  | X    | X       | D8Z08AA     |
| HP Business Headset                 | X  | X    | X       | QK550AA     |
| HP USB Business Speakers            | X  | X    | X       | D9J19AA     |

#### Removable Media Storage

|                             | DM | USDT | SFF/TWR | Part Number |
|-----------------------------|----|------|---------|-------------|
| HP 14-n-1 Media Card Reader |    |      | X       | TBD         |

#### Security Devices

|                                             | DM | USDT | SFF/TWR | Part Number |
|---------------------------------------------|----|------|---------|-------------|
| HP USDT Rear Port Controller Cover          |    | X    |         | VN571AA     |
| HP Solenoid Lock and Hood Sensor (USDT/SFF) |    | X    | X       | E0X97AA     |

### Summary of Changes

|                                        |   |   |          |         |
|----------------------------------------|---|---|----------|---------|
| HP Solenoid Lock and Hood Sensor (TWR) |   |   | TWR only | E0X96AA |
| HP SFF Wall Mount/Security Sleeve      |   |   | SFF only | VN570AA |
| HP UltraSlim Cable Lock                | X | X | X        | H4D73AA |

### Stands and Accessories

|                                                                | DM | USDT | SFF/TWR  | Part Number |
|----------------------------------------------------------------|----|------|----------|-------------|
| HP Integrated Work Center – Desktop Mini / Thin Client (IWCdm) | X  |      |          | G1V61AA     |
| HP Integrated Work Center Stand (SFF)                          |    |      | SFF only | QP897AA     |
| HP USDT Tower Stand                                            |    | X    |          | VN568AA     |
| HP SFF Tower Stand                                             |    |      | SFF only | VN569AA     |
| HP DM Chassis Tower Stand                                      | X  |      |          | G1K23AA     |
| HP 600/800 Tower Bezel Kit                                     |    |      | TWR only | E1C66AA     |
| HP 800/600 SFF Bezel Kit                                       |    |      | SFF only | E3F27AA     |
| HP 800 USDT Kit                                                |    | X    |          | E3F28AA     |
| HP Serial Port Adapter (RS-232 compatible)                     |    |      | X        | PA716A      |
| HP Parallel Port Kit                                           |    |      | X        | KD061AA     |
| HP PCI Expansion Kit                                           |    |      | TWR only | E1V16AA     |
| HP USB to Serial Adapter                                       | X  | X    |          | J7B60AA     |

### LANDesk Software (E-Delivery)

|                                                                           | Part Number |
|---------------------------------------------------------------------------|-------------|
| LANDesk Management Suite License - 1-499 Nodes E-Delivery                 | QY369AAE    |
| LANDesk Management Suite License - 500-999 Nodes E-Delivery               | QY370AAE    |
| LANDesk Management Suite License - 1000-1999 Nodes E-Delivery             | QY371AAE    |
| LANDesk Management Suite License - 2000-4999 Nodes E-Delivery             | QY372AAE    |
| LANDesk Management Suite License - 5000-9999 Nodes E-Delivery             | QY373AAE    |
| LANDesk Security Suite License E-Delivery                                 | QY379AAE    |
| LANDesk Management Suite 1 Year Maintenance - 1-499 Nodes E-Delivery      | HZ825AAE    |
| LANDesk Management Suite 1 Year Maintenance - 500-999 Nodes E-Delivery    | HZ826AAE    |
| LANDesk Management Suite 1 Year Maintenance - 1000-1999 Nodes E-Delivery  | HZ827AAE    |
| LANDesk Management Suite 1 Year Maintenance - 2000-4999 Nodes E-Delivery  | HZ828AAE    |
| LANDesk Management Suite 1 Year Maintenance - 5000-9999 Nodes E-Delivery  | HZ829AAE    |
| LANDesk Security Suite 1 Year Subscription                                | HZ830AAE    |
| LANDesk Patch Management 1 Year Subscription - 1-499 Nodes E-Delivery     | HZ831AAE    |
| LANDesk Patch Management 1 Year Subscription - 500-999 Nodes E-Delivery   | HZ832AAE    |
| LANDesk Patch Management 1 Year Subscription - 1000-1999 Nodes E-Delivery | HZ833AAE    |
| LANDesk Patch Management 1 Year Subscription - 2000-4999 Nodes E-Delivery | HZ834AAE    |
| LANDesk Patch Management 1 Year Subscription - 5000-9999 Nodes E-Delivery | HZ835AAE    |
| LANDesk Patch Management 1 Year Subscription - 5000-9999 Nodes E-Delivery | HZ835AAE    |

### Summary of Changes

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### Summary of Changes

| Date of change:    | Version History:  |          | Description of change:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|-------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | From v1 to v2     |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| May 28, 2014       | From v2.0 to v2.1 | Changed  | Updated the wattage consumption for the DM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| May 30, 2014       | From v2.1 to v2.2 | Changed  | Updated 3 <sup>rd</sup> party software                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| June 2, 2014       | From v2.2 to v2.3 | Changed  | Processors, storage, environmental.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| July 14, 2014      | From v2.3 to v3   | Update   | Added the headings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| July 16, 2014      | From v3 to v27    | Upgrade  | Change the version so it would match the PB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| July 18, 2014      | From v27 to v28   | Addition | Added a new description on processors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    |                   | Addition | Added a Section to the networking communication, a new wlan card                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                    |                   | Addition | Added a new section for (NON-SED) with a description, to the storage area                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| July 28, 2014      | From v28 to v29   | Addition | Added drawings to Weights and Dimensions section.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| August 7, 2014     | From v29 to v30   | Addition | Additon to "Presintalled when purchased" the value "Windows 8.1 Pro for Education (64-bit)*"                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                    |                   | Change   | In "Supports DDR3 memory up to 1333 MT/s data rate" change 1333 to 1600                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                    |                   | Change   | The lower i in "128 GB Turbo Drive M.2 PCIe SSD"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| September 29, 2014 | From v30 to v31   | Addition | Added new wireless connection under Networking/communications "Intel 7260 802.11 a/b/g/n M.2 BT NIC Wireless Network Connection (optional)"<br>Added under Networking and Communications two new sections" HP WLAN 802.11 a/b/g/n 2x2 Dual Band PCIe x1 WLAN/Bluetooth Card"<br>and "HP WLAN 802.11a/b/g/n Wireless 2x2 Dual-Band Minicard with Bluetooth Combo**"<br>Added under security "Common Criteria Certified, Infineon TPM SLB9656TT1.2- 4.32 FW"<br>Added under graphics the section "AMD Radeon R9 255 2GB PCIe x16 " |
|                    |                   | Removed  | From section Security "Trusted Platform Module (TPM) 1.2"                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| October 6, 2014    | From v31 to v32   | Change   | Change the slim drive bay in pages 2-4 to add the number "5.25'" before it                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                    |                   | Remove   | Remove from the section Slots on page 1 the sentence "(Available Jun '14)"                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| October 14, 2014   | From v32 to v33   | Change   | Change the values of Environmental data for SFF, US, Tower                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| October 15, 2014   | From v33 to v34   | Change   | Change the values of Environmental for DM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| October 29, 2014   | From v34 to v35   | Remove   | Remove windows Home and ultimate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| November 12, 2014  | From v35 to v 36  | Remove   | Several removals from Javier Lazaro in the document                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                    |                   | Addition | Added HP USB Gray Mouse value , added a value to the Max Supported Weighth                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| January 21, 2015   | From v36 to v37   | Addition | Added a note about Current Leakage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| January 28, 2015   | From v37 to v38   | Addition | Under Optional Discrete Graphics Solutions, AMD Radeon R7 240 2GB FH PCIe x16 GFX for SFF                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                    |                   |          | Under Adapters and cables, HP DisplayPort To HDMI 1.4 Adapter for all                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    |                   |          | 120GB SATA 2.5 Non-SED SSD (with 3.5" adapter when needed)                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                    |                   |          | 180GB SATA 2.5 Non-SED SSD (with 3.5" adapter when needed)<br>120GB SATA 2.5 Opal2 SED SSD (with 3.5" adapter when needed)                                                                                                                                                                                                                                                                                                                                                                                                       |

### Summary of Changes

|                   |                 |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-----------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                 |          | 180GB SATA 2.5 Opal2 SED SSD (with 3.5" adapter when needed)<br>under KEYBOARDS AND POINTING DEVICES, HP USB Antimicrobial Keyboard<br>HP USB Antimicrobial Mouse for all<br>Added the whole section of AMD Radeon R7 240 2GB PCIe x16<br>HP USB Antimicrobial Keyboard and Mouse (China Only)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                   |                 | Remove   | Deleted "HP" from 128 GB Turbo Drive SSD (PCIe card)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                   |                 | Changed  | Change value in OpenGL 4.3, from .0 to .3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| February 23, 2015 | From v38 to v39 | Addition | Processor support up to 84W (TWR/SFF), 65W (USDT), 35W (DM) added to "at a glance"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                   |                 | Removed  | Removed 160 GB SSD Non-SED from Solid State Drives (SSD) & Self-encrypting Solid State Drives (SED)<br>Removed HP 160 GB Solid State Drive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| March 16, 2015    | From v39 to v40 | Addition | Added a new value for "Power Supply" "DM"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| March 24, 2015    | From v40 to v41 | Changed  | Change the value in interface for "HP 500-GB 7200 RPM SATA 2.5" Self-Encrypting (SED) Hard Disk Drive"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| April 6, 2015     | From v41 to v42 | Addition | added HP Desktop Mini DVD Super Multi-Writer ODD Expansion Module to<br>Data Storage Drives and Accessories<br><br>added HP Desktop Mini I/O Expansion Module to Input Devices                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                   |                 |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| April 28, 2015    | From v42 to 44  | Addition | Added<br>Intel® Core™ i3-4360T Processor<br>Intel® Core™ i3-4170 Processor<br>Intel® Core™ i3-4160 T Processor<br>Intel® Pentium G3470 Processor<br>Intel® Pentium G3460T Processor<br>Intel® Pentium G3260 Processor<br>Intel® Pentium G3250T Processor<br><br>Added under Solid State Drives (SSD) & Self-encrypting Solid State Drives (SED)<br>128GB SATA 2.5 SSD TLC Non-SED (with 3.5" adapter when needed)<br>256GB SATA 2.5 SSD TLC Non-SED (with 3.5" adapter when needed)<br>512GB SATA 2.5 SSD Non-SED (with 3.5" adapter when needed)<br><br>Added under NETWORKING/COMMUNICATIONS<br>Intel 7260 802.11 ac PCIe x1 BT NIC<br><br>Added chart for HP 256 GB* (non-SED) TLC Solid State Drive, HP 128 GB* (non-SED) TLC Solid State Drive<br>HP 512 GB* (non-SED) TLC Solid State Drive and Intel® 7260 802.11ac PCIe x1 BT |
| May 20, 2015      | From v44 to v45 | Addition | Added an "X" mark to Solenoid Hood Lock / Sensor under USDT/DM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| June 17, 2015     | From v45 to v47 | Addition | Added SKU number for HP USB to Serial Adapter under stands and accessories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| July 6, 2015      | From v47 to v48 | Addition | Added new Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



### Summary of Changes

|                   |                 |         |                                                                                 |
|-------------------|-----------------|---------|---------------------------------------------------------------------------------|
|                   |                 | Changed | Changed Operating System                                                        |
| October 8, 2015   | From v48 to v49 | Added   | Added note about AMD and NVIDIA graphics cards are not available for Windows 10 |
| November 30, 2015 | From v49 to v50 | Deleted | Deleted TWR under technical specifications.                                     |
| December 9, 2015  | From v50 to v51 | Added   | Max resolution to Intel Celeron Procesors                                       |
| March 7, 2016     | From v51 to v52 | Added   | 256GB SATA 2.5" Non-SED Solid State Drive                                       |
| April 18, 2016    | From v52 to v53 | Added   | This product has obtained a Korea KCC EMC certificate.                          |