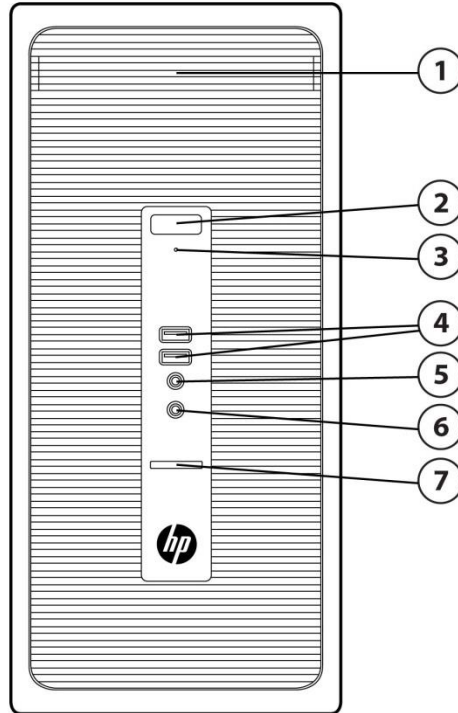


### Overview

#### HP ProDesk 400 G2 Microtower Business PC



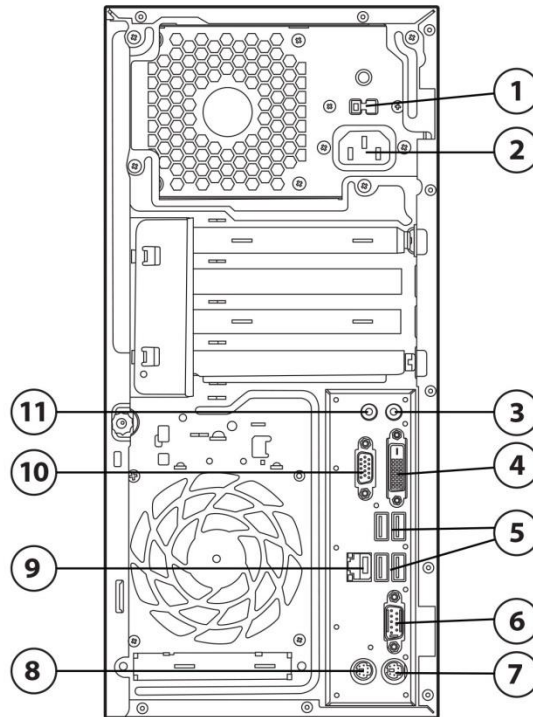
1. Slimline Drive Bay - supporting an optical disk drive (optional)
2. Power Button
3. Hard Drive Activity Light
4. (2) USB 3.0 Ports (blue)
5. 3.5mm Microphone Jack
6. 3.5mm Headphone Output
7. SD Reader

#### Not Shown

Slots (1) PCI 3.0 Express x16 Graphics Connectors  
(3) PCI Express 2.0 x1 Accessory Connectors

Bays (2) 3.5" Internal Storage Drive Bays (1 bay can be configured as 2.5")

### Overview



- |   |                                     |
|---|-------------------------------------|
| 1. Voltage Select Switch (included on some models only) | 7. PS/2 Keyboard Connector (purple) |
| 2. Power Cord Connector                                 | 8. PS/2 Mouse Connector (green)     |
| 3. Line-Out Connector for powered audio devices (green) | 9. RJ-45 Network Connector          |
| 4. DVI-D Monitor Connector                              | 10. VGA Monitor Connector           |
| 5. (4) USB 2.0 Ports (black)                            | 11. Line-In Audio Connector (blue)  |
| 6. RS-232 Serial Connector                              |                                     |

#### Not Shown

Parallel Port (optional); 2<sup>nd</sup> RS-232 Serial Port (optional)

### Overview

### At A Glance

- Redesigned expandable, upgradable Microtower chassis
- Intel® H81 Express chipset supporting Intel 4th generation Core processors, featuring integrated Intel HD Graphics
- HP developed and engineered UEFI BIOS supporting security, manageability and software image stability
- Realtek RTL8151GH-CG GbE LOM integrated network connection
- Up to 16GB DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Multi-independent monitor support via VGA and DVI-D video interfaces
- Discrete graphics options available
- DTS Sound+ audio management software
- Standard and high efficiency energy saving power supply options
- ENERGY STAR® qualified models certified EPEAT® Gold

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

### Standard Features and Configurable Components

#### OPERATING SYSTEMS

##### Preinstalled When Purchased

Windows 8.1 Pro (64-bit)\*

Windows 8.1 (64-bit)\*

Windows 7 Ultimate (32-bit)\*\*

Windows 7 Ultimate (64-bit)\*\*

Windows 7 Professional (32-bit)\*\*

Windows 7 Professional (64-bit)\*\*

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

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

Windows 7 Home Premium (32-bit)\*\*

Windows 7 Home Premium (64-bit)\*\*

Windows 7 Home Basic (32-bit)\*\*

FreeDOS 2.0

\*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See <http://www.microsoft.com>.

\*\*Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

\*\*\*This system is preinstalled with Windows 7 Professional 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.

#### PROCESSORS\*

##### 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

###### 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

###### 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

###### 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

### Standard Features and Configurable Components

#### Intel® Core™ i7-4770S Processor

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

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

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

#### Intel® Core™ i5-4690 Processor

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

#### Intel® Core™ i5-4690S Processor

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

#### Intel® Core™ i5-4590 Processor

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

#### Intel® Core™ i5-4590S Processor

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

#### Intel® Core™ i5-4570 Processor

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

#### Intel® Core™ i5-4570S Processor

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

#### Intel® Core™ i5-4670 Processor

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

#### Intel® Core™ i5-4670S Processor

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

### Standard Features and Configurable Components

6 MB cache, 4 cores, 4 threads  
Intel HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Core™ i5-4430 Processor

Up to 3.2 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

#### Intel® Core™ i5-4430s Processor

Up to 3.2 GHz Max. Turbo Frequency (2.7 GHz base frequency)  
6 MB cache, 4 cores, 4 threads  
Intel HD Graphics 4600  
Supports DDR3 memory up to 1600 MT/s data rate

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

##### Intel® Core™ i3-4360 Processor

Up to 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

Up to 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™ i3-4150 Processor

Up to 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

##### Intel® Core™ i3-4340 Processor

Up to 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

Up to 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™ i3-4130 Processor

Up to 3.4 GHz base frequency  
3 MB cache, 2 cores, 4 threads

### Standard Features and Configurable Components

Intel HD Graphics 4400  
Supports DDR3 memory up to 1600 MT/s data rate

#### **Intel® Pentium Processors**

##### Intel® Pentium G3450 Processor

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

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 G3240 Processor

Up to 3.1 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

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 G3420 Processor

Up to 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

##### Intel® Pentium G3220 Processor

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

#### **Intel® Celeron Processors**

##### Intel® Celeron™ G1850 Processor

2.9 GHz base frequency  
2 MB cache, 2 cores, 2 threads  
Intel HD Graphics  
Supports DDR3 memory up to 1333 MT/s data rate

##### Intel® Celeron™ G1840 Processor

2.8 GHz base frequency  
2 MB cache, 2 cores, 2 threads  
Intel HD Graphics

### Standard Features and Configurable Components

Supports DDR3 memory up to 1333 MT/s data rate

#### Intel® Celeron™ G1830 Processor

2.8 GHz base frequency

2 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

#### Intel® Celeron™ G1820 Processor

2.7 GHz base frequency

2 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

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

### CHIPSET

Intel® 8 Series (H81 Express) Chipset

### GRAPHICS

#### **Intel HD Graphics on all models (integrated on processor)**

AMD Radeon HD 8350 (1GB) FH PCIe x16\*

AMD Radeon HD 8350 (1GB) PCIe x16 DH

AMD Radeon HD 8470 (2GB) FH \*

AMD Radeon HD 8490 DP (1GB) PCIe x16

NVIDIA GeForce GT630 DP (2GB) FH PCIe x16\*\*

NVIDIA NVS 310 512MB 1st

NVIDIA NVS 315 1GB PCIe x16

AMD Radeon R7 240 2GB FH PCIe x16\*\*\*

AMD Radeon R9 255 2GB PCIe x16\*\*\*

NOTE: HD content required to view HD images.

NOTE: Discrete graphics options cannot be configured with 180W power supply and Quad-Core Processor

\*Available only in China region

\*\*Not configurable with 180W PSU

\*\*\*Projected availability, October 2014

### ADAPTERS AND CABLES

HP DMS-59 to Dual DisplayPort Cable

HP DMS-59 to Dual DVI Cable

HP DMS-59 to Dual VGA Cable

HP DisplayPort to DisplayPort Cable

HP DisplayPort to DVI-D Adapter



### Standard Features and Configurable Components

- HP DisplayPort to HDMI Adapter
- HP DisplayPort to VGA Adapter
- HP Serial Port Adapter
- HP Parallel Port Adapter
- HP DisplayPort Cable

### STORAGE\*

#### SATA Drives

- 2 TB, 7200 RPM, SATA 6.0 Gb/s, SMART IV, 3.5"
- 2 TB, 7200 RPM, SATA 6.0 Gb/s, SMART IV, 3.5" - 2<sup>nd</sup> hard drive
- 1 TB, 7200 RPM, SATA 6.0 Gb/s, SMART IV, 3.5"
- 1 TB, 7200 RPM, SATA 6.0 Gb/s, SMART IV, 3.5" - 2<sup>nd</sup> hard drive
- 500 GB, 7200 RPM, SATA 6.0 Gb/s, SMART IV, 3.5"
- 500 GB, 7200 RPM, SATA 6.0 Gb/s, SMART IV, 3.5" - 2<sup>nd</sup> hard drive
- 500GB, 7200 RPM SATA SED, 2.5" (with 3.5" adapter when installed in MT)
- 500GB, 7200 RPM SATA SED, 2.5" (with 3.5" adapter when installed in MT) - 2<sup>nd</sup> hard drive

#### Hybrid Drives

- 1 TB SATA 6G 2.5" (8 GB cache) SSHD Drive (with 3.5" adapter when installed in MT)
- 1 TB SATA 6G 2.5" (8 GB cache) SSHD Drive (with 3.5" adapter when installed in MT) - 2<sup>nd</sup> hard drive
- 500 GB SATA 6G 2.5" (8GB cache) SSHD Drive (with 3.5" adapter when installed in MT)
- 500 GB SATA 6G 2.5" (8GB cache) SSHD Drive (with 3.5" adapter when installed in MT) - 2<sup>nd</sup> hard drive
- 500 GB SATA 6G 2.5" (8GB cache) SSHD Drive w/caddy
- 500 GB SATA 6G 2.5" (8GB cache) SSHD Drive w/caddy- 2<sup>nd</sup> hard drive

#### Solid State Drives

- 128 GB SATA 6G 2.5" SSD (with 3.5" adapter when installed in MT)
- 128 GB SATA 6G 2.5" SSD (with 3.5" adapter when installed in MT) - 2<sup>nd</sup> hard drive
- 128 GB SATA 6G 2.5" SSD w/caddy
- 128 GB SATA 6G 2.5" SSD w/caddy - 2<sup>nd</sup> hard drive

#### Self-encrypting Drives

- 500GB 7200 RPM SATA 2.5 SED HDD

#### Self-encrypting Solid State Drives

- 500GB 2.5" FIPS 140-2 Self-Encrypting (SED) Solid State Drive
- 500GB 2.5" FIPS 140-2 Self-Encrypting (SED) Solid State Drive - 2<sup>nd</sup> hard drive
- 500GB 2.5" FIPS 140-2 w/ca Self-Encrypting (SED) Solid State Drive
- 500GB 2.5" FIPS 140-2 w/ca Self-Encrypting (SED) Solid State Drive - 2<sup>nd</sup> hard drive
- 256GB SATA 2.5" Opal2 Self-Encrypting (SED) Solid State Drive SSD
- 256GB SATA 2.5" Opal2 Self-Encrypting (SED) Solid State Drive - 2<sup>nd</sup> hard drive
- 256GB SATA 2.5" w/ca Opal2 Self-Encrypting (SED) Solid State Drive
- 256GB SATA 2.5" w/ca Opal2 Self-Encrypting (SED) Solid State Drive - 2<sup>nd</sup> hard drive
- 256 GB SATA 2.5" Self-Encrypting (SED) Solid State Drive (with 3.5" adapter when installed in MT)

### Standard Features and Configurable Components

- 256 GB SATA 2.5" Self-Encrypting (SED) Solid State Drive (with 3.5" adapter when installed in MT) - 2<sup>nd</sup> hard drive
- 256 GB SATA 2.5" w/caddy Self-Encrypting (SED) Solid State Drive
- 256 GB SATA 2.5" w/caddy Self-Encrypting (SED) Solid State Drive - 2<sup>nd</sup> hard drive
- 180GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500)
- 180GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500) - 2<sup>nd</sup> hard drive
- 180GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500) w/caddy
- 180GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500) w/caddy - 2<sup>nd</sup> hard drive
- 128GB SATA 2.5" Opal2 Self-Encrypting (SED) Solid State Drive
- 128GB SATA 2.5" Opal2 Self-Encrypting (SED) Solid State Drive- 2<sup>nd</sup> hard drive
- 128GB SATA 2.5" Opal2 Self-Encrypting (SED) Solid State Drive w/ caddy
- 128GB SATA 2.5" Opal2 Self-Encrypting (SED) Solid State Drive w/ caddy - 2<sup>nd</sup> hard drive
- 120GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500)
- 120GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500) - 2<sup>nd</sup> hard drive
- 120GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500) w/ caddy
- 120GB SATA 2.5" Opal1 Self-Encrypting (SED) Solid State Drive (Pro 1500) w/ caddy - 2<sup>nd</sup> hard drive

#### 10K 6 Gb/s Hard Drives

- 1TB 10K RPM 6G 3.5" Hard Drive
- 1TB 10K RPM 6G 3.5" Hard Drive - 2<sup>nd</sup> hard drive
- 500GB 10K RPM 6G 3.5" Hard Drive
- 500GB 10K RPM 6G 3.5 Hard Drive - 2<sup>nd</sup> hard drive

#### Frame/Carrier

HP Slim Removable SATA HDD Frame/Carrier

#### Optical Disc Drives

- Slim DVD-ROM
- Slim BDXL Blu-ray Writer
- Slim SuperMulti

#### Media Card Reader\*\*

SD Media Card Reader

\*For hard drives and solid state drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 30 GB (for Windows 8.1) of system disk is reserved for the system recovery software.

\*\*Card sold separately

### MEMORY\*

Form Factor	Type	Maximum	# of Slots
Microtower	DDR3 non-ECC Up to 1600 MT/s	16 GB	2 DIMM

\* Full availability of 4 GB or more of memory requires a 64-bit operating system. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

### Standard Features and Configurable Components

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.

#### NETWORKING/COMMUNICATIONS

##### Ethernet (RJ-45)

Realtek RTL8151GH-CG GbE LOM (standard)

Intel Ethernet I210-T1 PCIe x1 Gb Network Interface Card (optional)

##### Wireless\*

Intel® Dual Band Wireless-N 7260 802.11 a/b/g/n PCI Express (optional)

HP WLAN 802.11 a/b/g/n 2x2 Dual Band PCIe x1 WLAN/Bluetooth Card (optional)

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

#### AUDIO/MULTIMEDIA

HD audio with Realtek ALC221 codec (all ports are stereo)

DTS Sound+ audio management technology

Microphone and headphone front ports (3.5mm)

Line-out and Line-In rear Ports (3.5mm)

Multi-streaming capable

Internal speaker (standard)

#### KEYBOARDS AND POINTING DEVICES

##### Keyboard

HP PS/2 Keyboard

HP USB Keyboard

USB Smart Card (CCID) Keyboard

HP USB and PS/2 Washable Keyboard

HP Wireless Keyboard and Mouse Combo\*

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

##### Mice

HP PS/2 Mouse

HP USB Mouse

HP USB 1000dpi Laser Mouse

HP USB and PS/2 Washable Mouse

#### HP BIOSphere

### Standard Features and Configurable Components

Key features of the HP BIOS include:

- Deployment and manageability - HP BIOS provides several technologies that help integrate the HP ProDesk 400 G2 MT Business PC into the enterprise, such as PXE, and F10 Setup support for 12 languages.
- Support UEFI specification 2.3.1
- 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.
- Thermal Controlled Fans – Automatic or manual controlled fan speeds for cooling and acoustic performance
- 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 (Emergency Boot Block Recovery). In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS F10 setup and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.
- Serviceability - HP BIOS provides diagnostic and detailed service information.

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 Pro 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.
- Master Boot Record Security - Helps to prevent changes and/or infections to the Master Boot Record caused by viruses or malicious code.
- HP BIOS Protection – prevents unauthorized updates or changes to the BIOS due to malware, viruses, or malicious BIOS updates. Based on NIST SP800-147 policy guidelines.

### MANAGEABILITY

Fully manageable and supported by industry-standard HP Client Management Solutions. Optional LANDesk management tools simplify mobile device management and security. Simplify everything from deployment or migration to daily management, security, licensing, and more—and stop downtime before it starts.

- Hardware Management: Inventory, Device config and BIOS updates, HW alerting, Driver updates
- Software Management: Deployment, App Management, Patch Management; Deployment and Migration; Proactive HW and SW Management; Mobile Users and Device Management; Remote Assistance / Help Desk
- LANDesk Management Suite 9.5 (LDMS) – optional – contact HP representative for part numbers
- Hardware integration with Microsoft System Center Configuration Manager: Client Integration Kit (CIK), Client Catalog, Client Driver Packs
- HP SoftPaq Download Manager (SDM)
- HP System Software Manager (SSM)

### Standard Features and Configurable Components

- HP BIOS Configuration Utility (BCU)
- HP Driver Packs
- HP Client Management Interface (HP CMI)
- Absolute Persistence Software\*

\*BIOS Absolute Persistence module is shipped turned off, and will be activated when customers purchase and activate a subscription. Service may be limited. Check with Absolute for availability outside the U.S. The optional subscription service of Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: <http://www.absolute.com/company/legal/agreements/computrace-agreement>. If Data Delete is utilized, the Recovery Guarantee payment is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either create a PIN or purchase one or more RSA SecurID tokens from Absolute Software.

### SECURITY

Trusted Platform Module (TPM) 1.2 (Common Criteria EAL4+ certified)	N/A
SATA port disablement (via BIOS)	X
Drivelock	N/A
RAID configurations	N/A
Intel® Identify Protection Technology (IPT)*	N/A
Serial, parallel, USB enable/disable (via BIOS)	X
Optional USB Port Disable at factory (user configurable via BIOS)	X
Removable media write/boot control	X
Power-On password (via BIOS)	X
Administrator password (via BIOS)	X
HP Chassis (1 bay) Security Kit	N/A
Solenoid Hood Lock / Sensor	N/A
Support for chassis padlocks and cable lock devices	X

\*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. EPEAT registration varies by country. See [www.epeat.net](http://www.epeat.net) for registration status by country.

Low halogen (chassis, all internal components and modules)\*

TAA compliant

For accessibility information on HP products, please visit: <http://www.hp.com/accessibility>.

\*External power supplies, power cords, cables and peripherals are not Low Halogen. Service parts obtained after purchase may not be Low Halogen.

### PORTS

#### I/O Ports – Standard

USB 2.0	4 (rear)
USB 3.0	2 (front)

### Standard Features and Configurable Components

Serial (RS-232)	1
PS/2	1 keyboard (purple), 1 mouse (green)
Video	1 VGA, 1 DVI-D
<b>NOTE:</b> 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 Rear: line in/out 3.5mm diameter
RJ-45 Network Interface	1

#### **I/O Ports – Optional**

2nd Serial (RS-232)	1
Parallel	1
PCI Express x1 (v2.0)	3 4.2" full height 6.6" length 10W max. power
PCI Express x16 (v2.0)	1 4.2" full height 6.6" length 75W max. power

### **BAYS**

**(4 total – 2 external, 2 internal)**

External, SD reader	1
External, Slimline ODD	1
Internal 3.5" storage drive*	2

\*One bay can be configured as a 2.5"

### **SERVICE AND SUPPORT**

On-site Warranty <sup>1</sup>: One-year (1-1-1) limited warranty delivers one year of on-site, next business day <sup>2</sup> service for parts and labor and includes free telephone support <sup>3</sup> 24 x 7. One-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.

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.

### Technical Specifications – Operating Systems and Software

#### OPERATING SYSTEMS AND SOFTWARE

##### OPERATING SYSTEMS

<b>Preinstalled</b>	Windows 8.1 Pro (64-bit)* Windows 8.1 (64-bit)* Windows 7 Ultimate (32-bit)** Windows 7 Ultimate (64-bit)** Windows 7 Professional (32-bit)** Windows 7 Professional (64-bit)** Windows 7 Professional (32-bit) (available through downgrade rights from Windows 8.1 Pro)*** Windows 7 Professional (64-bit) (available through downgrade rights from Windows 8.1 Pro)*** Windows 7 Home Premium (32-bit)** Windows 7 Home Premium (64-bit)** Windows 7 Home Basic (32-bit)** FreeDOS 2.0
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For all Preinstalled operating systems HP provides Microsoft WHQL certified (where applicable) drivers on [www.hp.com](http://www.hp.com) at the time of product announcement.

**Web Support** Windows 7 Enterprise (32-bit or 64-bit)

For all Supported operating systems HP performs testing of the OS, and makes available all HP value add software (OS dependent). Certified drivers are made available on [www.hp.com](http://www.hp.com) within 30 days of product announcement.

\*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See <http://www.microsoft.com>.

\*\*Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

\*\*\*This system is preinstalled with Windows® 7 Professional 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
<b>Security</b>	HP Client Security: HP Drive Encryption (FIPS 140-2) <sup>1</sup> HP Device Access Manager with Just In Time Authentication HP Password Manager HP File Sanitizer (SSDs and Hybrid Drives not supported) <sup>5</sup> HP Disk Sanitizer External Edition <sup>2,4</sup> Microsoft Security Essentials (Windows 7)	Disk Sanitizer External Edition <sup>2,4</sup> Microsoft Defender <sup>7</sup>
<b>MultiMedia</b>	Cyberlink Power DVD, BD Cyberlink Power2Go (Secure Burn)	Cyberlink Power DVD, BD Cyberlink Power2Go (Secure Burn)
<b>Communication</b>		HP Wireless Hotspot <sup>8</sup>
<b>HP Value Add</b>	HP ePrint Driver <sup>3</sup> HP PageLift HP Recovery Manager HP Support Assistant	HP ePrint Driver <sup>3</sup> HP PageLift HP Recovery Manager HP Support Assistant

### Technical Specifications – Operating Systems and Software

<b>3<sup>rd</sup> Party</b>	HP Recovery Disk Creator	
	Box 50 GB Offer <sup>6</sup>	Box Application
	Foxit PhantomPDF Express	Foxit PhantomPDF Express
	Skype	Skype
<b>Microsoft Products</b>	Buy Office	Buy Office

1. Drive Encryption 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.
2. Available via download
3. Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see [www.hp.com/go/eprintcenter](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.
4. For the use cases outlined in the DOD 5220.22-M Supplement. Does not support Solid State Drives (SSDs). Requires Disk Sanitizer, External Edition for Business Desktops from [hp.com](http://hp.com).
5. For the use cases outlined in the DOD 5220.22-M Supplement. Does not support Solid State Drives (SSDs). Initial setup required. Web history deleted only in Internet Explorer and Firefox browsers and must be user enabled. With Windows 8.1, user must turn off Enhanced Protection Mode in IE11 for shred on browser close feature.
6. Requires Box registration. Offer available to new Box users only. Box App requires Windows 8 or 8.1. Offer subject to change without notice.
7. Requires Windows 8 and internet access.
8. The Wireless Hotspot application requires an active internet connection and separately purchased data plan. While HP Wireless Hotspot is active, on-device applications will continue to work and will use the same data plan as the wireless hotspot. Wireless Hotspot data usage may incur additional charges. Check with your plan for plan details. Requires Windows.



### Technical Specifications - Graphics

#### GRAPHICS

<b>Intel HD Graphics</b>		
<b>VGA Controller</b>	Integrated	
<b>DisplayPort</b>	Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 2 displays (including the integrated panel)	
<b>Bus Type</b>	N/A	
<b>RAMDAC</b>	N/A	
<b>Memory</b>	<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>	
<b>Maximum Graphics Memory</b>	Microsoft Windows 7	Windows 8.1
	Up to 1.7GB	Up to 1.8GB
	Note: the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.	
<b>Maximum Color Depth</b>	32 bits/pixel	
<b>Graphics/Video API Support</b>	<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 8.1, Linux OS Support</li> <li>• DirectX 11.1</li> <li>• OpenGL 4.0</li> <li>• Open CL 1.2</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		
	<b>Resolution</b>	<b>Refresh Rates</b>
	800x600	60 Hz
	1024x768	60 Hz
	1152x864	60 Hz

### Technical Specifications - Graphics

	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

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

### AMD Radeon HD 8470 Graphics Card

<b>Form Factor</b>	Full Height
<b>Graphics Controller</b>	AMD Radeon HD 8470
<b>Core Clock</b>	775MHz
<b>Memory Clock</b>	900MHz
<b>Memory</b>	2GB, DDR3, 64-bit wide
<b>Bus Type</b>	PCIe Gen2
<b>Max. Power</b>	< 30W
<b>Power Source Support</b>	12V and 3.3V
<b>3D API Support</b>	DX11
<b>HDCP Support</b>	Yes
<b>Display Max. Resolution</b>	Digital 2560 x 1600 Analog 2048 x 1536
<b>Supported Graphics APIs</b>	DX11, OpenGL, full 1080p BD (H264) playback in hardware, HDMI 1.4 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
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### Technical Specifications - Graphics

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>	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.	
<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	
<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 × 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 × 1200 at 60 Hz with reduced blanking using DisplayPort Multi-Stream topology technology.</li> </ul>

### Technical Specifications - Graphics

	DVI-D output:	<ul style="list-style-type: none"> <li>• Drives two digital display at resolutions up to 1920 × 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 × 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 × 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 × 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
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

### Technical Specifications - Graphics

2048 x 1536				60
2560 x 1600				60

### Technical Specifications - Graphics

<b>NVIDIA NVS 315 1GB PCIe x 16 Graphics Card</b>		
<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	
<b>Connectors</b>	DMS-59 , with support for dual VGA, dual DVI or dual Display Port with the appropriate adapter cable	
<b>Display Max. Resolution</b>	Up to 2048 x 1536 VGA; 1920 x 1200 DVI; 2560 x 1600 DisplayPort	
<b>Display Output</b>	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

### Technical Specifications - Graphics

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

### 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

### Technical Specifications - Graphics

<b>Display Max. Resolution</b>	2560 x 1600 digital, 2048 x 1536 analog	
<b>Display Support</b>	Integrated 400 MHz RAMDAC	
<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)	
	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

### 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 Analog 2048 x 1536	
<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		
	Analog Connection	Digital Connection



### Technical Specifications - Graphics

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 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 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
300 x 200	85	60
320 x 240	85	60

### Technical Specifications - Graphics

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

### AMD Radeon R7 240 2GB FH PCIe x16 GFX Graphics Card

<b>Form Factor</b>	Full Height
<b>Graphics Controller</b>	AMD Radeon R7 240
<b>Core Clock</b>	730MHz
<b>Memory Clock</b>	1800MHz
<b>Memory</b>	2GB, DDR3
<b>Frame Buffer</b>	128-bit wide frame buffer
<b>Bus Type</b>	PCI Express 3.0 interface
<b>Max. Power</b>	32.71 W
<b>Power Source Support</b>	12V and 3.3V
<b>HDCP Support</b>	Yes, All digital outputs support HDCP (High-Bandwidth Digital Content Protection)
<b>Display Max. Resolution</b>	Digital 1920 x 1200 Analog 2048 x1536

### Technical Specifications - Graphics

<b>Compliance</b>	Compliant with all listed and with all applicable ACPI, AGP Forum, ANSI, DDWG, HP, Intel, ITU, Microsoft, PCI SIG, SMPTE, and VESA APIs, standards, requirements, implementation guides, and ECRs.
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#### **SUPPORTED DVI-D (DIGITAL) AND DISPLAYPORT DISPLAY MODES**

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

<b>Resolution</b>	<b>Refresh Rates</b>
640 x 480	60 Hz
720 x 480	60 Hz
720 x 576	60 Hz
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
1440 x 900	60 Hz, 75 Hz
1600 x 1024	60 Hz
1600 x 1200	60 Hz
1680 x 1050	75 Hz
1920 x 1080	60 Hz

### **AMD Radeon R9 255 2GB PCIe x16 GFX**

<b>Form Factor</b>	PCIe x16
<b>Graphics Controller</b>	AMD Radeon R9 255
<b>Core Clock</b>	900MHz
<b>Memory Clock</b>	1150MHz
<b>Memory</b>	2GB, (4 pcs of 4Gb 128Mx32 GDDR5)
<b>Frame Buffer</b>	128-bit wide frame buffer
<b>Bus Type</b>	PCI Express 3.0 interface
<b>Max. Power</b>	N/A
<b>Power Source Support</b>	12V and 3.3V
<b>HDCP Support</b>	Yes, All digital outputs support HDCP (High-Bandwidth Digital Content Protection)
<b>Display Max. Resolution</b>	Digital 1920 x 1200 Analog 2048 x 1536

### Technical Specifications - Graphics

<b>Compliance</b>	<p>Compliant with all listed and with all applicable ACPI, AGP Forum, ANSI, DDWG, HP, Intel, ITU, Microsoft, PCI SIG, SMPTE, and VESA APIs, standards, requirements, implementation guides, and ECRs.</p> <p>Supports Microsoft DirectX 11.1, OpenGL 4.3 and OpenCL 1.2 APIs.</p>
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#### **SUPPORTED DVI-D (DIGITAL) AND DISPLAYPORT DISPLAY MODES**

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

Resolution	Refresh Rates
320 x 200	60 Hz
320 x 240	60 Hz
400 x 300	60 Hz
480 x 360	60 Hz
512 x 384	60 Hz
640 x 350	60 Hz
640 x 400	60 Hz
640 x 480	60 Hz
720 x 480	60 Hz
720 x 576	60 Hz
800 x 600	60 Hz
1024 x 768	60 Hz
1152 x 864	60 Hz
1280 x 720	60 Hz
1280 x 768	60 Hz
1280 x 960	60 Hz
1280 x 1024	60 Hz
1440 x 900	60 Hz, 75 Hz
1600 x 900	60 Hz
1600 x 1024	60 Hz
1600 x 1200	60 Hz
1680 x 1050	75 Hz
1680 x 1080	60 Hz
1920 x 1080	60 Hz
2560 x 1440	60 Hz
2560 x 1600	60 Hz

### 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 ProDesk 400 G1 Series Business PC supports the latest SATA 6.0Gb/s specification.

##### **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.

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

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

<b>2TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive</b>		
<b>Unformatted Capacity</b>	2 TB	
<b>Rotational Speed</b>	7,200 rpm	
<b>Interface</b>	SATA 6 Gb/s	
<b>Cache, Multisegmented (MB)</b>	64 MB	
<b>Seek Time (average)</b>	Read	<8.5 ms
	Write	<9.5 ms
<b>Height</b>	1.028 in/26.11 mm	
<b>Width</b>	4.0 in/101.6 mm	
<b>Depth</b>	5.787 in/146.99 mm	
<b>Weight</b>	1.38 lb/626 g	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

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

<b>1TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive</b>		
<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>	32 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)	
<b>500GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive</b>		
<b>Capacity</b>	500,107,862,016 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>	976,773,168	
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track:</b>	2.0 ms
	<b>Average:</b>	11 ms
	<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)	

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

<b>500GB 7200 RPM SATA 2.5” Self-Encrypting (SED) Hard Disk Drive</b>		
<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>	41° to 131° F (5° to 55° C)	
<b>1TB SATA 6G 2.5” 8GB Solid State Hybrid Drive (SSHD)</b>		
<b>Formatted Capacity</b>	1 TB	
<b>Spindle Speed</b>	5,400 rpm +/- 0.2%	
<b>Drive Type</b>	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
<b>Interface</b>	Serial ATA (SATA)	
<b>Cache Buffer</b>	64 MB	
<b>NAND Flash Commercial Multilevel Cell (cMLC)</b>	8 GB	



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

<b>Number of Sectors</b>	976,773,168	
<b>Seek Time</b> (typical reads)	Single Track:	2.0 ms
	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)	

### 500 GB SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD)

<b>Formatted Capacity</b>	500 GB	
<b>Spindle Speed</b>	5,400 rpm +/- 0.2%	
<b>Drive Type</b>	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
<b>Interface</b>	Serial ATA (SATA)	
<b>Cache Buffer</b>	64 MB	
<b>NAND Flash Commercial Multilevel Cell (cMLC)</b>	8 GB	
<b>Number of Sectors</b>	976,773,168	
<b>Seek Time</b> (typical reads)	Single Track:	2.0 ms
	Average:	12 ms
<b>Height</b>	0.268 +/- .008 in (6.8 +/- 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>	0.209 lb/95 g (max)	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

### 128 GB Solid State Drive

<b>Unformatted Capacity</b>	128 GB*
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### Technical Specifications – Hard Disk and Solid State Storage

<b>Architecture</b>	Multi Level Cell (MLC) 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>	0.16 lb (73 g)	
<b>Bandwidth Performance</b>	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
<b>Latency</b>	Read:	55ms (TYP)
	Write:	55ms (TYP)
<b>Power</b>	DC power requirement:	Min 4.5 V; Max 5.5 V
	Total power consumption:	160 mW (Active) ; <85 mW; (Idle)
<b>Useful Drive Life</b>	1.2 million device hours**	
<b>Environmental</b> (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	

\* 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.

### 500GB 2.5" FIPS 140-2 SED Solid State Drive

<b>Formatted Capacity</b>	500 GB
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with SATA interface.
<b>Interface</b>	Serial ATA (6.0 Gb/s)
<b>Form Factor</b>	2.5 inch
<b>Height</b>	6.80 mm ± 0.20
<b>Width</b>	69.85 mm ± 0.25

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

<b>Length</b>	100.35 mm ± 0.25/0.20	
<b>Weight (typical)</b>	<95 g (0.209 lb)	
<b>Bandwidth Performance</b>	Sustained data transfer rate OD	100 MB/s max
	I/O data-transfer rate	600 MB/s max
<b>Power</b>	Power consumption:	Spinup (max): 1.00A Idle, active: 0.70W Sleep 0.18W
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 140° F (0° to 60° C)
	Relative Humidity:	5% to 95%
	Shock:	Maximum 400 G/2 ms

### 256GB SATA 2.5" Opal2 SED Solid State Drive

<b>Unformatted Capacity</b>	256 GB 500,118,192 (User Addressable Sectors)	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with NAND Flash and SATA interface. Trusted Computing Group(TCG) OPAL compliant encrypted solid state drive	
<b>Interface</b>	Serial ATA (6.0 Gb/s)	
<b>Form Factor</b>	2.5 inch	
<b>Height</b>	6.80 mm ± 0.20	
<b>Width</b>	69.85 mm ± 0.25	
<b>Length</b>	100.20 mm ± 0.25	
<b>Weight</b>	Up to 55 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 520 MB/s
	Sustained Sequential Write:	Up to 500 MB/s
<b>Power</b>	Power consumption:	Active: 0.78A / 3.891W; Idle: 0.005A / 0.026W

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

<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours	
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms

#### 256 GB SATA 2.5” Self-Encrypting (SED) Solid State Drive

<b>Unformatted Capacity</b>	256,186,271 user addressable sectors	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with 25nm MLC NAND Flash and SATA interface	
<b>Interface</b>	Serial ATA 2.0 (3.0 Gb/s)	
<b>NAND Flash</b>	25nm MLC NAND Flash	
<b>Height</b>	.275 in/7mm	
<b>Width</b>	2.75 in/69.85 mm	
<b>Length</b>	3.95 in/100.5 mm	
<b>Weight</b>	0.161 lb (73 g)	
<b>Bandwidth Performance</b>	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
<b>Latency</b>	Read:	55 µs
	Write:	55 µs
<b>Power</b>	SATA power consumption:	160 mW (active average); <85 mW (idle average)
<b>Useful Drive Life</b>	72TB written, up to 40GB/day for 5 years	
<b>Environmental</b> (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

#### 180GB SATA 2.5” Opal1 SED Solid State Drive (Pro 1500)

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

<b>Unformatted Capacity</b>	351,651,888 Unformatted Capacity (Total User Addressable Sectors in LBA mode)	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with 20nm MLC NAND Flash and SATA interface	
<b>Interface</b>	Serial ATA (6.0 Gb/s)	
<b>NAND Flash</b>	20nm MLC NAND Flash	
<b>Form Factor</b>	2.5 inch	
<b>Thickness</b>	7 mm	
<b>Weight</b>	Up to 78 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 540 MB/s
	Sustained Sequential Write:	Up to 490 MB/s
	Random 4k Read:	Up to 41K IOPs
	Random 4k Write:	Up to 80K IOPs
<b>Power</b>	SATA power consumption:	195 mW (active average); 125 mW (idle average)
<b>Mean Time Between Failure (MTBF)</b>	1,200,000 hours	
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms

### 128GB SATA 2.5" Opal2 SED Solid State Drive

<b>Unformatted Capacity</b>	128 GB 250,069,680 (User Addressable Sectors)
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with NAND Flash and SATA interface. Trusted Computing Group(TCG) OPAL compliant encrypted solid state drive
<b>Interface</b>	Serial ATA (6.0 Gb/s)
<b>Form Factor</b>	2.5 inch

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

<b>Height</b>	6.80 mm ± 0.20	
<b>Width</b>	69.85 mm ± 0.25	
<b>Length</b>	100.20 mm ± 0.25	
<b>Weight</b>	Up to 55 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 520 MB/s
	Sustained Sequential Write:	Up to 340 MB/s
<b>Power</b>	Power consumption:	Active: 0.78A / 3.891W; Idle: 0.005A / 0.026W
<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours	
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms

### 120GB SATA 2.5" Opal1 SED Solid State Drive

<b>Unformatted Capacity</b>	234,442,648 Unformatted Capacity (Total User Addressable Sectors in LBA mode)	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with 20nm MLC NAND Flash and SATA interface	
<b>Interface</b>	Serial ATA (6.0 Gb/s)	
<b>NAND Flash</b>	20nm MLC NAND Flash	
<b>Form Factor</b>	2.5 inch	
<b>Thickness</b>	7 mm	
<b>Weight</b>	Up to 78 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 540 MB/s
	Sustained Sequential Write:	Up to 480 MB/s
	Random 4k Read:	Up to 41K IOPs

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

	Random 4k Write:	Up to 80K IOPs
<b>Power</b>	SATA power consumption:	195 mW (active average); 125 mW (idle average)
<b>Mean Time Between Failure (MTBF)</b>	1,200,000 hours	
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms
<b>1TB 10K SATA 6.0Gb/s 3.5” Hard Disk Drive</b>		
<b>Capacity</b>	500,107,862,016 bytes	
<b>Rotational Speed</b>	7,200 rpm	
<b>Interface</b>	Serial ATA 2.0 (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:	12 ms
	Full-Stroke:	25 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)	

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



### Technical Specifications - Removable Storage

#### REMOVABLE STORAGE

<b>HP Slim SuperMulti DVD Writer Drive</b>		
<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 8.5 GB DL or 4.7 GB standard	
<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>	0.42 lb (190 g)	
<b>Write speeds</b>	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
<b>Read speeds</b>	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
<b>Access time</b> (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)
<b>Power</b>	Source	Slimline SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
	Temperature	41° to 122° F (5° to 50° C)

### Technical Specifications - Removable Storage

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

<b>HP Slim Blu-ray BDXL Drive</b>			
<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>Triple-layer</b>	<b>Quadruple-layer</b>
<b>Write speeds</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	
<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	

### Technical Specifications - Removable Storage

	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> (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> (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 (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>Read speeds</b>	DVD+R/-R/+RW/-RW/+R DL /-R DL	Up to 8X
	DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
<b>Access time</b> (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

### Technical Specifications - Removable Storage

	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)

### Technical Specifications – Memory

#### MEMORY

#### System Memory Support

The HP ProDesk 400 G2 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

- Microtower (MT) platforms support up to two (2) industry-standard DDR3-SDRAM 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.

**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/Communication

#### NETWORKING/COMMUNICATION

<b>Realtek RTL8151GH-CG GbE LOM Network Adapter</b>		
<b>Connector</b>	RJ-45	
<b>System Interface</b>	Integrated on PCA	
<b>Controller</b>	Realtek RTL8151GH-CG Gigabit Ethernet Controller	
<b>Memory</b>	16 KB FIFO packet buffer memory	
<b>Data rates supported</b>	10/100/1000 Mbps	
<b>IEEE Compliance</b>	802.1P 802.1Q 802.3 802.3ab 802.3az 802.3u	
<b>Bus architecture</b>	PCI Express	
<b>Data transfer mode</b>	PCIe-based interface for active state operation (S0 state)	
<b>Power requirement</b>	Requires 3.3V and 1V or just 3.3V with integrated regulators Power consumption 0.425 W	
<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:	32° to 158° F (0° to 70° C)
	Operating Humidity:	60% RH
<b>Management</b>	WOL, auto MDI crossover, PXE, Multi-port teaming, Advanced cable diagnostic	
<b>Intel® Ethernet I210-T1 Gigabit Network Adapter</b>		
<b>Connector</b>	RJ-45	
<b>System Interface</b>	PCI Express x1	

### Technical Specifications – Networking/Communication

<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 802.1Q 802.2 802.3 802.3AB 802.3u 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 10BASE-T (half-duplex) 10 Mbps 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	

### Intel Dual Band Wireless-N 7260 802.11 a/b/g/n (2x2) Wireless Network Interface Connection

<b>Wireless LAN Standards</b>	IEEE 802.11a/b/g/n
<b>Interoperability</b>	Wi-Fi certified (802.11 a/b/g/n WMM, WPA, WPA2 and WPS)

### Technical Specifications – Networking/Communication

	Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP.	
	NOTE: 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.	
<b>Frequency Band</b>	802.11b/g/n	2.402-2.482 GHz
	802.11a/n	4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz
<b>Antenna Structure</b>	2 transmit; 2 receive (2x2)	
<b>Data Rates</b>	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)	
<b>Modulation</b>	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM	
<b>Security</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>	
	Note: Check latest software/driver release for updates on supported security features.	
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.	
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
<b>Roaming</b>	IEEE 802.11 compliant roaming between band Access Points	
<b>Output Power</b>	<ul style="list-style-type: none"> <li>• 2.4G: +13.5dBm minimum</li> <li>• 5G: +12dBm minimum</li> </ul>	
	Note: 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) In Power Save Polling mode and on battery power.	
	Idle mode: 100 mW (WLAN unassociated)	



### Technical Specifications – Networking/Communication

	Radio off: 100 mW (WLAN unassociated)	
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity</b>  Note: Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).	802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)  802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps)  802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)	
<b>Antenna Connections</b>	2 U.FL type connectors (output impedance of 50 ± 2 ohms)	
<b>Form Factors</b>	PCI-Express Half-MiniCard	
<b>Weight</b>	0.0068 lb (3.1 g)	
<b>Dimensions</b>	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)	
<b>Operating Voltage</b>	3.3V +/- 9%	
<b>Temperature</b>	<b>Operating:</b> <b>Non-operating:</b>	14° to 158° F (-10° to 70° C) -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating:</b> <b>Non-operating:</b>	10% to 90% (non-condensing) 5% to 90% (non-condensing)
<b>Altitude</b>	<b>Operating:</b> <b>Non-operating:</b>	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber - Radio OFF; LED White - Radio ON	

### HP WLAN 802.11 a/b/g/n 2x2 Dual Band PCIe x1 WLAN/Bluetooth Card

<b>Wireless LAN Standards</b>	IEEE 802.11a/b/g/n	
<b>Interoperability</b>	Wi-Fi certification	
	BQE certification of the Bluetooth component	
	CCXv1, v2, v3, v4, v5 CCX certified (Cisco Client Extensions)	
	NOTE: 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.	
<b>Frequency Band</b>	802.11b/g/n	2.402-2.482 GHz
	802.11a/n	4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz

### Technical Specifications – Networking/Communication

<b>Antenna Structure</b>	2 transmit; 2 receive (2x2) Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications.											
<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: 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>											
<b>Security</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 V5</li> <li>WAPI</li> </ul> <p>Note: Check latest software/driver release for updates on supported security features.</p>											
<b>Roaming</b>	IEEE 802.11 compliant roaming between band Access Points											
<b>Output Power</b>	<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> <p>Note: Maximum output power may vary by country according to local regulations.</p>											
<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 802.11 compliant power saving mode Supports USB selective suspend and resume of the Bluetooth component through the USB control signals.											
<b>Receiver Sensitivity</b>	802.11b <table border="1" data-bbox="730 1856 1329 1978"> <thead> <tr> <th>Sensitivity (dBm)</th> <th>Rate (Mbps)</th> <th>Modulation and Coding Rate</th> </tr> </thead> <tbody> <tr> <td>-95</td> <td>1</td> <td>BPSK</td> </tr> <tr> <td>-93</td> <td>2</td> <td>QPSK</td> </tr> </tbody> </table>			Sensitivity (dBm)	Rate (Mbps)	Modulation and Coding Rate	-95	1	BPSK	-93	2	QPSK
Sensitivity (dBm)	Rate (Mbps)	Modulation and Coding Rate										
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-93	2	QPSK										

### Technical Specifications – Networking/Communication

		-91	5.5	CCK																											
		-88	11	CCK																											
	802.11a/g	<table border="1"> <thead> <tr> <th>Sensitivity (dBm)</th> <th>Rate (Mbps)</th> <th>Modulation and Coding Rate</th> </tr> </thead> <tbody> <tr> <td>-90</td> <td>6</td> <td>BPSK - 1/2</td> </tr> <tr> <td>-89</td> <td>9</td> <td>BPSK - 3/4</td> </tr> <tr> <td>-87</td> <td>12</td> <td>QPSK - 1/2</td> </tr> <tr> <td>-85</td> <td>18</td> <td>QPSK - 3/4</td> </tr> <tr> <td>-82</td> <td>24</td> <td>16 QAM - 1/2</td> </tr> <tr> <td>-79</td> <td>36</td> <td>16 QAM - 3/4</td> </tr> <tr> <td>-76</td> <td>48</td> <td>64 QAM - 2/3</td> </tr> <tr> <td>-74</td> <td>54</td> <td>64 QAM - 3/4</td> </tr> </tbody> </table>			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
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-74	54	64 QAM - 3/4																													
	802.11n	<table border="1"> <thead> <tr> <th>Sensitivity (dBm)</th> <th>Rate (Mbps)</th> <th>Modulation and Coding Rate</th> </tr> </thead> <tbody> <tr> <td>-69</td> <td>150</td> <td>64 QAM - 5/6</td> </tr> <tr> <td>-66</td> <td>300</td> <td>64 QAM - 5/6</td> </tr> </tbody> </table>			Sensitivity (dBm)	Rate (Mbps)	Modulation and Coding Rate	-69	150	64 QAM - 5/6	-66	300	64 QAM - 5/6																		
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)																														
<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>	14° to 158° F (-10° to 70° 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 95% (non-condensing)																													
<b>Altitude</b>	<b>Operating:</b>	0 to 10,000 ft (3,048 m)																													
	<b>Non-operating:</b>	0 to 50,000 ft (15,240 m)																													

### AUDIO

<b>High Definition Audio</b>	
<b>Type</b>	Integrated
<b>HD Stereo Codec</b>	Realtek 2-channel ALC221 codec
<b>Audio I/O Ports</b>	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) 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

### Technical Specifications - Audio

	configured as a second front headphone output, both front headphone outputs are always driven with the same signal.
	All ports are 3.5mm
<b>Internal Speaker Amplifier</b>	1.5W amplifier for the internal speaker only. External speakers must be powered externally.
<b>Multi-streaming Capable</b>	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.
<b>Sampling</b>	8 kHz - 192 kHz
<b>Wavetable Syntheses</b>	Yes – Uses OS soft wavetable
<b>Analog Audio</b>	Yes
<b># of Channels on Line-Out</b>	Stereo (Left & Right channels)
<b>Internal Speaker</b>	Yes
<b>External Speaker Jack</b>	Yes

### Technical Specifications - Input/Output Devices

#### INPUT/OUTPUT DEVICES

<b>HP PS/2 Keyboard</b>		
<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 ± 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
	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

### Technical Specifications - Input/Output Devices

	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 ProtectTools smart card and the HP ProtectTools 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>	
<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 ± 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

### Technical Specifications - Input/Output Devices

	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)
	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 (FIPS 201)
	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)

### Technical Specifications - Input/Output Devices

		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	
USA		USAFCC part 15		
<b>Approvals</b>	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF			
<b>Ergonomic Compliance</b>	ISO 9241-4, TUVGS			
<b>Kit Contents</b>	Keyboard, I/O Security and Documentation CD, warranty card			
<b>HP USB PS/2 Washable Keyboard</b>				
<b>Physical Characteristics</b>	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		
<b>Electrical</b>	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		
<b>Mechanical</b>	Keycaps	Stepped -profile design		
	Switch actuation	55-g nominal peak force with tactile feedback		
	Switch life	20 million keystrokes		



### Technical Specifications - Input/Output Devices

	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
<b>Environmental</b>	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
	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 8, 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 PS/2 Mouse

<b>Dimensions</b> (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% (non condensing at ambient)
	Non-operating humidity	10% to 90% (non condensing at ambient)
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces

### Technical Specifications - Input/Output Devices

	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (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
	Mechanical life	Minimum 200,000 revolutions
<b>Regulatory Approvals</b>	UL/cUL, FCC, CE Mark, TUV/GS, VCCI, KCC, BSMI, C-Tick	

### Technical Specifications - Input/Output Devices

<b>HP USB Mouse</b>	
<b>Dimensions</b> (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

<b>HP USB 1000dpi Laser Mouse</b>		
<b>Dimensions</b> (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% (non-condensing at ambient)
<b>Mechanical</b>	Resolution	1000dpi
	Tracking Speed	45 cm/sec
	Cable Length	70.9 in (180 cm)

<b>HP USB PS/2 Washable Mouse</b>		
<b>Dimensions</b> (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)

### Technical Specifications - Input/Output Devices

	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 (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
	Tracking mechanism life	8.8 ft total 70 cm+ 2m extension
	Cable length	Mechanically compliant

### Technical Specifications - Input/Output Devices

	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

#### 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)* Non-operating: -22° to 140° F(-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) 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

Standard Efficiency	300W & 180W active PFC (230 VAC input only) 300W & 180W Reg (115V/230 VAC)
High Efficiency* 80 PLUS Bronze	300W & 180 active PFC EStar 6 82/85/82% efficient at 20/50/100% load (115V) 82/85/82% efficient at 20/50/100% load (230V)
Rated Voltage Range	200 - 240 VAC (300W & 180W active PFC) 100 - 240 VAC (300W & 180W ENERGY STAR® 6) 115 VAC/230 VAC (300W & 180W Reg)
Rated Line Frequency	50/60 Hz
Operating Line Frequency	47 – 63 Hz
Rated Input Current	4A/200 VAC, 8A/100 VAC
Rated Input Current with Energy Efficient* Power Supply	6.3A/100 VAC
Current Leakage (NFPA 99)	<900uA / 230 VAC (300W PSU)
Current Leakage with Energy Efficient Power Supply	<600uA / 230 VAC
Power Supply Fan	80mm Fan
Power cord length	6.0 ft. (1.83 m)
External Power Adapter	
Dimensions	N/A
Total Cord Length	N/A

\*High efficiency power supply is a requirement for ENERGY STAR® qualification in conjunction with a select range of processors and modules

### Technical Specifications – Weights & Dimensions

#### **WEIGHTS & DIMENSIONS**

(configured with 1 HDD & 1 ODD)

<b>Chassis (W x H x D)</b>	165 x 355 x 358.8 mm 6.49 x 13.976 x 14.126 in
<b>System Volume</b>	21.02 L
<b>System Weight*</b>	6.5 kg 14.33 lb
<b>Max Supported Weight (desktop orientation)</b>	N/A
<b>Tower Stand (H x W x D)</b>	N/A
<b>Packaged (H x W x D)</b>	496 x 240 x 520 mm 19.53 x 9.45 x 20.47 in
<b>Shipping Weight</b> (Packaged – ODD x 1, HDD x 1)	Est. 9.083 kg (20.024 lb)
<b>Palletization Profile</b>	2 x 5 = 10 -units per layer 4-layer max. 40-units per pallet

After-Market Options (availability may vary by region)

### 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
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- CD & Diskette Removal
- Tool icon for easy Identification

### ADDITIONAL FEATURES

	Description
<b>Drive Lock</b>	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
<b>Drive Protection System</b>	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



### After-Market Options (availability may vary by region)

	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
<b>SMART Technology (Self-Monitoring, Analysis and Reporting Technology)</b>	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted
<b>SMART I - Drive Failure Prediction</b>	Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count
<b>SMART II - Off-Line Data Collection</b>	By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
<b>SMART III - Off-Line Read Scanning with Defect Reallocation</b>	IOEDC: I/O Error Detection Circuitry Detects errors in Read/Write buffers on HDD cache RAM
<b>SMART IV - End-to-End CRC for hard drives</b>	Interface in F10 setup provides confirmation of SMART IV support.

### ENVIRONMENTAL DATA

#### Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration
- US ENERGY STAR®
- EPEAT <Gold> registered in the United States. See <http://www.epeat.net> for registration status in your country.

#### System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Desktop model is based on a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

#### Energy Consumption (in accordance with US ENERGY STAR® test method)

	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 60Hz</b>
Normal Operation (Short idle)	21.94 W	21.08 W	22.098 W
Normal Operation (Long idle)	21.16 W	19.43 W	20.46 W
Sleep	1.49 W	1.60 W	1.50 W
Off	0.79 W	0.86 W	0.78 W

#### Note:

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

#### Heat Dissipation\*

	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 60Hz</b>
Normal Operation (Short idle)	75 BTU/hr	72 BTU/hr	76 BTU/hr
Normal Operation (Long idle)	72 BTU/hr	66 BTU/hr	70 BTU/hr
Sleep	5 BTU/hr	5 BTU/hr	5 BTU/hr
Off	3 BTU/hr	3 BTU/hr	3 BTU/hr

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

### After-Market Options (availability may vary by region)

#### Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

Typically Configured – Idle  
Fixed Disk – Random writes

Sound Power  
( $L_{WA,d}$ , bels)

3.6  
3.6

Sound Pressure  
( $L_{pAm}$ , decibels)

26  
27

#### Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- 6 USB ports
- 2 memory slots
- 1 Mini PCIe half-length slot
- 1 MXM 3.0 Type A - 35W slot
- 1 mSATA slot
- 1 2.5" internal bay supporting up to Two 2.5" hard drives (HDD/SSD/SED/SSHD)
- 1 5.25" external supporting optical drive

<edit list of features as required>

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

#### Batteries

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

Batteries used in the product do not contain:

- Mercury greater the 1ppm by weight
- Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)

Battery type: Lithium

#### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the <gold> level, see [www.epeat.net](http://www.epeat.net)
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 11.9% post-consumer recycled plastic (by wt.)
- This product is 90.6% recycle-able when properly disposed of at end of life.

#### Packaging Materials

<b>External:</b>	PAPER/Corrugated	1065 g
<b>Internal:</b>	PLASTIC/EPE-Expanded Polyethylene	260 g
	PLASTIC/Polyethylene low density	50 g

The plastic packaging material contains at least 7 % recycled content.

The corrugated paper packaging materials contains at least 25% recycled content.

#### Common to all Form Factors

#### 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

### After-Market Options (availability may vary by region)

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

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

### Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

### End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

### After-Market Options (availability may vary by region)

#### **Hewlett-Packard Corporate Environmental Information**

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

Global Citizenship Report

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

Eco-label certifications

<http://www8.hp.com/us/en/hp-information/environment/ecolabels.html>

ISO 14001 certificates:

[http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC\\_GBU\\_Product\\_Design\\_ISO\\_14K\\_Certificate.pdf](http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf)

and

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

After-Market Options (availability may vary by region)

### Business Monitors

	<b>Part Number</b>
HP ProDisplay P191	C9E54AA
HP ProDisplay P201	C9F26AA
HP ProDisplay P221	C9E49AA
HP ProDisplay P17A	F4M97AA
HP ProDisplay P19A	D2W67AA
HP ProDisplay P231	E4S07AA
HP EliteDisplay E201	C9V73AA
HP EliteDisplay E221	C9V76AA
HP EliteDisplay E231	C9V75AA
HP EliteDisplay E190i	E4U30AA
HP EliteDisplay E241i	FOW81AA
HP EliteDisplay E271i	D7Z72AA
HP EliteDisplay E221c	D9E49AA
HP EliteDisplay S230tm	E4S03AA
HP L2206tm	BOL55AA

### Communication Devices

	<b>Part Number</b>
Intel Ethernet I210 – T1 Gbe NIC	E0X95AA
Intel 7260 802.11 a/b/g/n PCIe x1 WLAN Card	F2P07AA

### Graphics Solutions

	<b>Part Number</b>
AMD Radeon HD 8350 Graphics (PCIe x16)	E1C63AA
AMD Radeon HD 8490 Graphics Card	E1C64AA
Nvidia NVS 310 Graphics (PCIe x16)	A7U59AA
Nvidia NVS 315 Graphics (PCIe x16)	E1C65AA
HP DisplayPort Cable Kit	VN567AA
HP DisplayPort To Dual Link DVI-D Adapter	NR078AA
HP DisplayPort To DVI-D Adapter	FH973AA
HP DisplayPort to HDMI Adapter	BP937AA
HP DisplayPort to VGA Adapter	AS615AA
HP DMS-59 to Dual DVI Cable	DL139A
HP DMS-59 to Dual DisplayPort Adapter	XP688AA
Dual Output USB Graphics Adapter	C5U89AA

### Data Storage Drives and Accessories

	<b>Part Number</b>
HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK555AA
HP 1-TB 10K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	C2T91AA
HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK554AA
Intel Pro 1500 180GB SATA SED Opal1 SSD	G4M04AA
HP 128-GB SATA 3.0Gb/s Solid State Drive	QV063AA

### After-Market Options (availability may vary by region)

HP 500-GB SATA 3.0Gb/s Solid State Hybrid Drive	E1C62AA
HP Slim Removable SATA Hard Drive Enclosure (frame & carrier)	C1N41AA
HP Slim Removable SATA Hard Drive Enclosure (carrier only)	AR639AA

### Input Devices

	Part Number
HP USB Keyboard	QY776AA
HP USB Gray Keyboard (EMEA only)	B6B64AA
HP USB Smart Card (CCID) Keyboard	E6D77AA
HP USB Keyboard and Mouse Kit	B1T09AA
HP USB and PS/2 Washable Keyboard and Mouse Kit	BU207AA
HP PS/2 Mouse	QY775AA
HP USB Mouse	QY777AA
HP USB 1000dpi Laser Mouse	QY778AA
HP Wireless Keyboard and Mouse Combination	QY449AA

### System Memory

	Part Number
HP 4GB DDR3-1600 (PC3-12800) DIMM	B4U36AA
HP 8GB DDR3-1600 (PC3-12800) DIMM	B4U37AA

### Multimedia Devices

	Part Number
HP Slim DVD-ROM Drive	VP033AA
HP Slim SuperMulti DVD Writer Drive	QS209AA
HP USB HD 720P v2 Business Webcam	D8Z08AA
HP Business Headset	QK550AA
HP Business Speakers	D9J19AA

### Security Devices

	Part Number
HP UltraSlim Cable Lock	H4D73AA

### Stands and Accessories

	Part Number
HP (10 Sets) 400 G2 Bezel Support Kit	TBD
HP Serial Port Adapter (RS-232 compatible)	PA716A
HP Parallel Port Kit	KD061AA
HP PCI Expansion Kit	E1V16AA

### LANDesk Software (E-Delivery)

Contact your HP representative for available options.

### After-Market Options (availability may vary by region)

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April 2014

### After-Market Options (availability may vary by region)

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
June 13, 2014	From v1.7 to v1.8	Change	Graphic disclaimer note
June 13, 2014	From v1.7 to v1.8	Addition	Addition of change log
July 1, 2014	From v1.8 to v1.9	Addition	add environmental section above options
July 11, 2014	From 1.9 to 2	Update	Update System Volume
		Addition	Per Jeff request added the headings to the section
July 17, 2014	From v2 to v4	Upgrade	Update the version to match the PB