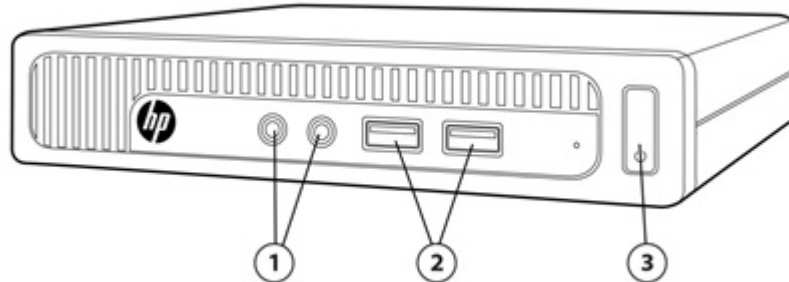# QuickSpecs

Overview

## HP ProDesk 600 G1 Desktop Mini Business PC

1.   3.5mm headphone output and microphone jacks

2.   (2) Front USB 3.0 ports

3.   Power button and PC status LED

     Not Shown

Slots   (1) internal M.2 connector for optional wireless NIC
          (1) internal M.2 connector for optional SSD drive (Available June '14)

Bays   (1) 2.5" internal storage drive bay

Rear I/O (2) USB 3.0 ports; (2) USB 2.0 ports
          (1) VGA video port; (2) DisplayPort with multi-stream video ports
          (1) RJ-45 network connector
          3.5mm audio out jack

VESA   Support for VESA 100mm mounting system on bottom of PC chassis

Overview

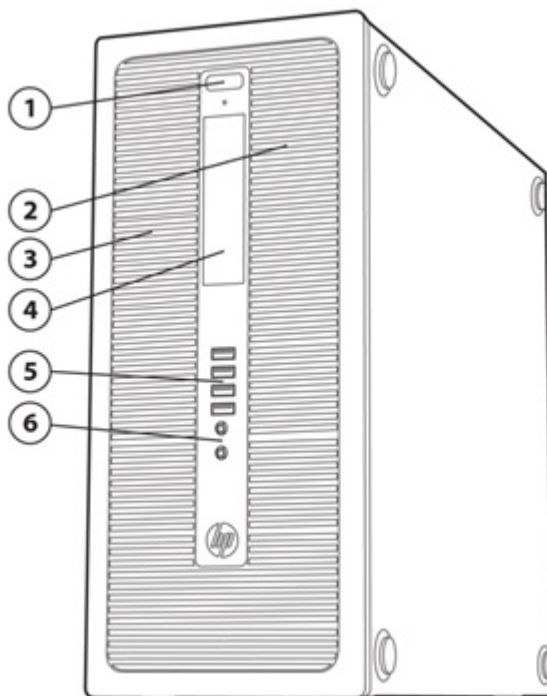## HP ProDesk 600 G1 Small Form Factor Business PC
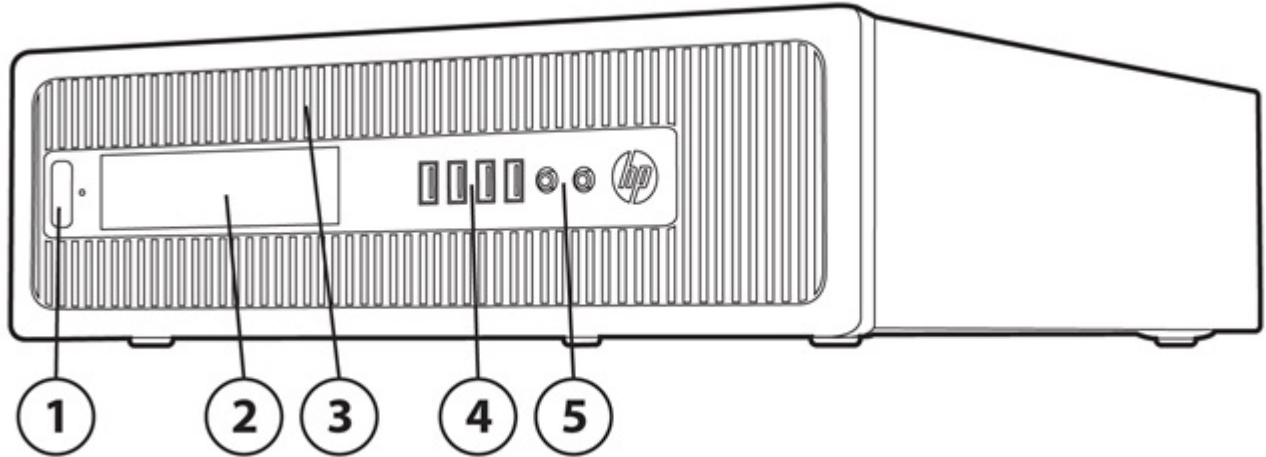
1.   Power button and PC status LED

2.   3.5" external drive bay; used for installing a Media Card Reader or 2nd data storage drive

3.   Slim drive bay supporting an optical disk drive (located behind removable bezel)

4.   (2) USB 3.0 ports, (2) USB 2.0 ports

5.   3.5mm headphone output and microphone jack

      <u>Not Shown</u>

Slots   (1) PCI Express x16 graphics connector
           (3) PCI Express x1 accessory connectors

Bays   (1) 2.5" internal storage drive bay
           (1) 3.5" internal storage drive bay

Rear I/O   (2) USB 3.0 ports; (4) USB 2.0 ports
           (1) VGA video port; (2) DisplayPort with multi-stream video ports
           (1) RJ-45 network connector
           (1) RS-232 serial port
           3.5mm audio in/out jacks
           PS/2 keyboard and mouse ports

Overview

HP ProDesk 600 G1 Tower Business PC

1. Power button and PC status LED

2. Slim drive bay supporting an optical disk drive (located behind removable bezel)

3. 5.25" half height external drive bay (located behind removable bezel)

4. 3.5" external drive bay; used for installing a Media Card Reader

5. (2) USB 3.0 ports, (2) USB 2.0 ports

6. 3.5mm headphone output and microphone jack

    <u>Not Shown</u>

Slots   (1) PCI Express x16 graphics connector
(3) PCI Express x1 accessory connector

Bays   (1) 2.5" internal storage drive bay
(2) 3.5" internal storage drive bay

Rear I/O   (2) USB 3.0 ports; (4) USB 2.0 ports
(1) VGA video port; (2) DisplayPort with multi-stream video ports
(1) RJ-45 network connector
(1) RS-232 serial port
3.5mm audio in/out jacks
PS/2 keyboard and mouse ports

Overview

At A Glance

- Choice of Desktop Mini, Small Form Factor or Tower chassis options
- PC chassis and all internal components and modules are manufactured with low halogen content
- HP developed and engineered UEFI BIOS supporting security, manageability and software image stability
- Intel® Q85 chipset supporting Intel 4th generation Core processors, featuring integrated Intel HD Graphics and Intel® Standard Manageability Technology
- Processor support up to 84W (TWR/SFF), 35W (DM)
- Intel® Ethernet Connection I217L GbE LOM integrated network connection
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Multi-independent monitor support via VGA and dual digital DisplayPort video interfaces with multi-stream
- Discrete graphics options available for SFF and TWR platforms
- DTS+ Sound audio management software
- Standard and high efficiency energy saving power supply options
- ENERGY STAR® qualified and certified EPEAT® Gold models
- Guaranteed lengthy purchase lifecycles and image stability

QuickSpecs

Standard Features and Configurable Components (availability may vary by country)

OPERATING SYSTEM

Preinstalled When Purchased

Windows 8.1 Pro (64-bit)*
Windows 8.1 (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)***

FreeDOS 2.0
Novell SUSE Linux Enterprise Desktop 11

*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.

CHIPSET

	DM	SFF/TWR
Intel® Q85 Express	X	X

PROCESSOR

	DM	SFF/TWR

Intel® 4th Generation Core™ i7 Processors

	DM	SFF/TWR
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		X
Intel® Core™ i7-4790S Processor Up to 4.0 GHz Max. Turbo Frequency (3.2 GHz base frequency) 8 MB cache, 4 cores, 8 threads Intel HD Graphics 4600 Supports DDR3 memory up to 1600 MT/s data rate		X (only SFF)
Intel® Core™ i7-4785T Processor Up to 3.2 GHz Max. Turbo Frequency (2.2 GHz base frequency) 8 MB cache, 4 cores, 8 threads Intel® HD Graphics 4600 Supports DDR3 memory up to 1600 MT/s data rate	X	

Standard Features and Configurable Components (availability may vary by country)

Intel Core i7-4771 Processor **X**
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

Intel® Core™ i7-4770 Processor **X**
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™ i7-4765T Processor **X**
Up to 3.0 GHz Max. Turbo Frequency (2.0 GHz base frequency)
8 MB cache, 4 cores, 8 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® 4th Generation Core™ i5 Processors
Intel® Core™ i5-4690 Processor **X**
Up to 3.9 GHz Max. Turbo Frequency (3.5 GHz base frequency)
6 MB cache, 4 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4590 Processor **X**
Up to 3.7 GHz Max. Turbo Frequency (3.3 GHz base frequency)
6 MB cache, 4 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4590T Processor **X**
Up to 3.0 GHz Max. Turbo Frequency (2.0 GHz base frequency), 6 MB cache, 4 cores, 4 threads
Intel® HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4670 Processor **X**
Up to 3.8 GHz Max. Turbo Frequency (3.4 GHz base frequency)
6 MB cache, 4 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4570 Processor **X**
Up to 3.6 GHz Max. Turbo Frequency (3.2 GHz base frequency)
6 MB cache, 4 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4570T Processor **X**
Up to 3.6 GHz Max. Turbo Frequency (2.9 GHz base frequency)
4 MB cache, 2 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Standard Features and Configurable Components (availability may vary by country)

Intel® Core™ i5-4570S Processor   **X (only SFF)**
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® 4th Generation Core™ i3 Processors
Intel® Core™ i3-4370 Processor   **X**
3.8 GHz base frequency
4 MB cache, 2 cores, 4 threads
Intel® HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4360 Processor   **X**
3.7 GHz base frequency
4 MB cache, 2 cores, 4 threads
Intel® HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4350 Processor   **X**
3.6 GHz base frequency
4 MB cache, 2 cores, 4 threads
Intel® HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4350T Processor   **X**
3.1 GHz base frequency
4 MB cache, 2 cores, 4 threads
Intel® HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4340 Processor   **X**
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   **X**
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™ i3-4330T Processor   **X**
3.0 GHz base frequency
4 MB cache, 2 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4160 Processor   **X**
3.6 GHz base frequency
3 MB cache, 2 cores, 4 threads
Intel® HD Graphics 4400
Supports DDR3 memory up to 1600 MT/s data rate

Standard Features and Configurable Components (availability may vary by country)

Intel® Core™ i3-4150 Processor   **X**
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™ i3-4150T Processor   **X**
3.0 GHz base frequency
4 MB cache, 2 cores, 4 threads
Intel® HD Graphics 4400
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4130 Processor   **X**
Up to 3.4 GHz base frequency
3 MB cache, 2 cores, 4 threads
Intel HD Graphics 4400
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4130T Processor   **X**
2.9 GHz base frequency
3 MB cache, 2 cores, 4 threads
Intel HD Graphics 4400
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4160T   **X**   **X**
3.1 GHz base frequency, 3 MB cache, 2 cores, 4 threads
Supports DDR3 memory 1600 MT/s data rate
Intel HD Graphics 4400

Intel® Core™ i3-4360T   **X**   **X**
3.2 GHz base frequency, 4 MB cache, 2 cores, 4 threads
Supports DDR3 memory 1600 MT/s data rate
Intel HD Graphics 4600

Intel® 4th Generation Pentium™ Processors

Intel® Pentium G3460 Processor   **X**
Up to 3.5 GHz Base Frequency
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium G3450 Processor   **X**
Up to 3.4 GHz Base Frequency
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium G3440 Processor   **X**
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

Standard Features and Configurable Components (availability may vary by country)

<u>Intel® Pentium™ G3440T Processor</u>   **X**
2.8 GHz base frequency
3 MB cache, 2 cores, 2 threads
Intel® HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

<u>Intel® Pentium G3430 Processor</u>   **X**
Up to 3.3 GHz base frequency
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

<u>Intel® Pentium G3420 Processor</u>   **X**
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

<u>Intel® Pentium™ G3420T Processor</u>   **X**
2.7 GHz base frequency
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

<u>Intel® Pentium™ G3240T Processor</u>   **X**
2.7 GHz base frequency
3 MB cache, 2 cores, 2 threads
Intel® HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

<u>Intel® Pentium G3250 Processor</u>   **X**
Up to 3.2 GHz Base Frequency
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate

<u>Intel® Pentium G3240 Processor</u>   **X**
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

<u>Intel® Pentium G3220 Processor</u>   **X**
Up to 3.0 GHz base frequency
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate

<u>Intel® Pentium™ G3220T Processor</u>   **X**
2.6 GHz base frequency
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate

Standard Features and Configurable Components (availability may vary by country)

Intel® Pentium® G3250T   **X**
2.8 GHz base frequency, 3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory 1333 MT/s data rate

Intel® Pentium® G3450T   **X**
2.9 GHz base frequency, 3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory 1600 MT/s data rate

Intel® 4th Generation Celeron™ Processors

Intel® Celeron™ G1850 Processor   **X**
2.9 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel® HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Celeron™ G1840 Processor   **X**
2.8 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel® HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Celeron™ G1840T Processor   **X**
2.5 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel® HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Celeron™ G1830 Processor   **X**
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   **X**
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

Intel® Celeron™ G1820T Processor   **X**
2.4 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate

Standard Features and Configurable Components (availability may vary by country)

GRAPHICS

	DM	SFF/TWR
Intel HD Graphics on all models (integrated on processor)	X	X
Optional Discrete Graphics Solutions		
AMD Radeon HD 8350 (1GB) PCIe x16		X
AMD Radeon HD 8490 (1GB) PCIe x 16		X
AMD Radeon R7 240 2GB FH PCIe x16 GFX		X
AMD Radeon R9 255 2GB FH PCIe x16 GFX		TWR only
NVIDIA NVS 310 (512 MB) PCIe x16		X
NVIDIA NVS 315 (1GB) PCIe x 16		X
NVIDIA GeForce GT630 (2 GB) FH PCIe x16		TWR only
Adapters and Cables		
HP DMS-59 to Dual DisplayPort Cable		X
HP DMS-59 to Dual DVI Cable		X
HP DMS-59 to Dual VGA Cable		X
HP DisplayPort to DisplayPort Cable	X	X
HP DisplayPort to DVI-D Adapter	X	X
HP DisplayPort to HDMI Adapter	X	X
HP DisplayPort To HDMI 1.4 Adapter	X	X
HP DisplayPort to VGA Adapter	X	X
HP Serial Port Adapter		X
HP Parallel Port Adapter		X

STORAGE

Hard Disk Drive (HDD)	DM	SFF/TWR
320 GB 7200 rpm HDD		X
500 GB 7200 rpm HDD	X	X
500 GB 7200 rpm SED HDD	X	X
500 GB 10K rpm HDD		X
1 TB 7200 rpm HDD		X
1 TB 10K rpm HDD		X
2 TB 7200 rpm HDD		X

Solid State Hybrid Drives (SSHD)	DM	SFF/TWR
500 GB SSHD (8 GB cache)	X	X
500 GB SATA 6G 2.5 8G SSHD	X	
1 TB SSHD (8 GB cache)	X	X
1 TB SATA 6G 2.5 8G SSHD	X	

Solid State Drives (SSD) & Self-encrypting Solid State Drives (SED)	DM	SFF/TWR
120 GB SATA 2.5 Non-SED SSD (with 3.5" adapter when needed)	X	X
180 GB SATA 2.5 Non-SED SSD (with 3.5" adapter when needed)	X	X
120 GB Opal SED	X	X
120 GB SATA 2.5 Opal2 SED SSD (with 3.5" adapter when needed)	X	X
180 GB SATA 2.5 Opal2 SED SSD (with 3.5" adapter when needed)	X	X

Standard Features and Configurable Components (availability may vary by country)

	DM	SFF/TWR
Intel Pro 1500 120gb SSD Opal 1 SED drive SRP	X	
120GB SATA 2.5 2nd Opal1 SED SSD	X	
128 GB SSD Non-SED		X
128 GB Opal SED	X	X
128 GB Turbo Drive SSD (M.2 PCIe)	X	
128GB SATA 2.5 2nd Opal2 SED SSD	X	
180 GB Opal SED	X	X
Intel Pro 1500 180gb SSD Opal 1 SED drive	X	
256 GB SED		X
256 GB Opal SED	X	X
256GB SATA 2.5 SSD (Non-SED)	X	X
512 GB SATA 2.5 SSD (Non-SED)		X (Only SFF)

Optical Disc Drives	DM	SFF/TWR
Slim DVD-ROM		X
Slim BDXL Blu-ray Writer		X
Slim SuperMulti DVD Writer		X
HH Supermulti ODD		TWR only

Removable	DM	SFF/TWR
HP Slim Removable SATA HDD Frame/Carrier		X

MEMORY

Form Factor	Type	Maximum	# of Slots
Desktop Mini	DDR3 non-ECC up to 1600 MT/s	16 GB	2 SODIMM
Small Form Factor	DDR3 non-ECC Up to 1600 MT/s	32 GB	4 DIMM
Tower	DDR3 non-ECC Up to 1600 MT/s	32 GB	4 DIMM

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

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

Standard Features and Configurable Components (availability may vary by country)

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)	DM	SFF/TWR
Intel I217LM Gigabit Network Connection (standard)	X	X
Intel Ethernet I210-T1 PCIe x1 Gb Network Interface Card (optional)		X
Wireless		
HP WLAN 802.11 a/g/n 2x2 DualBand PCIe x1 Card (optional)		X
Intel Centrino Advanced-N 6205 802.11 a/b/g/n PCI Express x1 Wireless Network Connection (optional)		X
Intel Wireless-N 7260 802.11 M.2 a/b/g/n NIC Card Wireless Network Connection (optional)	X	
Intel Wireless-N 7260 802.11 a/b/g/n PCIe x1 NIC Wireless Network Connection (optional)		X
Intel 7260 802.11 a/b/g/n M.2 BT NIC	X	X

AUDIO/MULTIMEDIA

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

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

KEYBOARDS AND POINTING DEVICES

Keyboard	DM	SFF/TWR
HP PS/2 Keyboard		X
HP USB Keyboard	X	X
USB Smart Card (CCID) Keyboard	X	X
HP USB and PS/2 Washable Keyboard	X	X
HP Wireless Keyboard and Mouse Combo*	X	X
HP USB Antimicrobial Keyboard	X	X

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

Mice	DM	SFF/TWR
HP PS/2 Mouse		X
HP USB Mouse	X	X
HP USB 1000dpi Laser Mouse	X	X
HP USB and PS/2 Washable Mouse	X	X
HP USB Antimicrobial Mouse	X	X

Standard Features and Configurable Components (availability may vary by country)

HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability - HP BIOS provides several technologies that help integrate the HP ProDesk 600 G1 Series Business PC into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Stability - HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- UEFI specification 2.1
- Computrace agent - For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management - The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance - Industry leading acoustic emissions across the range of operating conditions.
- Serviceability - HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery - HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery. In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS Features

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

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

SECURITY

	DM	SFF/TWR
Trusted Platform Module (TPM) 1.2	X	X
SATA port disablement (via BIOS)	X	X
Drive lock	X	X
Intel® Identify Protection Technology (IPT)[1]	X	X
Serial, parallel, USB enable/disable (via BIOS)	X	X
Optional USB Port Disable at factory (user configurable via BIOS)	X	X
Removable media write/boot control	X	X
Power-On password (via BIOS)	X	X
Setup password (via BIOS)	X	X
HP Chassis (1 bay) Security Kit		TWR only
Solenoid Hood Lock / Sensor		X
Support for chassis padlocks and cable lock devices	X	X

[1]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

Standard Features and Configurable Components (availability may vary by country)

ENVIRONMENTAL & REGULATORY

ENERGY STAR® qualified models available

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

Low halogen (chassis, all internal components and modules)

TAA compliant

PORTS

I/O Ports - Standard	DM	SFF/TWR
VGA video port	1 (rear)	1 (rear)
DisplayPort with multi-stream video ports	2 (rear)	2 (rear)
USB 2.0	2 (rear)	2 (front); 4 (rear)
USB 3.0	2 (front); 2 (rear)	2 (front); 2 (rear)
Serial (RS-232)	N/A	1
PS/2	N/A	1 keyboard (purple) 1 mouse (green)
Audio	3.5mm headphone & microphone jack (front) 3.5mm audio out jack (rear)	3.5mm headphone & microphone jack (front) 3.5mm audio in & out jacks (rear)
Network Interface	1 RJ-45	1 RJ-45
I/O Ports - Optional	**DM**	**SFF/TWR**
2nd Serial (RS-232)	N/A	1
Parallel	N/A	1

SLOTS

	DM	SFF	TWR
PCI Express x1(v2.0)	N/A	3 ea. 2.5" low profile 6.6" length 10W max. power	3 ea. 4.2" full height 6.6" length 10W max. power
PCI Express x16 (v3.0)	N/A	1 ea. 2.5" low profile 6.6" length 35W max. power	1 ea. 4.2" full height 6.6" length 75W max. power
M.2	1 ea. M.2-2230 (for WLAN) 1 ea. M.2-2280 (for storage drives)	N/A	N/A

BAYS

	DM	SFF/TWR
Media Card Reader	N/A	1
Slim Optical Disc Drive	N/A	1
3.5" internal storage drive	N/A	1 - SFF 2 - TWR
2.5" internal storage drive	1	1

Standard Features and Configurable Components (availability may vary by country)

SERVICE AND SUPPORT

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

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, Software and eDocumentation

OPERATING SYSTEMS

Preinstalled	Windows 8.1 Pro (64-bit)*
	Windows 8.1 (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)***
	FreeDOS 2.0
	Novell SUSE Linux Enterprise Desktop 11

For all Preinstalled operating systems HP provides Microsoft WHQL certified (where applicable) drivers on www.hp.com at the time of product announcement.

Web Support	Windows 7 Enterprise (32-bit or 64-bit)
	Windows 8 (64-bit)
	Windows 8 Pro (64-bit)*
	Windows 8 Enterprise (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 within 30 days of product announcement.

Certified	Novell SUSE Linux Enterprise Desktop 11[1]
	Red Hat Enterprise Linux 64[1]

For all Certified operating systems HP will submit hardware to the operating system vendor for testing and certification. All drivers would be obtained from the operating system vendor, not supplied by HP. Certification will be posted by the operating system vendor.

Test & Document	Windows® Vista Enterprise (32-bit or 64-bit)
	Windows® Vista Professional (32-bit or 64-bit)

For all Test & Document operating systems HP will perform functional testing of the operating system on the HP business PC platform. Any issues found will be documented in an Engineering Advisory and/or Service Advisory and posted to www.hp.com. HP will not develop or qualify any drivers or perform any integration testing.

*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.

[1]The following features are not supported by Novell SUSE Linux Enterprise Desktop:

- Intel Gigabit CT Desktop NIC
- Broadcom NetXtreme Gigabit Ethernet Plus
- HP 16-in-1 Media Card Reader
- HP Client Security
- HP Blu-ray Writer playback of commercial movies
- DisplayPort video interface
- HP 2nd serial port adapter
- Power Management features

Systems configured with Linux do not qualify for ENERGY STAR®

The following features are not supported by Red Hat Enterprise Linux 64:

- TPM v1.2 embedded Security Chip
- Intel Gigabit CT Desktop NIC

Technical Specifications – Operating Systems, Software and eDocumentation

- HP Wireless 802.11b/g/n NIC
- HP 16-in-1 Media Card Reader
- HP Blu-ray Writer
- HP 2nd serial port Adapter
- HP USB Smart Card (CCID) Keyboard
- Power Management features

Systems configured with Linux do not qualify for ENERGY STAR®

SSOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Included	Windows 7	Windows 8.1
Security	Absolute Persistence (status tracing)[1]	Absolute Persistence (status tracing) [1]
	Device Access Manager	Device Access Manager
	Drive Encryption[4]	Drive Encryption[4]
	File Sanitizer (Activated via Wizard)	File Sanitizer (Activated via Wizard)
	Disk Sanitizer (external version)[2]	Disk Sanitizer (external version)[2]
	Microsoft Security Essentials	Microsoft Defender
	HP Client Security	Secure Erase
		HP Client Security
MultiMedia	Cyberlink Power DVD, BD	Cyberlink Power DVD, BD
	Cyberlink Power2Go (Secure Burn)	Cyberlink Power2Go (Secure Burn)
Communication		HP Wireless Hotspot
HP Value Add	HP ePrint Driver[3]	HP ePrint Driver[1]
	HP PageLift	HP PageLift
	HP Support Assistant	HP Recovery Manager
	HP Recovery Disk Creator	HP Support Assistant
		HP QuickStart
3rd Party	Adobe Flash Player	Bing Search
	Bing Search for Internet Explorer 10	Foxit PhantomPDF *Express* for HP
	Box	Skype
	Foxit PhantomPDF *Express* for HP	
	Skype	
Microsoft Products	Buy Office	Buy Office

[1] Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging from one to five years. Service is limited, check with Absolute for availability outside the U.S.

[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).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] Drive Encryption is planned to be available in October 2013. 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.

Technical Specifications - Graphics

Intel HD Graphics

VGA Controller	Integrated
DisplayPort	Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays (including the integrated panel)
Bus Type	N/A
RAMDAC	N/A
Memory	Intel graphics do not have dedicated memory but utilizes some of the computer's system memory The amount of memory used for graphics depending 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. 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.

Maximum Graphics Memory	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.

Maximum Color Depth	32 bits/pixel
Graphics/Video API Support	4th Generation Core processors:

- 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.
- 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
  - Encode/transcode HD content
  - Playback of high definition content including Blu-ray Disc
  - Superior image quality with sharper, more colorful images
- DirectX Video Acceleration (DXVA) support for accelerating video processing
  - Full AVC/VC1/MPEG2 HW Decode
- Advanced Scheduler 2.0, 1.0
- Windows 7, Windows 8, Linux OS Support
- DirectX 11.1
- OpenGL 4.3
- Open CL 1.2

Supported Display Resolutions and Refresh Rates

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

Technical Specifications - Graphics

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

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

AMD Radeon HD 7650A Graphics Card

Form Factor	MXM 3.0
Graphics Controller	AMD Radeon HD 7650A
Core Clock	600MHz
Memory Clock	800MHz
Memory	2GB, DDR3, 128-bit wide
Bus Type	MXM
Max. Power	35W
Power Source Support	12V and 19V
3D API Support	DX11, SMS
HDCP Support	Yes
Display Max. Resolution	Digital 2560 x 1600 Analog 2048 x 1536
Supported Graphics APIs	DX11, OpenGL, full 1080p BD (H264) playback in hardware, Multi-Stream DisplayPort support

QuickSpecs

HP ProDesk 600 G1 Business Series Desktop

Technical Specifications - Graphics

Supported Display Resolutions and Refresh Rates

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

Resolution	Refresh Rates
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

Introduction

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.

The NVIDIA® NVS 310 graphics card is an ideal solution for customers requiring a small form factor graphics add-in card for either standard or small form factor PC designs.

Performance and Features

The NVIDIA® NVS 310 Graphics Card offers 512 MB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.

DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.

For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.

Form Factor — Low Profile: 2.713 × 6.15 in

Graphics Controller — NVIDIA® NVS 310

Memory Clock — 875MHz

Memory Size — 512 MB DDR3

Memory Bandwidth — 14 GB/s

Max. Power — 19.5W

Display Max. Resolution — Up to 2560 x 1600 (digital display) per display

Display Output — Up to 2 displays in the following configurations

DisplayPort output:
- 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
- Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort Multi-Stream topology technology.

DVI-D output:
- 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
- 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

HDMI output:
- 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

Technical Specifications - Graphics

VGA display output:
- Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors

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	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
2048 x 1536				60
2560 x 1600				60

NVIDIA GeForce GT630 Graphics Card

Introduction

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.

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.

Performance and Features

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards deliver superior PCI Express (PCIe) Gen 3 features including:

- Unprecedented flexibility for new applications and enhanced performance
- Support for NVIDIA surround technology
- Run multiple displays from a single graphics card
- Full 16 lane PCIe Generation 3 bus support with peak bandwidth support
- Wireless Display ready for future support

Form Factor	PCIe x16 Card
Graphics Controller	NVIDIA Kepler Architecture GPU
Core Clock	875 MHz
Memory Clock	891 MHz
Memory Size	2 GB DDR3 128 bit
Memory Bandwidth	28.5 GB/s
Display Max. Resolution	2560 x 1600 digital, 2048 x 1536 analog
Display Output	Integrated 400 MHz RAMDAC

Technical Specifications - Graphics

Supported Display Resolutions and Refresh Rates

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

Resolution	Maximum Refresh Rates (Hz)	
	Analog Connection	Digital Connection
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	60
2048 x 1536	75	60
2560 x 1600	N/A	60

NVIDIA NVS 315 1GB PCIe x 16 Graphics Card

Introduction	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.
Performance and Features	The NVIDIA® NVS 315 Graphics Card offers 1 GB of ultrafast DDR3 memory and is capable of supporting up to 2 displays. DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA. For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.
Form Factor	Low Profile: 2.713 × 6.15 in
Graphics Controller	NVIDIA® NVS 315
Memory Clock	875MHz
Memory Size	512 MB DDR3
Memory Bandwidth	14 GB/s
Connectors	DMS-59 , with support for dual VGA, dual DVI or dual Display Port with the appropriate adapter cable
Display Max. Resolution	Up to 2048 x 1536 VGA; 1920 x 1200 DVI; 2560 x 1600 DisplayPort
Display Output	Up to 2 displays in the following configurations

Technical Specifications - Graphics

Supported Display Resolutions and Refresh Rates

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

Resolution	Maximum Refresh Rates (Hz) by Connection	
	Analog Connection	Digital Connection
640 x 480	85	60
720 x 480	85	60
720 x 576	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 768	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1024	85	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	N/A
2048 x 1536	75	N/A
2560 x 1440	N/A	60*
2560 x 1600	N/A	60*

* Display Port Only

AMD Radeon R7 240 2GB PCIe x16

Memory	2048MB DDR3 128-bit wide frame buffer running at 1800MHz.
Controller Clock Speed	AMD R14D-M2-70 GPU engine running at 730 MHz.
Multidisplay Support	Yes (2)
Graphics /API support	Supports Microsoft DirectX 11.1, OpenGL 4.3 and OpenCL 1.2 APIs. DX 11.1, Shader Model 5, UVD 4.2, VCE 2.0, OpenGL 4.2 (4.1+), OpenCL 1.2, and DirectCompute 11
Output Connectors	1 x of each DVI-I (VGA via dongle output), and HDMI connectors.

Supported Display Resolutions and Refresh Rates

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

Resolution	VGA	DVI-D	HDMI
640x480	85	60	60
720x480	85	60	60
720x576	85	60	60
800x600	85	60	60
1024x768	85	60	60
1280x720	85	60	60
1280x768	85	60	60
1280x1024	85	60	60
1440x900	85	60	60
1600x1024	85	60	60
1600x1200	85	60	60
1680x1050	75	60	60
1920x1080	85	60*	60
1920x1200	85	60*	NA
1920x1440	85	NA	NA
2048x1536	75	NA	NA

Technical Specifications - Graphics

2560x1440	NA	NA	NA
2560x1600	NA	NA	NA

* Requires display with support for reduced blanking timing

AMD Radeon R9 255 2GB PCIe x16

Memory	2GB 128-bit wide frame buffer operating at 1150MHz.
Controller Clock Speed	AMD Cape Verde GPU engine operating at 900 MHz.
Multidisplay Support	Yes (2)
Graphics /API support	Supports Microsoft DirectX 11.1, OpenGL 4.3 and OpenCL 1.2 APIs. DX 11.1, Shader Model 5, UVD 4.2, VCE 2.0, OpenGL 4.2 (4.1+), OpenCL 1.2, and DirectCompute 11
Output Connectors	1 x of each Dual-Link DVI-I, DisplayPort 1.2 and HDMI 1.4 output connectors. DisplayPort and HDMI outputs support audio 1 VGA and 1 DisplayPort1.2

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

SUPPORTED DVI-D (DIGITAL) AND DISPLAYPORT DISPLAY MODES Resolution	Depth (BPP)	Refresh Rate (Hz)
320x200	8, 16, 32	60
320x240	8, 16, 32	60
400x300	8, 16, 32	60
480x360	8, 16, 32	60
512x384	8, 16, 32	60
640x350	8, 16, 32	60
640x400	8, 16, 32	60
640x480	8, 16, 32	60
720x480	8, 16, 32	60
720x576	8, 16, 32	60
800x600	8, 16, 32	60
1024x768	8, 16, 32	60
1152x864	8, 16, 32	60
1280x720	8, 16, 32	60
0.98M9 (1280x768)	8, 16, 32	60
1280x960	8, 16, 32	60
1280x1024	8, 16, 32	60
1.30MA (1440x900)	8, 16, 32	60, 75
1600x900	8, 16, 32	60
1.64MA (1600x1024)	8, 16, 32	60
1600x1200	8,16, 32	60
1.76MA (1680x1050)	8, 16, 32	60
1.76MA-R (1680x1050)	8, 16, 32	75-R
2.07M9-R (1920x1080)	8, 16, 32	60-R
2.30MA-R (1920x1200)	8, 16, 32	60-R
2560x1440	8, 16, 32	60
2560x1600	8, 16, 32	60

VGA AND DVI-A (ANALOG) DISPLAY MODES

Resolution Depth (bpp)	CRT	Refresh Rate (Hz)
320x200	8, 16, 32	60, 75, 85
320x240	8, 16, 32	60, 75, 85
400x300	8, 16, 32	60, 75, 85
480x360	8, 16, 32	60, 75, 85
512x384	8, 16, 32	60, 75, 85

Technical Specifications - Graphics

640x350	8, 16, 32	60, 75, 85
640x400	8, 16, 32	60, 75, 85
640x480	8, 16, 32	60, 75, 85
720x480	8, 16, 32	60, 75, 85
720x576	8, 16, 32	50, 60, 75, 85
800x600	8, 16, 32	60, 75, 85
1024x768	8, 16, 32	60, 75, 85
1152x864	8, 16, 32	60, 75, 85
1280x720	8, 16, 32	60, 75, 85
0.98M9 (1280x768)	8, 16, 32	60, 75, 85
1280x960	8, 16, 32	60, 75, 85
1280x1024	8, 16, 32	60, 75, 85
1.30MA (1440x900)	8, 16, 32	60, 75
1600x900	8, 16, 32	60, 75, 85
1.64MA (1600x1024)	8, 16, 32	60, 75, 85
1600x1200	8, 16, 32	60, 75, 85
1.76MA (1680x1050)	8, 16, 32	60, 75
1920x1080	8, 16, 32	60, 75, 85
2.30MA (1920x1200)	8, 16, 32	60, 75, 85
1920x1440	8, 16, 32	60, 75, 85
2048x1536	8, 16, 32	60, 75

AMD Radeon HD 8350 1GB PCIe x16 DH Graphics Card

Introduction	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.
Form Factor	PCIe x16
Graphics Controller	AMD Radeon HD 8350
Core Clock	GPU engine operates at 523 MHz
Memory	1GB, DDR3, SDRAM
Memory Clock	875 MHz
HDCP Support	Yes
Display Max. Resolution	Digital 1920 x 1200 Analog 2048 x 1536

Supported Display Resolutions and Refresh Rates

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

	Analog Connection	Digital Connection
640 x 480	85	60
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

Technical Specifications - Graphics

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

Introduction	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.
Form Factor	PCIe x16
Graphics Controller	AMD Radeon HD 8490
Core Clock	GPU engine operates at 875 MHz
Memory	1GB, DDR3, SDRAM
Memory Clock	900 MHz
HDCP Support	Yes
Display Max. Resolution	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
400 x 300	85	60
640 x 480	85	60
720 x 480	85	60
720 x 576	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 768	85	60
1280 x 1024	85	60
1440 x 900	75	75
1600 x 900	85	60
1600 x 1024	85	60
1600 x 1200	85	60
1680 x 1050	75	75-R
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	N/A
2048 x 1536	75	N/A
2560 x 1440	N/A	60
2560 x 1600	N/A	60

Technical Specifications - Hard Disk and Solid State Storage

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 600 G1 Series Business PC supports the latest SATA 6.0Gb/s specification.

HP Drive Lock

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

SMART IV Technology

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

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

Native Command Queuing

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

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

Technical Specifications - Hard Disk and Solid State Storage

HP 500-GB 7200 RPM SATA 2.5" Self-Encrypting (SED) Hard Disk Drive

Capacity	500,107,862,016 bytes
Rotational Speed	7,200 rpm
Drive Type	Self-Encrypting Drive (SED) with SATA interface
Interface	SATA 6 Gb/s
Segmented Buffer with write cache	32768 KB - A portion of buffer capacity used for firmware
Number of Sectors	976,773,168

Seek Time (typical reads)	Single Track:	1.0 ms
	Average:	13 ms
	Full-Stroke	25 ms

Media Diameter	2.5 in/63.5 mm
Height	0.267 in/6.8 mm, ±0.2mm
Width	2.75 in/69.85 mm, ±0.25mm
Length	3.945 in/100.2 mm, ±0.25mm
Weight	3.35 oz/95 g (max)
Operating Temperature	32° to 140° F (0° to 60° C)

HP 1-TB SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD)

Formatted Capacity	1 TB
Spindle Speed	5,400 rpm +/- 0.2%
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash
Interface	Serial ATA (SATA)
Cache Buffer	64 MB
NAND Flash Commercial Multilevel Cell (cMLC)	8 GB
Number of Sectors	976,773,168

Seek Time (typical reads)	Single Track:	2.0 ms
	Average:	12 ms

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

Technical Specifications - Hard Disk and Solid State Storage

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

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

HP 120 GB Solid State Drive

Unformatted Capacity	120 GB	
Architecture	Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller	
Interface	Serial ATA 2.0 (3.0 Gb/s)	
Dimensions (W x H x D)	2.74 x 0.37 x 4 in (6.98 x 0.95 x 10.2 cm)	
Weight	0.18 lb (80 g)	
Bandwidth Performance	Sustained Sequential Read:	Up to 250 MB/s
	Sustained Sequential Write:	Up to 70 MB/s
	Random Read:	Up to 35K IOPs
	Random Write:	Up to 6.6K IOPs
Latency	Read:	65-ms
	Write:	85-ms
Power	DC power requirement:	5 VDC 5%-100 mV ripple p-p
	Total power consumption:	0.15W (active); 0.075W (idle)
Useful Drive Life	35TB written, up to 20GB/day for 5 years	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Maximum Wet Bulb Temperature (operating):	84° F (29° C)
	Shock:	1,500 G/0.5-ms

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

Technical Specifications - Hard Disk and Solid State Storage

HP 128 GB Solid State Drive

Unformatted Capacity	128 GB*	
Architecture	Multi Level Cell (MLC) NAND	
Interface	SATA 6 GB/sec	
Dimensions (W x H x D)	2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm)	
Weight	0.16 lb (73 g)	
Bandwidth Performance	Sustained Sequential Read:	Up to 450 MB/ss
	Sustained Sequential Write:	Up to 260 MB/s
	Random Read (4KB):	up to 46K IOPs
	Random Write (4KB):	up to 56K IOPs
Latency	Read:	55ms (TYP)
	Write:	55ms (TYP)
Power	DC power requirement:	Min 4.5 V; Max 5.5 V
	Total power consumption:	160 mW (Active) ; <85 mW; (Idle)
Useful Drive Life	1.2 million device hours**	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity (operating):	5% to 95%
	Shock:	1,500 G/1.0 msec
Regulations	UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS 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.

HP 128 GB* Turbo Drive SSD (M.2 PCIe card)

Unformatted Capacity	128 GB*	
Architecture	NAND Flash Memory which has a high reliability and a high technology in a small form factor for using a SSD and supporting PCIe interface up to 4 lanes.	
Form Factor	PCIe SATAe Ultrathin	
Dimensions (Width x Length x Thickness)	.899 x 3.149 x .146 in (22 x 80 x 3.73 mm)	
Weight	0.017 lb (8 g) Max	
Bandwidth Performance - Performance measured using IOMeter 2008 on Windows 8 64bit. Actual performance may vary depending on use conditions and environment.	Sustained Sequential Read (128KB):	Up to 920 MB/ss
	Sustained Sequential Write (128KB):	Up to 430 MB/s
	Random Read (4KB):	up to 8500 IOPs
	Random Write (4KB):	up to 32000 IOPs
Power	Allowable voltage	3.3V ± 5%
	Total power consumption:	5.8 W (Active) ; 80 mW; (Idle)
MTBF	1.5 M hours	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity (operating):	5% to 95%
	Shock:	1,500 G
Regulations	Safety TUV UL CB c-UL-us	TUV UL CB c-UL-us TUV

Technical Specifications - Hard Disk and Solid State Storage

EMC/EMI	CE (EU)
	BSMI (Taiwan)
	KCC (South Korea)
	VCCI (Japan)
	C-Tick (Austrailia)
	FCC (USA)

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

HP 128 GB* SATA 2.5" Self-Encrypting (SED) Solid State Drive

Unformatted Capacity	128 GB
Architecture	Self-Encrypting (SED) Solid State Drive using NAND Flash and SATA interface
Interface	SATA 6 Gb/s
Height	.267 in/6.80 mm
Width	2.75 in/69.85 mm
Length	3.94 in/100.2 mm
Weight	0.121 lb (55 g) max

Performance

Host Transfer Rate:	600 MB/s
Sequential Read:	Up to 520 MB/s
Sequential Write:	Up to 340 MB/s

* For hard drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 16GB for Windows 7 and up to 36GB for Windows 8.1 is reserved for system recovery software.

** Notes :
1. Measured at HP 8570p@Win7 x64
2. Performance measured using CrystaldiskMark 3.01c
3. Drive was connected as primary

Power

System power consumption:	Active* - 0.78A / 3.891W (typical)
	Idle** - 0.005A / 0.026W (typical)

* Active power is measured during execution of IOMeter 2006 in Windows 7
** Idle power is measured on DOS Idle status with DIPM on

System Reliability	MTBF - 1,500,000 Hours

Environmental
(all conditions, non-condensing)

Operating Temperature:	32° to 158° F (0° to 70° C)
Relative Humidity (operating):	5% to 95%
Shock:	1500G, duration 0.5ms, Half Sine Wave

Technical Specifications - Hard Disk and Solid State Storage

HP 256 GB SATA 2.5" Self-Encrypting (SED) Solid State Drive

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

HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	500,107,862,016 bytes	
Rotational Speed	7,200 rpm	
Interface	Serial ATA 3.0 (6.0 Gb/s)	
Buffer Size	16 MB	
Logical Blocks	976,773,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
Height (nominal)	1 in/2.54 cm	
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm	
Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Hard Disk and Solid State Storage

HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	1,000,204,886,016 bytes	
Rotational Speed	7,200 rpm	
Interface	Serial ATA 3.0 (6.0 Gb/s)	
Buffer Size	32 MB	
Logical Blocks	1,953,525,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
Height (nominal)	1 in/2.54 cm	
Width (nominal)	Media diameter: 3.5 in/8.89 cm	
	Physical size: 4 in/10.2 cm	
Operating Temperature	41° to 131° F (5° to 55° C)	

HP 2-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

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

Technical Specifications - Removable Storage

HP Slim SuperMulti DVD Writer Drive

Height	12.7mm height	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Disc recording capacity	Up to 8.5 GB DL or 4.7 GB standard	
Dimensions (W x H x D)	5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel	
Weight (max)	0.42 lb (190 g)	
	DVD-RAM	Up to 5X
	DVD-R DL	Up to 6X
	DVD+R	Up to 8X
	DVD+RW	Up to 8X
Write speeds	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
	DVD-RAM	Up to 5X
	DVD-RW, DVD+RW	Up to 8X
	DVD-R DL, DVD+R DL	Up to 8X
Read speeds	DVD+R, DVD-R	Up to 8X
	DVD-ROM DL, DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
Access time (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)
	Source	Slimline SATA DC power receptacle
Power	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)
Environmental conditions (operating - non-condensing)	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)

HP Slim Blu-ray BDXL Drive

Height	12.7mm Slim tray-load
Orientation	Either horizontal or vertical

Technical Specifications - Removable Storage

Interface type	SATA/ATAPI	
Disc capacity	Up to 128 GB QL, 100 GB TL, 50 GB DL or 25 GB standard SL	
Dimensions W x H x D (max)	5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel	
Weight (max)	Up to 0.37 lb (170 g) without bezel	

		Triple-layer	**Quadruple-layer**
Write speeds	BD-R	Up to 4x	Up to 4x
	BD-RE	Up to 2x	Not supported
		Single-layer	**Double-layer**
	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	N/A
	CD-R	Up to 24x	N/A
	CD-RW	Up to 24x	N/A

		Triple-layer	**Quadruple-layer**
Read speeds	BD-R	Up to 4x	Up to 4x
	BD-RE	Up to 4x	Not supported
		Single-layer	**Double-layer**
	BD-ROM	Up to 6X	Up to 6X
	BD-R	Up to 6x	Up to 6x
	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	Not supported
	DVD+R	Up to 8x	Up to 8X
	DVD+RW	Up to 8x	Not supported
	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)	

Access times (typical reads, including setting)	**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)
Power	**Source**	Slimline SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC -1200 mA typical, 2000 mA maximum
Environmental (all conditions non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)
	Relative Humidity (operating)	10% to 80%

Technical Specifications - Removable Storage

Maximum Wet Bulb Temperature (operating)	84° F (29° C)	

HP Slim DVD-ROM Drive

Height	12.7mm	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Dimensions (W x H x D)	5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel	
Weight (max)	Up to 0.37 lb (170 g) without bezel	
Read speeds	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
Access time (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)
Power	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
Environmental (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

System Memory Support

The HP ProDesk 600 G1 Business PC supports the 4th 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 4th 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) with a maximum of two DIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- Memory data transfer rates of up to 1600 MT/s; actual supported data transfer rate determined by the configured processor.
- 64-bit wide channels
- DDR3/DDR3L system memory I/O voltage of 1.5V
- Theoretical maximum memory bandwidth of:
  - 21.3 GB/s in dual-channel mode assuming 1333 MT/s
  - 25.6 GB/s in dual-channel mode assuming 1600 MT/s

Platform Memory Support

- The Small Form Factor (SFF) and Tower (TWR) platforms support up to four (4) industry-standard DDR3-SDRAM DIMMs.
- The Desktop Mini platform supports up to two (2) industry-standard DDR3-SDRAM SODIMMs.

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 and Communications

Intel® I217LM GbE Network Connection (integrated)

Connector	RJ-45
System Interface	Integrated on PCA
Controller	Intel I217LM GbE platform LAN connect networking controller
Memory	24 KB FIFO packet buffer memory
Data rates supported	10/100/1000 Mbps
IEEE Compliance	802.1P 802.1Q 802.2 802.3 802.3ab 802.3az 802.3u
Bus architecture	PCI Express and SMBus
Data transfer mode	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
Power requirement	Requires 3.3V and 0.9V or just 3.3V with integrated regulators Power consumption 0.733 Watts
Boot ROM support	Yes
Network transfer mode	Full-duplex Half-duplex (not supported for the 1000BASE-T transceiver)
Network transfer rate	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
Environmental	Operating Temperature: 0° to 85° C Operating Humidity: 60% RH
Management	WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic, WFM 2.0
Alerting	ASF 2.0 support; AMT 9.0 support

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

Wireless LAN Standards	IEEE 802.11a/b/g/n	
Interoperability	Wi-Fi certification	
	BQE certification of the Bluetooth component	
	CCXv1, v2, v3, v4, v5 CCX certified (Cisco Client Extensions)	
	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.	
Frequency Band	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
Antenna Structure	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.	

Technical Specifications - Networking and Communications

Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 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.
Security	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through V5 • WAPI **NOTE:** Check latest software/driver release for updates on supported security features.
Roaming	IEEE 802.11 compliant roaming between band Access Points
Output Power	• +13.5 dBm minimum • Maximum output power must be able to achieve modular regulatory certification peak gain of +3dBi at 2.4GHz and +5dBi at 5GHz **NOTE:** Maximum output power may vary by country according to local regulations.
Power Consumption	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)
Bluetooth Power Consumption	Peak operating: 330 mW Receive: 230 mW USB selective suspend: 17 mW
Power Management	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.

Receiver Sensitivity

802.11b

Sensitivity (dBm)	Rate (Mbps)	Modulation and Coding Rate
-95	1	BPSK
-93	2	QPSK
-91	5.5	CCK
-88	11	CCK

802.11a/g

Sensitivity (dBm)	Rate (Mbps)	Modulation and Coding Rate
-90	6	BPSK - ½
-89	9	BPSK - ¾
-87	12	QPSK - ½
-85	18	QPSK - ¾
-82	24	16 QAM - ½
-79	36	16 QAM - ¾
-76	48	64 QAM - 2/3
-74	54	64 QAM - ¾

802.11n

Sensitivity (dBm)	Rate (Mbps)	Modulation and Coding Rate
-69	150	64 QAM - 5/6
-66	300	64 QAM - 5/6

Technical Specifications - Networking and Communications

Form Factors	PCI-Express Half-MiniCard
Weight	0.1133 oz (3.212 g)
Dimensions	1.04 x 1.17 x 0.042 in (26.65 x 29.85 x 1.067 mm)
Operating Voltage	3.3V +/- 9%
Temperature	Operating: 14° to 158° F (-10° to 70° C) Non-operating: -40° to 176° F (-40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)

Intel® Ethernet I210-T1 Gigabit Network Adapter

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

Intel Centrino Advance-N 6205 Wireless Network Interface Connection

Wireless LAN Standards	IEEE 802.11a/b/g/n IEEE 802.11 e, 802.11i, 802.11d, 802.11d, 802.11h
Interoperability	Wi-Fi certified (802.11 a/b/g/n WMM, WPA, WPA2 and WPS) Tested with wireless access points from several major manufacturers OS compatible with Microsoft Windows, Win7 and XP Cisco Compatible Extensions Program compliant (802.11a/b/g only) with Microsoft Windows XP and Windows 7
Frequency Band	2.4 GHz and 5 GHz

Technical Specifications - Networking and Communications

Antenna Structure	2 transmit; 2 receive (2x2)	
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps	
	802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps	
	802.11n: 66 possible data rates, ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification	
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM	
Security	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128bits), TKIP, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP, MSCHAP, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM, EAP-AKA PAP, CHAP, TLS, GTC	
	Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows XP only.	
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.	
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) Intel® My Wifi Technology (iPAN)	
Roaming	Provide seamless roaming between like access points (same frequency band)	
Output Power (for CCK)	15 dBm	
Output Power (for OFDM; power varies by data rate)	15 dBm	
Power Consumption	Transmit: 2.3 Watts (average, with one spatial streams)	
	Receive: 1.9 Watts (average with two receive chains)	
	Idle mode: 30mW – 40mW (average)	
	Radio off: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Antenna Connections	3 U.FL type connectors, 50 ohm nominal impedance	
Range	802.11 a - Typical (@6 Mbps)	600 feet - Outdoor Open Area 150 feet - Indoor, Office environment
	802.11 b - Typical (@1 Mbps)	1200 feet - Outdoor Open Area 300 feet - Indoor, Office environment
	802.11 g - Typical (@1 Mbps)	1200 feet - Outdoor Open Area 300 feet - Indoor, Office environment
Form Factors	CMIT & SFF:	PCIe
Weight	0.013 lb (4.0 g)	
Dimensions	1.1 x 1.2 in (26.8 x 30.0 mm)	
Operating Voltage	3.3V +/- 9%, 1.5V +/- 5%	
Temperature	**Operating:** **Non-operating:**	32° to 176° F (0° to 80° C) -40° to 176° F (-40° to 80° C)
Humidity	**Operating:** **Non-operating:**	10% to 90% (non-condensing) 5% to 90% (non-condensing)
	Microsoft Windows XP	Microsoft Windows Win 7
Configuration Utility	• Microsoft Windows XP Wireless Network Connection Manager • Intel PROSet for Microsoft Windows XP (required for Cisco Compatible Extensions support)	• Intel IHV extensions for Win7 available to support Cisco Compatible Extensions

Technical Specifications - Audio

High Definition Audio

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

QuickSpecs

Technical Specifications – Keyboards and Pointing Devices

HP USB Keyboard

Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.12 x 6.47 x 0.96 in (46.03 x 16.43 x 2.44 cm)
	Weight	2 lb (0.9 kg)
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
Mechanical	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
Environmental	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)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
Ergonomic compliance	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, KC	
Kit contents	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

QuickSpecs

Technical Specifications – Keyboards and Pointing Devices

HP PS/2 Keyboard

Physical Characteristics	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
Electrical	Operating voltage	+ 5VDC ± 5%
	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
Mechanical	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	50-dBA maximum sound pressure level
Environmental	Operating temperature	32° to 104° F (0° to 40° C)
	Non-operating temperature	-22° to 149° F (-30° to 65° C)
	Operating humidity	15% to 80% (non-condensing at ambient)
	Non-operating humidity	15% to 90% (non-condensing at ambient)
	Operating shock	N/A
	Non-operating shock	65 inch 2.9 ms, six surface; 30g 266 inch/second; 50g 266 inch/second six surface
	Operating vibration	2-g peak acceleration
	Non-operating vibration	Starting at 5 Hz, vary the frequency of vibration from 5 to 500 Hz and back to 5 Hz at a Logarithmic sweep rate of 1 octave per minute.
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	29.93 in (76 cm) on concrete, 16-drop sequence
Approvals	CUL, ICES-003 Class B, FCC, CE Mark,TUV GS, VCCI, BSMI, C-Tick, KC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

HP USB Smart Card (CCID) Keyboard

- Protects against unauthorized access with smart card technology
- Delivers even greater security when combined with a HP Client Security card and the HP Client Security Software
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QuickSpecs

Technical Specifications – Keyboards and Pointing Devices

Key Benefits:
- Combination of username and password or pin with a smart card or security token
- Secures online transactions using digital signatures and certificates
- Conforms to industry standards for ease of setup and use
- Delivers long product life and quiet operation with high-impact materials and lubricated keys
- Spill drain feature

	Keys	104, 105, 106, 107, 109 layout (depending upon country
	Form factor	USB basic smart card keyboard
Physical Characteristics	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
	Operating voltage	+ 5VDC ± 5%
	Power consumption	100-mA maximum (with four LEDs ON)
Electrical	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
	Languages	30+ available
	Keycaps	Standard design
	Switch actuation	55 g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
Mechanical	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
	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
Environmental	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
	Support	All ISO 7816 smart cards
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)
	Chipset	SCM STCIII
	Standard APIs supported	PC/SC, EMV2000, CT-API
	Power	USB Port
		Short circuit detection (protects smart card and reader)
		Power supply compliant with ISO7816 and EMV (5V, 60 mA)
		Supports 3-V and 5-V cards

QuickSpecs

Technical Specifications – Keyboards and Pointing Devices

SmartCard Function	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
Approvals	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF		
Ergonomic Compliance	ISO 9241-4, TUVGS		
Kit Contents	Keyboard, I/O Security and Documentation CD, warranty card		

HP USB PS/2 Washable Keyboard

	Keys	104 (US) layout or 105 (EU) layout – depending upon country
Physical Characteristics	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
	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)
Electrical	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
	Keycaps	Stepped -profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes
Mechanical	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
	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 95% (non-condensing at ambient)
	Non-operating humidity	0% to 95% (non-condensing at ambient)
Environmental	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces

Technical Specifications – Keyboards and Pointing Devices

	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
Operating system support	Windows® 7, Windows Vista, Windows XP Professional	
Approvals	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

HP Wireless Keyboard and Mouse

Keyboard	Dimensions (H x L x W)	1.09 x 18.1 x 6.47 in (27.87 x 460.3 x 164.3 mm)
	Weight – Without Two AA Alkaline Batteries	1.94 lb (880 g)
Mouse	Dimensions (H x L x W)	1.46 x 4.53 x 2.47 in (37 x 115 x 62.9 mm)
	Weight – Without Two AA Alkaline Batteries	0.15 lb (67 g)
Receiver	Dimensions (H x L x W)	0.33 x 1.79 x 0.72 in (8.4 x 45.5 x 18.4 mm)
	Weight	0.21 oz (5.9 g)
	Cable Length – Minimum	6 ft (1.8 m)
	Range	32.8 ft (10 m)
System Requirements	Windows 7 Home Basic*, Windows 7 Home Premium*, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows 7 Ultimate Edition 32*, Windows 7 Ultimate Edition 64* Windows Vista or Windows XP Available USB port for the receiver CD-ROM Drive	
	*This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.	
Approvals	Product Safety	UL; CSA /TUV (Europe only); CE Mark; CB Report
	Ergonomics	ANSI; ISO (Europe only); GS Mark (Germany only)
	EMC	FCC; CE; ACA (-tick); BSMI; KC ; VCCI
	CE Mark	EN 55022:2010; EN 55024; EN 301489-1; EN 61000
	Design Guidelines for PCs	PC 99 - connector overmold colors; PC 2001 - full functionality
	Telecom	All local telecom requirements and approvals for intended markets
	USA	FCC Title 47 CFR, Par 15, Subpart C; other local requirements
	Country Support	US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria, Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia,

Technical Specifications – Keyboards and Pointing Devices

	Lithuania, Luxemburg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, Thailand, Canada, China, Japan, Korea, Taiwan, India, Venezuela, Ecuador, Russia, Ukraine, Israel, Croatia, United Arab Emirates, Peru, Brazil, Chile, Argentina, Mexico, South Africa, and up to 193 countries worldwide.	
Environmental	Keyboard contains 25% post-consumer recycled plastic material	

HP PS/2 Mouse

Dimensions (H x L x W)	1.46 x 2.48 x 4.53 in (3.70 x 6.29 x 11.50 cm)	
Weight	3.53 oz (100g; +10g/- 5 g)	
Environmental	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
	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
Electrical	Operating voltage	5 VDC ± 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
	Resolution	800 DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	±15%
	Switch actuation	65±20 gf
Mechanical	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
	Width	6 mm

Technical Specifications – Keyboards and Pointing Devices

Scroll wheel	Diameter	22.5 ± 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
Regulatory Approvals	UL/cUL, FCC, CE Mark, TUV/GS, VCCI, KCC, BSMI, C-Tick	

HP USB Mouse

Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
Weight	0.22 lb (0.10 kg)
Cable length	70.9 in (180 cm)
System requirements	Available USB port

HP USB 1000dpi Laser Mouse

Dimensions (H x L x W)	1.47 x 4.53 x 2.47 in (37.3 x 114.97 x 62.86 mm)	
Weight	3.360 oz (102g)	
Cable length	70.9 in (180 cm)	
System requirements	Available USB port	
Environmental	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)
Mechanical	Resolution	1000dpi
	Tracking Speed	45 cm/sec
	Cable Length	70.9 in (180 cm)

Technical Specifications – Keyboards and Pointing Devices

HP USB PS/2 Washable Mouse

Dimensions (H x L x W) 1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)

Weight	4.44 oz (126 g)	
Environmental	Operating temperature	–32° to 104°F (0° to 40° C)
	Non-operating temperature	–4° to 140°F (–20° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	10% to 90% non-condensing
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
Electrical	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
Mechanical	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
	Cable length	8.8 ft total 70 cm+ 2m extension
	Microsoft PC99 – 2001	Mechanically compliant
Scroll wheel	Width	6 mm
	Diameter	1 in (25.4 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	3 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory approvals	Compliant	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

	DM	SFF	TWR
Standard Efficiency	65W active PFC 87% efficient 89% average efficiency at 230V 88% average efficiency at 115V	240W active PFC	320W active PFC
80 PLUS Gold	N/A	240W active PFC 87/90/87% efficient at 20/50/100% load (115V) 89/91/90% efficient at 20/50/100% load (230V)	320W active PFC 87/90/87% efficient at 20/50/100% load (115V) 89/92/90% efficient at 20/50/100% load (230V)
80 PLUS Platinum	N/A	240W active PFC 90/92/89% efficient at 20/50/100% load (115V) 90/93/91% efficient at 20/50/100% load (230V)	320W active PFC 90/92/89% efficient at 20/50/100% load (115V) 90/94/91% efficient at 20/50/100% load (230V)
Operating Voltage Range	90 - 264 VAC	90 - 264 VAC	90 - 264 VAC
Rated Voltage Range	100 - 240 VAC	100 - 240 VAC	100 - 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Operating Line Frequency Range	47 - 63 Hz	47 - 63 Hz	47 - 63 Hz
Rated Input Current	N/A	4A	5.5A
Rated Input Current with Energy Efficient* Power Supply	TBA	4A	5.5A
DC Output	+19.5V		

Technical Specifications – Power

Current Leakage (NFPA 99: 2102)	Less than 500 microamps of leakage current at 120 Vac with the ground wire disconnected, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.		
	Less than 100 microamps of leakage current at 120 Vac with the ground wire intact with normal polarity, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.		
Power Supply Fan	N/A	92=>70mm variable speed	92mm variable speed
Power cord length	N/A	6.0 ft. (1.83 m)	6.0 ft. (1.83 m)
External Power Adapter			
Dimensions	2.2 x 1.2 x 4.5 in 55 x 30 x 113.5 mm	N/A	N/A
Total Cord Length	12 ft. 8 in	N/A	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)

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

Technical Specifications – Miscellaneous Features

Management Features

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

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
    - 2 - processor thermal protection activated
    - 3 - processor not installed
    - 4 - power supply failure
    - 5 -- memory error
    - 6 - video error
    - 7 - PCA failure (ROM detected failure prior to video)
    - 8 - invalid ROM, bootblock 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 replacemen
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

Technical Specifications – Miscellaneous Features

Additional Features

	Description
Towerable Orientation	Product can be oriented as either a desktop or a tower
Drive Lock	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.
	DPS Access through F10 Setup during Boot
	A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user
Drive Protection System	Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced
	The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted
SMART I - Drive Failure Prediction	Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count
SMART II - Off-Line Data Collection	
SMART III - Off-Line Read Scanning with Defect Reallocation	By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
	IOEDC: I/O Error Detection Circuitry
SMART IV - End-to-End CRC for hard drives	Detects errors in Read/Write buffers on HDD cache RAM
	Interface in F10 setup provides confirmation of SMART IV support.

Technical Specifications – Environmental Data

Environmental Data

Eco-Label Certifications & Declarations	This product series has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US ENERGY STAR®
- IT ECO declaration
- EPEAT® Gold where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country.

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

Model	Energy Consumption (typically configured)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
DM	Normal Operation (Short idle)	8.10 W	8.19 W	7.85 W
	Normal Operation (Long idle)	5.99 W	6.16 W	5.96 W
	Sleep	1.67 W	1.57 W	1.65 W
	Off	1.03 W	1.0 W	1.06 W
SFF	Normal Operation (Short idle)	16.44 W	16.22 W	16.12 W
	Normal Operation (Long idle)	14.15 W	13.19 W	14.80 W
	Sleep	1.44 W	1.52 W	1.43 W
	Off	0.58 W	0.64 W	0.57 W
TOWER	Normal Operation (Short idle)	18.28 W	19.36 W	18.83 W
	Normal Operation (Long idle)	17.94 W	16.83 W	17.79 W
	Sleep	1.47 W	1.57 W	1.46 W
	Off	0.54 W	0.63 W	0.53 W

Note: Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP personal 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.

Model	Energy Consumption (typically configured)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
DM	Normal Operation (Short idle)	28 BTU/hr	28 BTU/hr	27 BTU/hr
	Normal Operation (Long idle)	20 BTU/hr	21 BTU/hr	20 BTU/hr
	Sleep	6 BTU/hr	5 BTU/hr	6 BTU/hr
	Off	4 BTU/hr	3 BTU/hr	4 BTU/hr
SFF	Normal Operation (Short idle)	56 BTU/hr	55 BTU/hr	55 BTU/hr
	Normal Operation (Long idle)	48 BTU/hr	45 BTU/hr	50 BTU/hr
	Sleep	5 BTU/hr	5 BTU/hr	5 BTU/hr

Technical Specifications – Environmental Data

	Off	2 BTU/hr	2 BTU/hr	2 BTU/hr
TOWER	Normal Operation (Short idle)	63 BTU/hr	66 BTU/hr	64 BTU/hr
	Normal Operation (Long idle)	61 BTU/hr	58 BTU/hr	61 BTU/hr
	Sleep	5 BTU/hr	5 BTU/hr	5 BTU/hr
	Off	2 BTU/hr	2 BTU/hr	2 BTU/hr 2 BTU/hr

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Model	(Typically configured)		
DM	Idle	3.6	25
	Fixed Disk (random writes)	3.6	24
SFF	Idle	3.6	26
	Fixed Disk (random writes)	3.6	26
TOWER	Idle	3.6	26
	Fixed Disk (random writes)	3.6	26

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:

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

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

Batteries
The battery in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the1ppm by weight
- Cadmium greater than 20ppm by weight

Model	**Additional Information**
DM	

- 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>

Technical Specifications – Environmental Data

level, see http://www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 16% post-consumer recycled plastic (by wt.)
- This product is 91.3% recycle-able when properly disposed of at end of life.

Packaging Materials

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

SFF

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country.
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 14.8% post consumer recycled plastic (by wt.)
- This product is 94.1% recyclable when properly disposed of at end of life.

Packaging Materials

- External:
  - PAPER/Corrugated 2300 g
- Internal:
  - PLASTIC/EPE-Expanded Polyethylene 110 g
  - PLASTIC/Polyethylene low density 56 g
  - PLASTIC/Polypropylene 15 g
- The PAPER/Corrugated material contains at least 38.38% recycled content.
- The PLASTIC/EPE-Expanded Polyethylene material contains at least 60.4% recycled content.
- The PLASTIC/Polyethylene low density material contains at least 60.4% recycled content.
- The PLASTIC/Polyethylene packaging material contains at least 60.4 % recycled content.

TOWER

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country.
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 15% post consumer recycled plastic (by wt.)
- This product is 95.5% recyclable when properly disposed of at end of life.

Packaging Materials

-

Technical Specifications – Environmental Data

- External:
  - PAPER/Corrugated 2280 g
- Internal:
  - PLASTIC/EPE (Expanded Polystyrene) 144 g
  - PLASTIC/Polyethylene low density 40 g
- PLASTIC/Polypropylene 15 g
- The PAPER/Corrugated material contains at least 53.5% recycled content.
- The PLASTIC material contains at least 60.42% recycled content.

RoHS Compliance   Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

Material Usage   This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at: http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- 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)
- **ALL FORM FACTORS ARE UL CERTIFIED**

Technical Specifications – Environmental Data

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

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

End-of-life Management and Recycling

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

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

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:
Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Eco-label certifications
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

Options and Accessories (sold separately)

Communication Devices

	DM	SFF/TWR	Part Number
Intel Ethernet I210 - T1 Gbe NIC		X	E0X95AA
Intel 6205 802.11 a/b/g/n PCIe x1 NIC		X	E0X93AA

NOTE: The use of any of these optional NIC Cards (wired or wireless) will disable the Intel vPro Technology features.

Graphics Solutions

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

Data Storage Drives and Accessories

	DM	SFF/TWR	Part Number
HP Desktop Mini 500-GB Hard Disk Drive	X		
HP Desktop Mini DVD-Writer ODD Module ()	X		
HP Desktop Mini I/O	X		
HP Desktop Rack Mount Module	X		
HP Desktop Mini Security/Dual Vesa Sleeve	X		
HP Desktop 65w Mini Power Supply Kit	X		
HP Desktop 90w Mini Power Supply Kit	X		
HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive		X	QK554AA
HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive		X	QK555AA
HP 128-GB SATA 3.0Gb/s Solid State Drive	X	X	QV063AA
HP 128-GB SED Opal 2 Solid State Drive	X		G1K24AA
HP 160-GB SATA 3.0Gb/s Solid State Drive	X	X	QV064AA*
HP 500-GB SATA 3.0Gb/s Solid State Hybrid Drive	X	X	E1C62AA
HP Slim Removable SATA Hard Drive Enclosure (frame & carrier)		X	C1N41AA
HP Slim Removable SATA Hard Drive Enclosure (carrier only)		X	E3F39AA
HP Chassis (1bay) Security Kit		TWR only	AR639AA
HP Desktop Mini 500GB HDD/ I/O Expansion Module	X		K9Q82AA

*Not available in all regions.

Options and Accessories (sold separately)

Input Devices

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

*Keyboard contains 25% post-consumer recycled plastic material

System Memory

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

Multimedia Devices

	DM	SFF/TWR	Part Number
HP Slim DVD-ROM Drive		X	VP033AA
HP Slim SuperMulti DVD Writer Drive		X	QS209AA
HP USB HD 720P v2 Business Webcam	X	X	D8Z08AA
HP Business Headset	X	X	QK550AA
HP USB Business Speakers	X	X	D9J19AA
HP Desktop Mini DVD Super Multi-Writer ODD Expansion Module	X		K9Q83AA

Removable Media Storage

	DM	SFF/TWR	Part Number
HP 14-n-1 Media Card Reader (available Dec. 2013)		X	TBD

Security Devices

	DM	SFF/TWR	Part Number
HP Solenoid Lock and Hood Sensor (SFF)		SFF only	E0X97AA
HP Solenoid Lock and Hood Sensor (TWR)		TWR only	E0X96AA
HP SFF Wall Mount/Security Sleeve		SFF only	VN570AA
HP UltraSlim Cable Lock	X	X	H4D73AA
HP Desktop Mini Security/Dual VESA Sleeve	X		G1K22AA

Options and Accessories (sold separately)

Stands and Accessories

	DM	SFF/TWR	Part Number
HP Integrated Work Center - Desktop Mini / Thin Client (IWCdm)	X		
HP Integrated Work Center Stand (SFF)		SFF only	QP897AA
HP SFF Tower Stand		SFF only	VN569AA
HP DM Chassis Tower Stand	X		G1K23AA
HP 600/800 Tower Bezel Kit		TWR only	E1C66AA
HP 800/600 SFF Bezel Kit		SFF only	E3F27AA
HP Serial Port Adapter (RS-232 compatible)		X	PA716A
HP Parallel Port Kit		X	KD061AA
Belkin USB to Serial Adapter	X		EM449AA
HP Desktop Mini Rack Mount Module	X		G1K21AA

LANDesk Software (E-Delivery)

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

Summary of Changes

Date	Version History	Action	Description of Change
September 29, 2014	From v24 to v25	Addition	Added under Graphics "AMD Radeaon R9" section, and under "Networking" added the section " HP WLAN 802.11 a/b/g/n 2x2 Dual Band PCIe x1 WLAN/Bluetooth Card"
October 14, 2014	From v25 to v26	Changes	Change the values in the chart Environmental Datafor DM, SFF and Tower
October 15, 2014	From v26 to v27	Changes	Change the values in the chart Environmental Datafor DM, SFF and Tower
October 29, 2014	From v27to v28	Removed	Remove OS Windows Ultimate and home
November 12 , 2014	From v28 to v29	Changes	Several changes from Javier Lazaro, Change the weight for DM in the "Max Supported Weigth"
		Addition	Added a new option of mouse "HP USB Gray Mouse" 2 new sections for Hard Drive and Solid State
January 21, 2015	From version 29 to version 30	Added	Added a note about Current Leakage, under POWER
January 28, 2015	from v30 to v31	Changed	From Bays 3.5" internal storage drive 1 to 2 in TWR From Graphics/Video API Support, OpenGL 4.3, from .0 to .3
		Removed	Intel® Pentium® G3250T from Sff/MT Intel® Pentium® G3450T From Sff/MT
		Added	AMD Radeon R7 240 2GB FH PCIe x16 GFX under Graphics to SFF/MT HP DisplayPort To HDMI 1.4 Adapter under Graphics (with 3.5" adapter when needed) to 120 GB SATA 2.5 Non-SED SSD and 180 GB SATA 2.5 Non-SED SSD to Sff/MT (with 3.5" adapter when needed) to 180 GB SATA 2.5 Opal2 SED SSD and 120 GB SATA 2.5 Opal2 SED SSD to SFF/MT 512 GB SATA 2.5 SSD (Non-SED) only for SFF HP USB Antimicrobial Keyboard under Graphics Under Slots added 3 ea. 2.5" low profile 6.6" length 10W max. power and (v2.0) to PCI Express x1 1 ea. 2.5" low profile 6.6" length 35W max. power (v3.0) to PCI Express x16 AMD Radeon R7 240 2GB PCIe x16 HP DisplayPort to HDMI 1.4 Adapter, and HP USB Antimicrobiall Keyboard and Mouse (China Only) under Graphics
February 23, 2015	from v31 to v32	Changed	Change the values in the chart "Slots" for SFF and TWR
		Removed	Removed chart HP 160 GB Solid State Drive
		Added	Processor support up to 84W (TWR/SFF), 35W (DM) added to "At a glance"

Summary of Changes

March 17, 2015	From v32 to v34	Added	Added a new value to "Power Supply"
		Added	Added a new value to the Supported Display Resolution and Refresh Rates
March 24, 2015	from v34 to v35	Changed	Change the chart HP 500-GB 7200 RPM SATA 2.5" Self-Encrypting (SED) Hard Disk Drive
April 6 , 2015	from v35 to v36	Added	added HP Desktop Mini DVD Super Multi-Writer ODD Expansion Module to Data Storage Drives and Accessories added HP Desktop Mini I/O Expansion Module to Input Devices added HP Desktop Mini DVD Super Multi-Writer ODD Expansion Module under Multimedia Devices added HP Desktop Mini Security/Dual VESA Sleeve under Security Devices added under Stands and Accessories, HP Desktop Mini Rack Mount Module