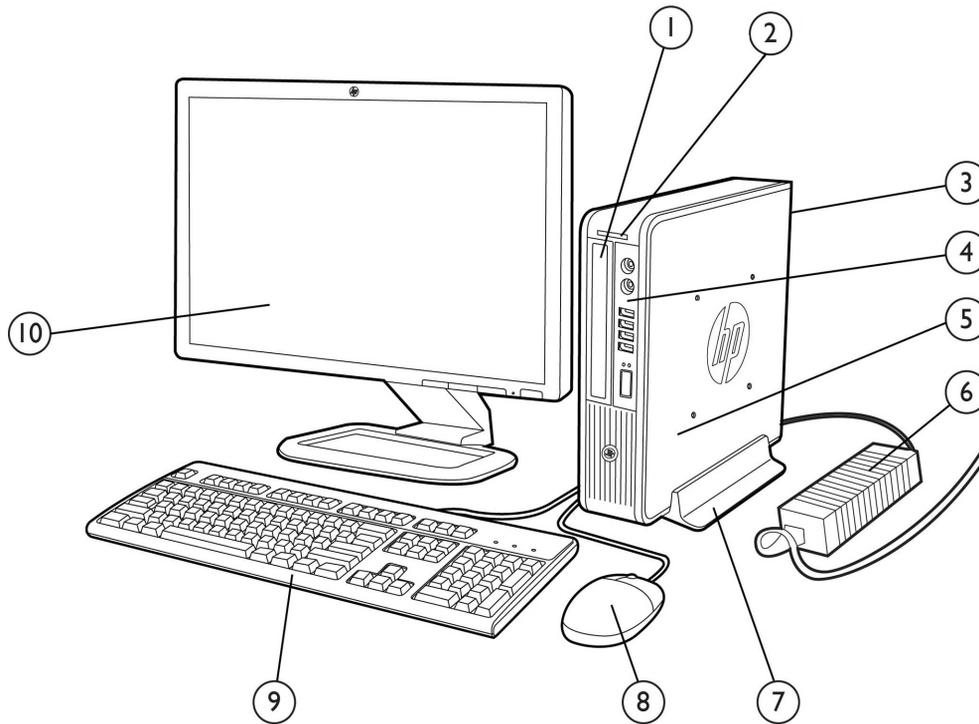


### Overview

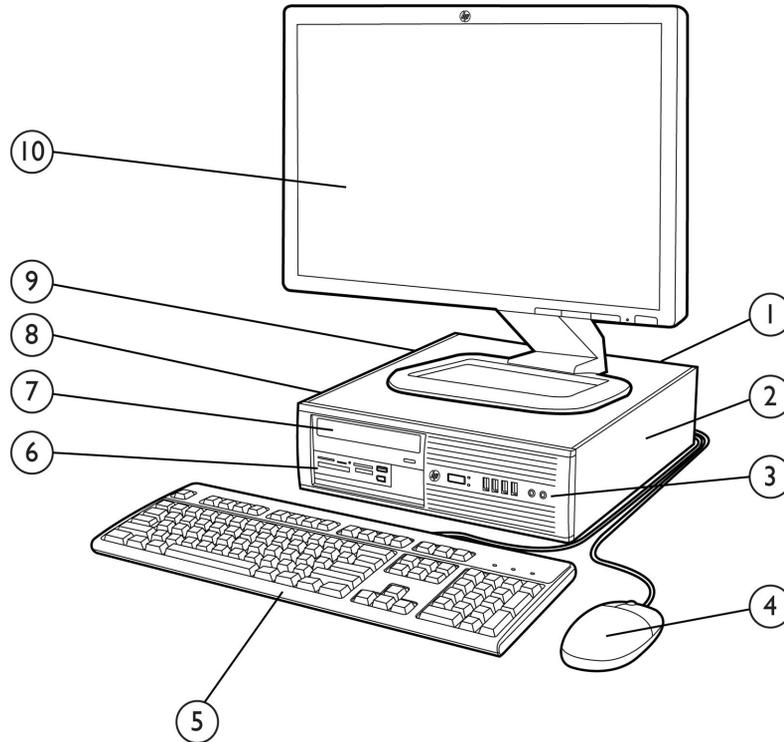
### HP COMPAQ ELITE 8300 ULTRA-SLIM BUSINESS PC



- 1 Optical Disc Drive (optional)
- 2 Secure Digital (SD) Card Reader (optional)
- 3 Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, (2) DisplayPort 1.1a and (1) VGA video interfaces, PS/2 mouse and keyboard ports, RJ-45 network interface, 3.5mm audio in/out jacks
- 4 Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack
- 5 2.5" internal data drive bay
- 6 135W 87% efficient external Power Adapter or 180W 87% efficient external Power Adapter (when configured with discrete graphics)
- 7 HP USDT Tower Stand (optional)
- 8 HP Mouse
- 9 HP Keyboard
- 10 HP Monitor (sold separately)

### Overview

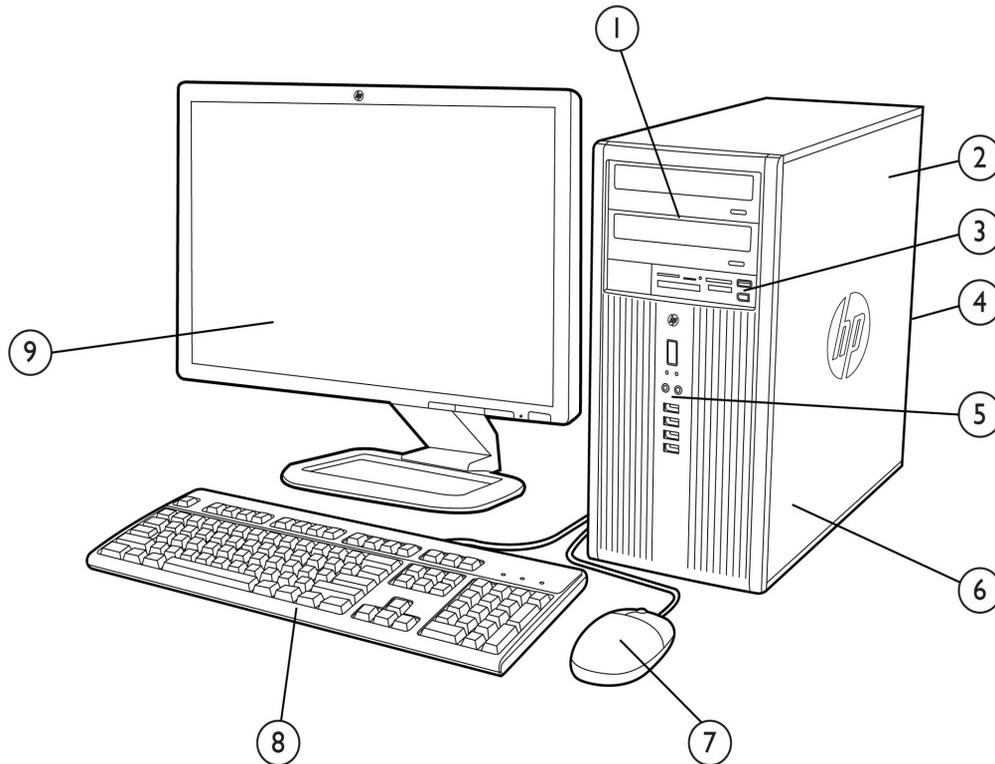
### HP COMPAQ ELITE 8300 SMALL FORM FACTOR BUSINESS PC



- 1 Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort 1.1a and VGA video interfaces, and 3.5mm audio in/out jacks
- 2 Low profile expansion slots include (1) PCI, (1) PCI Express x1 and (2) PCI Express x16 graphics
- 3 Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack
- 4 HP Mouse
- 5 HP Keyboard
- 6 3.5" external drive bay supporting a media card reader or a secondary data drive
- 7 5.25" external drive bay supporting an optical disk drive
- 8 3.5" internal drive bay supporting primary data drive
- 9 240W standard efficiency or 90% high efficiency Power Supply
- 10 HP Monitor (sold separately)

### Overview

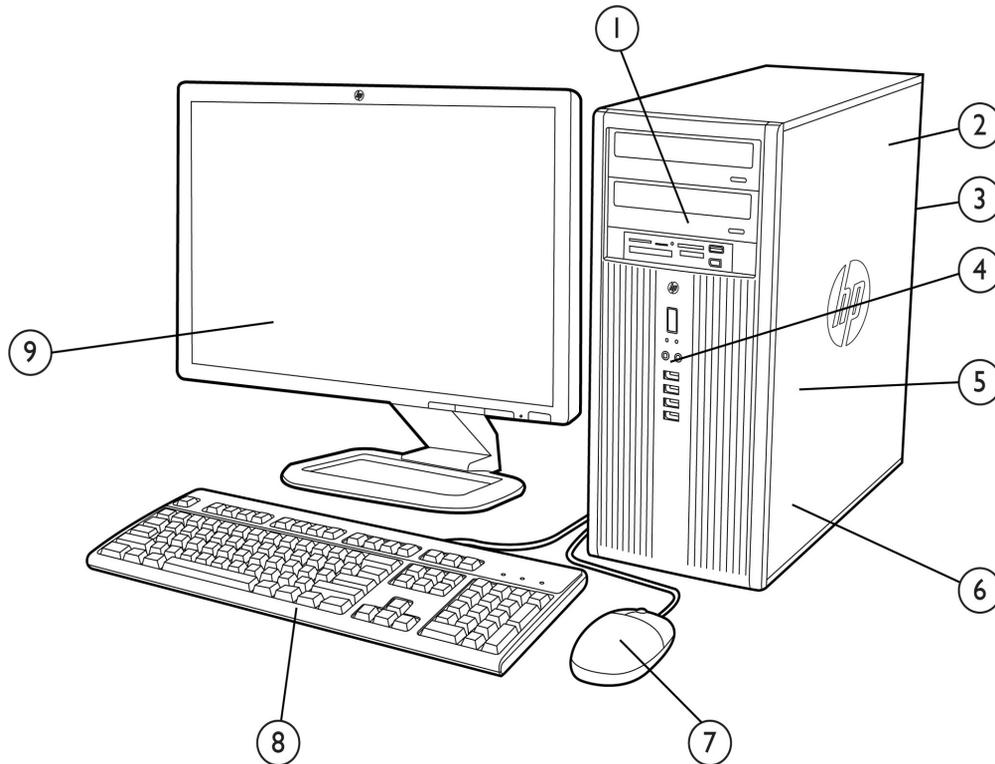
### HP COMPAQ ELITE 8300 MICROTOWER BUSINESS PC



- 1 (2) 5.25" external drive bays supporting optical disk drives or removable hard disk drives  
(2) 3.5" internal drive bays supporting data drives capable of RAID configurations
- 2 320W standard efficiency or 90% high efficiency Power Supply
- 3 3.5" external drive bay supporting the optional HP Media Card Reader
- 4 Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort 1.1a and VGA video interfaces, and 3.5mm audio in/out jacks
- 5 Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack
- 6 Full height expansion slots include (1) PCI, (1) PCI Express x1 and (2) PCI Express x16 graphics
- 7 HP Mouse
- 8 HP Keyboard
- 9 HP Monitor (sold separately)

### Overview

### HP COMPAQ ELITE 8300 CONVERTIBLE MINITOWER BUSINESS PC



- 1 (3) 5.25" external drive bays supporting optical disk drives, removable hard disk drives, or the HP Media Card Reader
- 2 320W standard efficiency or 90% high efficiency Power Supply
- 3 Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort 1.1a and VGA video interfaces, and 3.5mm audio in/out jacks
- 4 Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack
- 5 (3) 3.5" internal drive bays supporting multiple data drives capable of RAID configurations
- 6 Full height expansion slots include (3) full-length PCI, (1) PCI Express x1, and (2) PCI Express x16 graphics
- 7 HP Mouse
- 8 HP Keyboard
- 9 HP Monitor (sold separately)

### Overview

#### At A Glance

- Choice of four professional chassis form factors: USDT, SFF, MT, CMT (MT not available in all regions)
- PC chassis and all internal components and modules are 100% free of brominated flame retardants (BFRs) and Polyvinyl Chloride (PVC).
- UEFI BIOS developed and engineered by HP for better security, manageability and software image stability
- Intel Q77 Express chipset supporting Intel 2nd and 3rd generation Core processors, featuring Intel HD Graphics and vPro Technology (available with select processors)
- Intel 82579LM GbE integrated network connection
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Dual independent monitor support via VGA and digital DisplayPort 1.1a video interfaces; USDT provides dual digital support via (2) integrated DisplayPort 1.1a ports
- Discrete graphics options available for all platforms including the Ultra Slim Desktop (USDT) featuring DisplayPort 1.2 technology
- SRS Premium Sound audio management software
- Standard efficiency or 90% high efficiency energy saving power supplies available on the SFF, MT and CMT models; 87% efficient energy saving external power adapter standard with USDT models
- ENERGY STAR® qualified models certified EPEAT® Gold
- SFF, MT and CMT models can be configured with multiple data drives in a RAID array
- Optional Intel Smart Response Technology SSD disk cache module
- Guaranteed lengthy purchase lifecycles and image stability
- Software image fully compatible across all models and form factors
- Created using industry leading Design for Environment standards
- Selected configurations with global availability easily set up and ordered through HP.com Business to Business portals (<http://h10019.www1.hp.com/business-site/index.html>)
- Tailored HP Factory Express deployment and lifecycle services available (<http://h71028.www7.hp.com/enterprise/cache/97688-0-0-225-121.aspx>)
- Protected by HP Services, including standard warranties up to 5-5-5 (terms and conditions vary by country; certain restrictions and exclusions apply)
- Tool-less serviceability features for easier upgrades and repairs

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

### OPERATING SYSTEMS

#### Preinstalled

- Genuine Windows® 7 Ultimate (32-bit or 64-bit)
- Genuine Windows® 7 Professional (32-bit or 64-bit)
- Genuine Windows® 7 Home Premium (32-bit or 64-bit)
- Genuine Windows® 7 Home Basic (32-bit)
- FreeDOS

### CHIPSET

	USDT	SFF/MT/CMT
Intel® Q77 Express	X	X

### PROCESSOR

	USDT	SFF/MT/CMT
<b>Intel® 3rd Generation Core™ i7 Processors</b>		
<u>Intel® Core™ i7-3770 Processor</u> Up to 3.9 GHz turbo boost frequency, 8 MB cache, 4 cores, 8 threads Intel HD Graphics 4000 Supports DDR3 memory up to 1600 MT/s data rate Supports Intel vPro Technologies and Intel's Stable Image Platform Program (SIPP)		X
<u>Intel® Core™ i7-3770S Processor</u> Up to 3.9 GHz turbo boost frequency, 8 MB cache, 4 cores, 8 threads Intel HD Graphics 4000 Supports DDR3 memory up to 1600 MT/s data rate Supports Intel vPro Technologies and Intel's Stable Image Platform Program (SIPP)	X	
<b>Intel® 3rd Generation Core™ i5 Processors</b>		
<u>Intel® Core™ i5-3570 Processor</u> Up to with 3.8 GHz turbo boost frequency, 6 MB cache, 4 cores, 4 threads Intel HD Graphics 2500 Supports DDR3 memory up to 1600 MT/s data rate Supports Intel vPro Technologies and Intel's Stable Image Platform Program (SIPP)		X
<u>Intel® Core™ i5-3570S Processor</u> Up to with 3.8 GHz turbo boost frequency, 6 MB cache, 4 cores, 4 threads Intel HD Graphics 2500 Supports DDR3 memory up to 1600 MT/s data rate Supports Intel vPro Technologies and Intel's Stable Image Platform Program (SIPP)	X	
<u>Intel® Core™ i5-3475S Processor</u> Up to with 3.6 GHz turbo boost frequency, 6 MB cache, 4 cores, 4 threads Intel HD Graphics 4000 Supports DDR3 memory up to 1600 MT/s data rate Supports Intel vPro Technologies and Intel's Stable Image Platform Program (SIPP)	X	

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

<u>Intel® Core™ i5-3470 Processor</u>		<b>X</b>
Up to with 3.6 GHz turbo boost frequency, 6 MB cache, 4 cores, 4 threads		
Intel HD Graphics 2500		
Supports DDR3 memory up to 1600 MT/s data rate		
Supports Intel vPro Technologies and Intel's Stable Image Platform Program (SIPP)		
<u>Intel® Core™ i5-3470S Processor</u>	<b>X</b>	
Up to with 3.6 GHz turbo boost frequency, 6 MB cache, 4 cores, 4 threads		
Intel HD Graphics 2500		
Supports DDR3 memory up to 1600 MT/s data rate		
Supports Intel vPro Technologies and Intel's Stable Image Platform Program (SIPP)		
<b>Intel® 2nd Generation Core™ i3 Processors</b>		
<u>Intel® Core™ i3-2130 Processor</u>	<b>X</b>	<b>X</b>
3.4 GHz base frequency, 3 MB cache, 2 cores, 4 threads		
Intel HD Graphics 2000		
Supports DDR3 memory up to 1333 MT/s data rate		
<u>Intel® Core™ i3-2120 Processor</u>	<b>X</b>	<b>X</b>
3.3 GHz base frequency, 3 MB cache, 2 cores, 4 threads		
Intel HD Graphics 2000		
Supports DDR3 memory up to 1333 MT/s data rate		
<b>Intel® Pentium® Processors</b>		
<u>Intel® Pentium® G870 Processor</u>	<b>X</b>	<b>X</b>
3.1 GHz base frequency, 3 MB cache, 2 cores, 2 threads		
Intel HD Graphics		
Supports DDR3 memory up to 1333 MT/s data rate		
<u>Intel® Pentium® G860 Processor</u>	<b>X</b>	<b>X</b>
3.0 GHz base frequency, 3 MB cache, 2 cores, 2 threads		
Intel HD Graphics		
Supports DDR3 memory up to 1333 MT/s data rate		
<u>Intel® Pentium® G640 Processor</u>	<b>X</b>	<b>X</b>
2.8 GHz base frequency, 3 MB cache, 2 cores, 2 threads		
Intel HD Graphics		
Supports DDR3 memory up to 1066 MT/s data rate		

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

### GRAPHICS

	USDT	SFF/MT/CMT
<b>Integrated on all models (depends on processor)</b>		
Intel HD Graphics: Basic, 2000, 2500, 4000	X	X
<b>NOTE:</b> When the USDT model configuration includes an Intel Core i5 or Intel Core i7 processor but not a discrete MXM graphics card, all three monitor ports are driven by the processor's integrated graphics engine. When the model is configured with an Intel Pentium or Core i3 processor only 2 of the 3 graphics display ports are active. Due to a limitation with the Intel integrated graphics, when a DisplayPort to DVI or HDMI adapter is installed, the VGA port will not be active.		
<b>Optional Discrete Graphics Solutions</b>		
ATI Radeon HD 7650A (MXM)	X	
<b>NOTE:</b> When this MXM graphics card is installed in the USDT all three monitor ports are active. The integrated processor graphics will operate the top DisplayPort (in DP 1.1 mode) while the discrete ATI graphics will operate the bottom DisplayPort (in DP 1.2 mode) and VGA output.		
AMD Radeon HD 6350 (512 MB) PCIe x16 (includes a DMS-59 to Dual VGA Y Cable)		X
AMD Radeon HD7450 (1 GB) PCIe x16 (includes a DVI to VGA adapter cable)		X
NVIDIA NVS 300 (512 MB) PCIe x16 (Includes a DMS-59 to Dual VGA Y Cable)		X
NVIDIA NVS 310 (512 MB) PCIe x16		X
<b>Adapters and Cables</b>		
DisplayPort to DisplayPort Cable	X	X
DisplayPort to DVI-D Adapter	X	X
DisplayPort to HDMI Adapter	X	X
DisplayPort to VGA Adapter	X	X

### STORAGE

	USDT	SFF/MT/CMT
<b>SATA Hard Drive</b>		
250 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"		X
320 GB, 7200 rpm, SATA 6.0 Gb/s, SMRT IV, 2.5"	X	
500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 2.5"	X	
500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"		X
1 TB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"		X
<b>SATA Self-encrypting Drive</b>		
320 GB (with 3.5" adapter when installed in SFF/MT/CMT)	X	X
<b>SATA Solid State Drive</b>		

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

120 GB (with 3.5" adapter when installed in SFF/MT/CMT)	X	X
128 GB (with 3.5" adapter when installed in SFF/MT/CMT)	X	X
<b>SATA Self-encrypting Solid State Drive</b>		
256 GB (with 3.5" adapter when installed in SFF/MT/CMT)	X	X
<b>Optical Disc Drive</b>		
DVD-ROM		X
Slim DVD-ROM	X	
SuperMulti DVD Writer		X
Slim SuperMulti DVD Writer	X	
Blu-ray Writer		X
<b>Media Card Reader</b>		
22-in-1		X
Secure Digital (SD) HC	X	

## MEMORY

Form Factor	Type	Maximum	# of Slots
Ultra Slim Desktop	DDR3 non-ECC Up to 1600 MT/s	16 GB	2 SODIMM
Small Form Factor Microtower Convertible Minitower	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.

## PERFORMANCE

<b>Intel Smart Response Technology Disk Cache Modules</b>	USDT	SFF/MT/CMT
20 GB SATA Solid State Disk Cache		X
24 GB mSATA Solid State Disk Cache	X	

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

### NETWORKING/COMMUNICATIONS

	USDT	SFF/MT/CMT
<b>Ethernet (RJ-45)</b>		
Intel 82579LM Gigabit Network Connection (standard)	X	X
Intel Gigabit CT Desktop PCIe x1 Network Card (optional)		X
<b>Wireless</b>		
802.11b/g/n PCI Express x1 Network Card (optional)		X
Intel Centrino Advanced-N 6205 PCI Express Mini Card Wireless Network Connection (optional)	X	
<b>NOTE:</b> Either the integrated network connection or the Intel Centrino wireless NIC is required to support Intel vPro Technology features.		

### AUDIO/MULTIMEDIA

	USDT	SFF/MT/CMT
HD audio with Realtek ALC221 codec (all ports are stereo)	X	X
SRS Premium Sound audio management technology	X	X
Microphone* and headphone front ports (3.5mm)	X	X
Line-out and Line-In rear Ports* (3.5mm)	X	X
Multi-streaming capable*	X	X
Internal Speaker (standard)	X	X
Thin USB Powered Speakers (optional)	X	X
USB HD 720P Business Webcam includes Cyberlink YouCam BE software includes HP Face Recognition for HP ProtectTools software	X	X
Business Headset	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.

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

### KEYBOARDS AND POINTING DEVICES

	USDT	SFF/MT/CMT
<b>Keyboard</b>		
HP PS/2 Keyboard	X	X
HP USB Keyboard	X	X
USB Smart Card (CCID) Keyboard	X	X
USB and PS/2 Washable Keyboard	X	X
Wireless Keyboard and Mouse Combo	X	X
<b>Mice</b>		
PS/2 Optical Mouse	X	X
USB Optical Mouse	X	X
1USB Laser Mouse	X	X
USB and PS/2 Washable Mouse	X	X

### HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Compaq Elite 8300 Business PC into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Select models feature either Intel Standard Manageability or Intel Core vPro Processor Technology.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Support 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

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

use ACPI to provide power conservation features.

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

## SECURITY

	USDT	SFF/MT/CMT
Trusted Platform Module (TPM) 1.2	X	X
Stringent security (via BIOS) <sup>1</sup>	X	X
SATA port disablement (via BIOS)	X	X
Drive lock	X	X
RAID configurations		X
Intel Identify Protection Technology (IPT) <sup>2</sup>	X	X
Serial, parallel, USB enable/disable (via BIOS)	X	X
Optional USB Port Disable at factory (user configurable via BIOS)	X	X
Removable media write/boot control	X	X
Power-On password (via BIOS)	X	X
Setup password (via BIOS)	X	X
Solenoid Hood Lock / Sensor		X
Hood Sensor	X	
Support for chassis padlocks and cable lock devices	X	X

<sup>1</sup>This setting is defaulted to disable; but when enabled, the PW jumper will not clear the BIOS pre-boot authentication passwords.

<sup>2</sup>Models configured with Intel Core processors have the ability to utilize advanced security protection for online transactions. IPT, used in conjunction with participating web sites, provides double identity authentication by adding a hardware component in addition to the usual user name and password. IPT is initialized through an HP ProtectTools module

## POWER

	USDT	SFF	MT/CMT
<b>Power Supply</b>			
Standard efficiency	N/A	240 W active PFC	320 W active PFC
High efficiency	Integrated graphics:	135 W 87% efficient active PFC	240 W 90% efficient active PFC
	Discrete graphics:	180 W 87% efficient active PFC	320 W 90% efficient active PFC

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

### ENVIRONMENTAL

Energy Star® qualified models available

EPEAT® registered where applicable/supported. See [www.epeat.net](http://www.epeat.net) for registration status by country.

BFR/PVC free (chassis, all internal components and modules)

### PORTS

#### I/O Ports – Standard

	USDT	MT/CMT
USB 2.0		4 each (front) 2 each (rear)
USB 3.0		4 each (rear)
Serial (RS-232)	N/A	1 each
PS/2	2 each (color-coded support for keyboard (purple) and mouse (green))	
Video	1 each VGA and 2 each DisplayPort 1.1a (for integrated dual digital monitor support)	1 each VGA and DisplayPort 1.1a (for integrated dual independent monitor support)
	<b>NOTE:</b> When configured with an Intel Pentium or 2nd Generation Intel Core i3 CPU only two of the available video output ports are active.	
Audio	Front – microphone & headphone Rear – line input, line out All ports are 3.5mm in diameter <b>NOTE:</b> See Audio/Visual section for information on re-taskable audio ports	
NIC		1 each RJ-45

#### I/O Ports – Optional

	USDT	MT/CMT
Serial (RS-232)	N/A	1 each
Parallel	N/A	1 each
eSATA	N/A	1 each

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

#### USDT Video Out Ports

Depending upon the model configuration, the USDT video ports will be active as per the following chart:

DisplayPort #1 Connection (top port)	DisplayPort #2 Connection (top port)	VGA Port Connection	Result
DP	DP	VGA	All outputs are active <sup>1,2</sup>
DP	DP – VGA	VGA	All outputs are active <sup>1,2</sup>
DP	DP – dIDVI	VGA	All outputs are active <sup>3</sup>
DP	DP – DVI/HDMI	VGA	VGA will be inactive
DP – VGA	DP	VGA	All outputs are active <sup>4</sup>
DP – VGA	DP – VGA	VGA	All outputs are active <sup>2</sup>
DP – VGA	DP – dIDVI	VGA	All outputs are active <sup>3,4</sup>
DP – VGA	DP – DVI/HDMI	VGA	VGA will be inactive
DP – dIDVI	DP	VGA	All outputs are active <sup>1,2</sup>
DP – dIDVI	DP – VGA	VGA	All outputs are active <sup>1,2</sup>
DP – dIDVI	DP – dIDVI	VGA	All outputs are active <sup>3</sup>
DP – dIDVI	DP – DVI/HDMI	VGA	VGA will be inactive
DP – DVI/HDMI	DP	VGA	VGA will be inactive
DP – DVI/HDMI	DP – VGA	VGA	VGA will be inactive
DP – DVI/HDMI	DP – dIDVI	VGA	VGA will be inactive
DP – DVI/HDMI	DP – DVI/HDMI	VGA	VGA will be inactive

#### Connection Type

#### Description

DP	Direct connection to a DisplayPort monitor
DP-VGA	VGA monitor connected with a DP to VGA adapter
DP – dIDVI	Dual link DVI monitor connected with a DP to dIDVI-D adapter
DP – DVI/HDMI	DVI-D or HDMI monitor attached using a DP to DVI-D or DP to HDMI adapter
VGA	Direct connection to a VGA monitor

#### Notes:

1. DisplayPort #2 is restricted to modes 1900x1200 and lower when any display is connected to the VGA Port
2. If active, the VGA output is limited to modes of 1900 x 1200 and lower when any display is connected to the DisplayPort #2
3. Not a recommended configuration since the dP to dIDVI adapter is intended for dual link DVI monitors which have > 1920 x 1200 resolution
4. May not be an optimum configuration due to DP to VGA/DVI/HDMI adapter limitations; better configuration achieved by swapping DisplayPort #1 and DisplayPort #2 connections.

The DP to VGA adapter is limited to resolutions of 1920 x 1200 and below

The DP to DVI and HDMI adapters are limited to resolutions of 1920 x 12 and 1920 x 1080, respectively

The DP to dIDVI adapter is intended to only be used with monitors that require dual link DVI source

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

### SLOTS

	USDT	SFF	MT	CMT
PCI Express Mini Card	1 each	N/A	N/A	N/A
MXM	1 each	N/A	N/A	N/A
mSATA	1 each	N/A	N/A	N/A
Conventional PCI Revision 2.3 5-volt	N/A	1 each 2.5" low profile 6.6" length 25W max. power	1 each 4.2" full height 6.6" length 25W max. power	3 each 4.2" full height 6.6" length 25W max. power
PCI Express x1	N/A	1 each (2.0) 2.5" low profile 6.6" length 10W max. power	1 each (2.0) 4.2" full height 6.6" length 10W max. power	1 each (2.0) 4.2" full height 6.6" length 10W max. power
PCI Express x16 (wired as x4)	N/A	1 each (2.0) 2.5" low profile 6.6" length 35W max. power	1 each (2.0) 4.2" full height 6.6" length 35W max. power	1 each (2.0) 4.2" full height 6.6" length 35W max. power
PCI Express x16	N/A	1 each (3.0) 2.5" low profile 6.6" length 35W max. power	1 each (3.0) 4.2" full height 6.6" length 75W max. power <sup>1</sup>	1 each (3.0) 4.2" full height 6.6" length 75W max. power <sup>1</sup>

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

### BAYS

	USDT	SFF	MT	CMT
3.5" external	N/A	1 each	1 each	N/A
5.25" external	N/A	1 each 8.19" depth	2 each 8.19" depth	2 each 8.19" depth 1 each 5.7" depth
Slim	1 each	N/A	N/A	N/A
Secure Digital (SD) Reader	1 each	N/A	N/A	N/A
Internal HDD Bays	1 each 2.5" drives	1 each 3.5" drives	2 each 3.5" drives	3 each 3.5" drives

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

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

### **FORM FACTORS AVAILABLE**

Ultra-slim Desktop

Small Form Factor

Microtower

Convertible Minitower

### **SERVICE AND SUPPORT**

3 year standard on-site warranty and service<sup>1</sup>: This limited warranty and service offering delivers parts, labor and on-site repair. Optional terms available up to 5 years. Response time is next business day<sup>2</sup> and includes free telephone support<sup>3</sup> 24 x 7. Global coverage<sup>2</sup> ensures any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.

## OPERATING SYSTEMS

### Preinstalled

Genuine Windows® 7 Ultimate (32-bit or 64-bit)  
Genuine Windows® 7 Professional (32-bit or 64-bit)  
Genuine Windows® 7 Home Premium (32-bit or 64-bit)  
Genuine Windows® 7 Home Basic (32-bit)  
FreeDOS

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

### Supported

Genuine Windows® 7 Enterprise (32-bit or 64-bit)

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

### Limited Support

Genuine Windows® XP Professional (32-bit)

For all Limited Support operating systems HP will make available on [www.hp.com](http://www.hp.com) certified drivers for major subsystems, if not provided by the operating system, within 30 days of product announcement.

HP performs functional testing on representative configurations. Some newer technologies may not be supported.

HP value added software and 3rd party applications (i.e. DVD players) are not supported.

### Certified

Novell SUSE Linux Enterprise Desktop 11  
Red Hat Enterprise Linux 64

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

Genuine Windows® Vista Enterprise (32-bit or 64-bit)  
Genuine 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](http://www.hp.com). HP will not develop or qualify any drivers or perform any integration testing.

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

- Intel Gigabit CT Desktop NIC
- Broadcom NetXtreme Gigabit Ethernet Plus
- HP 22-in-1 Media Card Reader
- HP ProtectTools
- 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
- HP Wireless 802.11b/g/n NIC
- HP 22-in-1 Media Card Reader
- HP Blu-ray Writer

### Technical Specifications – Operating Systems, Software and eDocumentation

- HP FireWire / IEEE 1394 PCI Card
- HP 2nd serial port Adapter
- HP USB Smart Card (CCID) Keyboard
- Power Management features

Systems configured with Linux do not qualify for ENERGY STAR

### INCLUDED SOFTWARE COMPONENTS AND APPLICATIONS

- Adobe Flash Player
- Ask Search (alternate search engine)
- HP Marketplace
- HP ProtectTools Security Suite, including:
  - Computrace for HP ProtectTools
  - Device Access Manager for HP ProtectTools
  - Drive Encryption for HP ProtectTools
  - Embedded Security for HP ProtectTools
  - File Sanitizer for HP ProtectTools
  - Privacy Manager for HP ProtectTools
- HP Wallpaper
- Microsoft Advantage Program, including the following:
  - Bing Bar Toolbar
  - Bing Search
  - Microsoft Internet Explorer Home Page
  - Microsoft Office Starter 2010
- Microsoft Security Essentials
- PDF Complete Corporate Edition
- WinZip Basic
- Yahoo Search (alternate search engine)

### INCLUDED HP DOCUMENTATION (eDOCS)

- HP eHelp Documentation
- HP Hardware Reference Guide
- HP Quick Setup & Getting Started Guide
- HP Regulatory and Safety Information
- HP Safety and Comfort Guide
- HP Warranty Documentation

### INCLUDED HP SUPPORT APPLICATIONS

- HP EUDI Support Environment
- HP Help and Support
- HP Recovery Manager
- HP Setup v9.0
- HP Support Assistant

### OPTIONAL SOFTWARE APPLICATIONS

#### Multi-media Software Applications

- Corel WinDVD 8 BD

### *Technical Specifications – Operating Systems, Software and eDocumentation*

- Corel WinDVD 8 SD
- Roxio Creator Business 10 HD
- SRS Premium Sound PRO

#### Collaboration and Online Storage Solutions

- Box.net Online Storage (10GB) - USA only
- Box.net Online Storage (unlimited) - USA only
- HP MyRoom
- HP Virtual Rooms (up to 3 people per meeting)

#### Productivity Solutions

HP Power Assistant

Microsoft Office Professional 2010

Microsoft Office Home & Business Edition 2010

Microsoft Office Personal 2010 (Japan only)

Microsoft Windows Virtual PC - XP mode

PDF Complete Office Edition

## INTEL 3<sup>RD</sup> GENERATION CORE vPRO PROCESSORS

All HP Compaq Elite 8300 Business PC models featuring this technology include processors that are part of the Intel 2012 Stable Image Platform Program (SIPP) designed to ensure the stability promise inherent in the value proposition of the HP Compaq Elite 8300 Business PC, thus making these models the most stable, secure, and manageable platforms available to enterprises today.

**Intel Advanced Management Technology (AMT) v8.0** – An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 8.0 includes the following advanced management functions:

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

### Technical Specifications - Graphics

#### Intel HD Graphics

<b>VGA Controller</b>	Integrated
<b>DisplayPort</b>	1.1a; integrated, multimode capable; supports HDCP and audio over DisplayPort
<b>Bus Type</b>	PCI Express x16
<b>RAMDAC</b>	Integrated, 350 MHz
<b>Memory</b>	Intel graphics do not have dedicated memory but utilizes some of the computer's system memory. The amount of memory used for graphics depends on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content.

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.

<b>Maximum Graphics Memory</b>	Microsoft Windows XP Up to 1GB	Microsoft Windows 7 Up to 1.7GB
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**Note:** the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.

**HW Video Decode** AVC/VC1/MPEG2/JPEG/MJPEG/PAVP

**Maximum Color Depth** 32 bits/pixel

**Graphics/Video API Support** 3<sup>rd</sup> 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
  - Playback of Blu-ray disc S3D content using HDMI (V.1.4 with 3D)
- DirectX Video Acceleration (DXVA) support for accelerating video processing
  - Full AVC/VC1/MPEG2 HW Decode
- Advanced Scheduler 2.0, 1.0, XPDM support
- Windows 7, Windows XP, OSX, Linux OS Support
- DirectX 11, DirectX 10.1, DirectX 10, DirectX 9 support
- OpenGL 3.3 support

2<sup>nd</sup> Generation Core processors:

- The Processor Graphics contains a refresh of the sixth generation graphics core enabling substantial gains in performance and lower power consumption.
- 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
  - Playback of Blu-ray disc S3D content using HDMI (V.1.4 with 3D)
- DirectX Video Acceleration (DXVA) support for accelerating video processing

### Technical Specifications - Graphics

- Full AVC/VC1/MPEG2 HW Decode
- Advanced Scheduler 2.0, 1.0, XPDM support
- Windows 7, XP, Windows Vista, OSX, Linux OS Support
- DirectX 10.1, DirectX 10, DirectX 9 support
- OpenGL 3.0 support

#### Supported Display Resolutions and Refresh Rates

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

Resolution	Analog	Digital
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

\* Only supported when using a DisplayPort connection

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

Note: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

### AMD Radeon HD 6350 Graphics Card

#### Introduction

The AMD Radeon HD 6350 DH PCIe x16 Graphics Card provides a low profile, PCI Express x16 graphics add-in card solution based on the AMD Radeon™ HD 6350 GPU. This card supports dual display video output through its single DMS-59 connector using a DMS-50 adapter cable.

An ideal solution for desktop PC customers seeking stable 2D and advanced 3D graphics performance, the AMD Radeon HD 6350 DH PCIe x16 Graphics Card is an excellent choice for small business users engaging in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

**NOTE:** Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

#### Key Benefits

- 512 MB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory
- AMD Radeon™ HD 6350 GPU
- Conforms to full PCI Express 2.0A specification for low profile form factor (x16 lanes native PCI Express implementation)
- Includes a DMS-59 to Dual VGA Y Cable
- HDCP supported on DVI outputs ( DVI Requires optional kit DL139A)
- DirectX 11 support in hardware for optimal performance in DX11 applications.
- AMD Avivo technology for improved image and video playback.
- OpenGL 4.0 support in hardware for optimal performance with OpenGL applications

### Technical Specifications - Graphics

**NOTE:** The AMD Radeon HD 6350 PCIe x16 Graphics Card does not support Dual-link DVI capable monitors.

<b>Form Factor</b>	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
<b>Graphics Controller</b>	AMD HD 6350 GPU
<b>Output Connector</b>	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Also supports dual digital displays with an optional DMS-59 to dual DVI cable.
<b>Core Clock</b>	650MHz
<b>Memory Clock</b>	800MHz
<b>Memory Frame Buffer</b>	512MB, DDR3, 64-bit wide
<b>Bus Type</b>	PCI Express x16, Generation 2.0
<b>Max. Vertical Refresh</b>	85Hz
<b>Display Support</b>	Integrated 400MHz RAMDAC
<b>Display Max. Resolution</b>	Digital 1900 x 1200 Analog 2048 x 1536
<b>Max. Power Consumption</b>	19.9W
<b>Supported Graphics APIs</b>	HDCP supported on DVI output using optional DMS-59 to dual DVI cable. DirectX 11 support in hardware. OpenGL 4.0 support in hardware.

#### 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 Rate (Hz)	
	Analog	Digital
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	N/A
2048 x 1536	75	N/A
2560 x 1600	N/A	N/A

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

#### AMD Radeon HD 7450 Graphics Card

Introduction

### Technical Specifications - Graphics

The AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Card provides a low profile, PCI Express x16 graphics add-in card solution based on the AMD Radeon™ HD 7450 Graphics Processor\*. This card supports dual displays with its DisplayPort and dual link (DL) DVI connectors.

An ideal solution for desktop PC customers seeking stable 2D and advanced 3D graphics performance, the AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Card is an excellent choice for small business users engaging in Web conferencing or video or photo editing, while improving the everyday business PC experience with better graphics and excellent visual display quality.

The AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Cards delivers PCI Express (PCIe) features including:

- Full 16 lane PCIe bus support with peak bandwidth support
- High resolution monitor support with the dual-link DVI port
- Multimode DisplayPort connector for current and future display technology support

**NOTE:** Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

\* Based on AMD Radeon™ HD 6000 series GPU technology

#### Key Benefits

- 1GB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory
- Featuring the AMD Radeon™ HD 7450 Graphics Processing Unit
- Conforms to full PCI Express 2.0A specification for low profile form factor (x16 lanes native PCI Express implementation)
- Provides dual-link (DL) DVI-I and DisplayPort output ports. A DVI-to-VGA adapter cable included
- 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 connection use the optional DisplayPort Cable Kit VN567AA

- Supports audio with video through the DisplayPort connector
- DisplayPort 1.2 support provided in a future driver update
- HDCP supported on DisplayPort and DVI output
- DirectX 11 support in hardware for optimal performance in DX11 applications.
- ATI Avivo technology for improved image and video playback.
- OpenGL 4.0 support in hardware for optimal performance with OpenGL applications
- Thermally controlled fan for quiet operation.
- BFR/PVC free construction

<b>Form Factor</b>	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
<b>Graphics Controller</b>	AMD HD 7450 GPU (based on AMD Radeon HD 6000 series technology)
<b>Output Connector</b>	Dual-link (DL) DVI-I and DisplayPort output ports
<b>Core Clock</b>	625MHz
<b>Memory Clock</b>	800MHz
<b>Memory Frame Buffer</b>	1GB, DDR3, 64-bit wide
<b>Bus Type</b>	PCI Express x16, Generation 2.0
<b>Max. Vertical Refresh</b>	85Hz
<b>Display Support</b>	Integrated 400MHz RAMDAC
<b>Display Max. Resolution</b>	Digital 2560 x 1600 Analog 2048 x 1536

### Technical Specifications - Graphics

<b>Max. Power Consumption</b>	19.9W
<b>Supported Graphics APIs</b>	DirectX 11 support in hardware. OpenGL 4.0 support in hardware.

#### 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 Rate (Hz)	
	Analog	Digital
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**

\* Only supported with a Display Port monitor connection

\*\* Only supported when using a dual link DVI or DP monitor connection.

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

### NVIDIA NVS 300 Graphics Card

#### Introduction

The NVIDIA NVS 300 PCIe Graphics Card is a low profile, dual-head graphics card delivering next-generation multi-display capabilities to professional business and commercial applications.

If you require a graphics card for use with desktops in a telesales-center environment, or frequently analyze spreadsheets requiring the flexibility of dual-monitor displays, the NVIDIA NVS 300 PCIe Graphics Card is the ideal solution for you. Easily installed with a setup wizard, this controller integrates seamlessly with the Microsoft Windows environment. nView - NVIDIA's multi-display software, enhances your productivity in single or multi-display environments by allowing you to take advantage of features like gridlines & Virtual Desktops (Virtual Desktops allows an end user to create up to 32 individual desktops)

The NVIDIA NVS 300 PCIe Graphics Card is also GPU computing ready. It is capable of enhancing system performance if used in conjunction with applications that support GPU computing through DirectCompute, CUDA, or OpenCL frameworks.

The NVIDIA NVS 300 PCIe Graphics Card includes 512MB of DDR3 graphics memory. A minimum system memory configuration of 1GB is needed to support this card.

**NOTE:** Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

#### Key Benefits

### Technical Specifications - Graphics

- View your work on two monitors with nView multi-display software and create up to 32 individual desktops (using 'Virtual Desktops' with nView)
- Compatible with all major financial, non-linear editing (NLE), and electronic design automation (EDA) applications
- Includes 512 MB of dedicated DDR3 graphics memory
- Deliver crystal-clear images via dual 400-MHz RAMDACs
- Supports the latest flat-panel displays, dual analog or digital displays
- Robust IT management tools for seamless installation, deployment and maintenance
- Passive heatsink for silent operation
- DirectX 10.1 support in hardware for optimal performance in DX10 applications
- OpenGL 3.3 support in hardware for optimal performance with OpenGL applications

<b>Form Factor</b>	PCI Express x16 (generation 2.0) Low Profile, half length, 2.586" x 5.7" (6.57 x 14.48 cm) Full height bracket utilized when configured to CMT or MT
<b>Graphics Controller</b>	Nvidia GT218 GPU
<b>Memory Frame Buffer</b>	512MB DDR3, 64-bit wide
<b>Output Connectors</b>	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Support dual digital displays with an optional adapter (see complete listing of available optional adapters elsewhere in this QuickSpec).
<b>RAMDAC</b>	Dual 400MHz
<b>Core Clock</b>	520MHz
<b>Memory Clock</b>	790MHz
<b>Frame Buffer</b>	512MB DDR2, 64-bit wide
<b>Maximum Pixel Clock (analog)</b>	400MHz
<b>Overlay planes</b>	One 16-bit video overlay plane
<b>Video Acceleration</b>	Directx 10.1; OpenGL 3.3; CUDA, DirectCompute Full screen, full frame video playback of HDTV, Blu-ray and DVD content
<b>High-definition Video Processor (HDVP)</b>	Inbuilt video decoder for multiple video formats including MPEG2, VC-1, WMV9, H.264, and MVC Capable of decoding dual Video Streams at HD (1080p) resolutions Hardware color-space conversion (YUV 4:2:2 and 4:2:0) High-Quality in-built Filtering/Scaling Stereo & HD Audio (LPCM 7.1) support for HDMI outputs (HDMI via optional DVI-HDMI dongles) with the DMS-59 to DisplayPort Adapter
<b>Supported Graphics APIs</b>	OpenGL 3.3 support in hardware DirectX 10.0 support in hardware

#### 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 Rate (Hz)	
	Analog	Digital
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60

### Technical Specifications - Graphics

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	N/A
2048 x 1536	75	N/A

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

### NVIDIA NVS 310 Graphics Card

#### Introduction

If you are seeking stable 2D and advanced 3D graphics performance from your HP Compaq Business Desktop, the NVIDIA GeForce 310 DP PCIe x16 Graphics Card is the perfect solution, providing a low profile, PCI Express x16 graphics add-in card.

The NVIDIA GeForce 310 DP PCIe x16 Graphics Card is an excellent choice for your small business, enabling you to engage in video conferencing or 3D image manipulation, while improving your everyday business PC experience with faster frame rates and excellent visual quality.

The NVIDIA GeForce 310 DP PCIe x16 Graphics Card delivers PCI Express (PCIe) features including:

- Full 16 lane support with peak bandwidth support
- High resolution LCD monitor support with the dual-link DVI port
- Multimode DisplayPort connector for current and future technology support

#### Key Benefits

- Stable 2D and advanced 3D graphics performance
- Faster frame rates and excellent visual quality
- Low profile configured with full-height bracket
- 512 MB DDR3 dedicated on-board graphics frame buffer memory
- Conforms to full PCI Express 2.0 specification for low-profile form factor (x16 lanes native PCI Express implementation)
- Provides dual-link (DL) DVI-I and DisplayPort output ports
- Dual-link (DL) DVI support for high resolution LCD monitor support (such as the HP LP3065 LCD monitor)
- 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 connection use the optional DisplayPort Cable Kit VN567AA.

- Supports audio with video through the DisplayPort connector
- HDCP for content protected playback support
- DisplayPort connector supports Multimode technology to support connection to DVI-D monitors\*

\*With the appropriate adapter cable

<b>Bus Type</b>	PCI Express x16
<b>Graphics Chip</b>	GT218
<b>Core Clock</b>	589MHz
<b>Memory Clock</b>	790MHz

### Technical Specifications - Graphics

<b>Frame Buffer</b>	512MH DDR2, 64-bit wide
<b>Audio Support</b>	Audio supported through DisplayPort only; integrated HD audio codec supports linear PCM and Dolby Digital (7.1) audio formats
<b>Max. Power</b>	25W
<b>Dimensions</b>	2.71" x 6.6" (68.90mm x 167.65mm)
<b>Maximum Vertical Refresh Rate</b>	85Hz
<b>Display Support</b>	Integrated 400MHz RAMDAC
<b>Display Max. Resolution</b>	Digital 2560 x 1600 Analog 2048 x 1536

#### 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 Rate (Hz)	
	Analog	Digital
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	N/A
2048 x 1536	75	N/A
2560 x 1600	N/A	60*

\* Only supported when using a dual-link DVI or DP connection

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

**Board Display Options** Supports two displays via dual DisplayPort connectors

### 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 Compaq 8300 Pro Business PC supports the latest SATA 6.0Gb/s specification.

#### HP Drive Lock

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

#### SMART IV Technology

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

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

#### Native Command Queuing

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

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

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

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

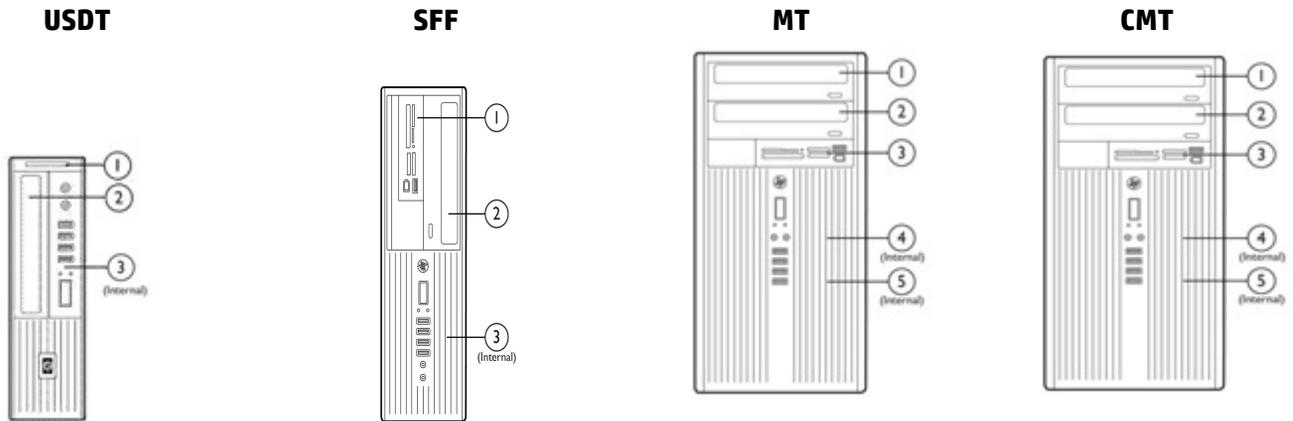
Flexible implementation:

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

**NOTE:**

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

- Are only available on the SFF, MT and CMT form factors. The USDT does not support RAID as it does not allow for more than one hard disk drive.
- Are complete RAID systems and have both drives installed. If the CMT is configured with three hard disk drives, the third drive is would be unpartitioned and not part of the RAID array
- Have the necessary Option ROM configuration.
- Are pre-loaded and pre-installed with all required Intel software.
- Include a preinstalled operating system that is mirrored mode out of the box.



Storage Drive Support												
	USDT			SFF			MT			CMT		
	SDR	ODD	HDD	MCR	ODD	HDD	MCR	ODD	HDD	MCR	ODD	HDD
Quantity Supported	1	1	1	1	1	2	1	2	2	1	2	3
Position	1	2	3	1	2	1,3	3	1,2	4,5	3	1,2	4,5,6

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

Controller	USDT	SFF	MT	CMT
Hard Drive Controller	These systems provide up to four serial ATA (SATA) interfaces that support transfer rates up to 6.0 Gb/s (for ports 0 and 1, 3 Gb/s on all others) and RAID data protection functionality. These systems can also support an external SATA (eSATA) device through an optional bracket/cable assembly (does not apply to USDT).			
SATA Interfaces	2 ea. SATA 3.0	2 ea. SATA 3.0 1 ea. SATA 2.0 1 ea. eSATA		2 ea. SATA 3.0 2 ea. SATA 2.0 1 ea. eSATA
Host SATA Controller	Advanced Host Controller Interface (AHCI) Revision 1.2. The specification includes a description of the hardware/software interface between system software and the host controller hardware.			

### HP 250-GB 7200rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

<b>Capacity</b>	250,059,350,016 bytes
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Buffer Size</b>	8 MB
<b>Logical Blocks</b>	488,397,168
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track:</b> 1.0 ms
	<b>Average:</b> 8.5 ms
	<b>Full-Stroke:</b> 18 ms
<b>Height</b> (nominal)	1 in (2.54 cm)
<b>Width</b> (nominal)	Media diameter: 3.5 in (8.89 cm)
	Physical size: 4 in (10.2 cm)
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

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

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

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

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

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

#### HP 120-GB Solid State Drive

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

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

#### HP 128 GB Solid State Drive

<b>Unformatted Capacity</b>	128 GB*
<b>Architecture</b>	Multi Level Cell (MLC) NAND
<b>Interface</b>	SATA 6 GB/sec
<b>Dimensions (W x H x D)</b>	2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm)
<b>Weight</b>	0.16 lb (73 g)
<b>Bandwidth Performance</b>	<b>Sustained Sequential Read:</b> Up to 450 MB/s <b>Sustained Sequential Write:</b> Up to 260 MB/s <b>Random Read:</b> up to 46K IOPs <b>Random Write:</b> up to 56K IOPs
<b>Latency</b>	<b>Read:</b> 55µs (TYP) <b>Write:</b> 55µs (TYP)
<b>Power</b>	<b>DC power requirement:</b> Min 4.5 V; Max 5.5 V <b>Total power consumption:</b> 160 mW (Active); <85 mW; (Idle)
<b>Useful Drive Life</b>	1.2 million device hours** <b>Operating Temperature:</b> 32° to 158° F (0° to 70° C) <b>Relative Humidity:</b> 5% to 95% <b>Maximum Wet Bulb Temperature (operating):</b> 84° F (29° C) <b>Shock:</b> 1,500 G/1.0 msec
<b>Regulations</b>	UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS CISPR 22:2002 Class B, Korea KCC, CE Mark
<b>Option kit contents</b>	HP 128 GB Solid State Drive, documentation, 3.5-inch bay adapter bracket, 3.5-inch bay adapter bracket screws, SATA cable

\* 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 - Removable Storage

#### HP Blu-ray Writer Drive

<b>AMO Part Number</b>	AR482AA	
<b>Height</b>	5.25-inch, half-height, tray-load	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA	
<b>Disc capacity</b>	50 GB DL or 25 GB standard	
<b>Dimensions</b> (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 19.0 cm)	
<b>Weight</b> (max)	2.0 lb (907 g)	
	<b>DVD-ROM</b>	8.5GB DL or 4.7GB standard
	<b>Blu-ray</b>	50GB DL or 25GB standard
	<b>Full Stroke DVD</b>	< 250 ms (seek)
	<b>Full Stroke CD</b>	< 210 ms (seek)
	<b>Blu-ray</b>	< 275 ms (seek)
		(Time to drive ready from tray loading)
	BD-ROM (SL/DL)	25S / 28S
	BD-R (SL/DL)	25S / 28S
	BD-RE (SL/DL)	25S / 28S
	DVD-ROM (SL/DL)	18S / 18S
<b>Disc Capacity</b>	<b>Startup Time</b>	DVD-R (SL/DL) 25S / 25S
		DVD-RW 25S
		DVD+R (SL/DL) 25S / 25S
		DVD+RW DVD+RW 25S
		DVD-RAM 45S
		CD-ROM 15S
	<b>CD-ROM Read</b>	CD-ROM up to 40X
		CD-R up to 40X
		CD-RW up to 40X
	<b>DVD-ROM Read</b>	DVD-RAM up to 5X
		DVD+RW up to 10X

### Technical Specifications - Removable Storage

		DVD-RW up to 10X
		DVD+R DL up to 8X
		DVD-R DL up to 8X
		DVD-ROM up to 16X
		DVD-ROM DL up to 8X
		DVD+R up to 12X
		DVD-R up to 12X
<b>Maximum Data Transfer Rates</b>	<b>Blu-ray</b>	BD-ROM up to 6X
		BD-ROM DL up to 4.8X
		BD-R up to 6X
		BD-R DL up to 4.8X
		BD-R up to 6X
		BD-RE SL/DL up to 4.8X
<b>Power</b>	<b>Source</b>	SATA DC power receptacle
	<b>DC Power Requirement</b>	5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p
	<b>DC Current</b>	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum
	<b>Temperature (operating)</b>	41° to 122° F (5° to 50° C)
<b>Environmental</b> (all conditions non-condensing)	<b>Relative Humidity (operating)</b>	10% to 90%
	<b>Maximum Wet Bulb Temperature (operating)</b>	86° F (30° C)

### HP SuperMulti DVD Writer Drive

<b>AMO Part Number</b>	AR630AT	
<b>Height</b>	5.25-inch, half-height, tray-load	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	Serial ATA	
<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
<b>Weight (max)</b>	2.6 lb (1.2 kg)	
	CD Media Read Access	Random < 120 ms typical Full Stroke < 200 ms typical
	DVD Media Read Access	Random < 130 ms typical Full Stroke < 240 ms typical

### Technical Specifications - Removable Storage

<b>Performance</b>	CD Media Read Transfer	CD-ROM, CD-R Read	Up to 6000 KB/s (40X)
		CD-RW Read	Up to 4800 KB/s (32X)
		Digital/Analog Audio Playback	Up to 2400 KB/s (16X)
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)
		Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)
		Video CD Playback	Up to 2400 KB/s (16X)
		DVD-ROM SL Read	Up to 21600 KB/s (16X)
		DVD-ROM DL Read	Up to 10800 KB/s (8X)
		DVD Video Playback	Up to 10800 KB/s (8X)
		DVD Video SL (other than playback)	Up to 21600 KB/s (16X)
	DVD Media Read Transfer	DVD Video DL (other than playback)	Up to 10800 KB/s (8X)
		DVD-R	Up to 21600 KB/s (16X)
		DVD+R	Up to 21600 KB/s (16X)
		DVD-RW	Up to 10800 KB/s (8X)
	CD Media Write Transfer	DVD-R DL	Up to 10800 KB/s (8X)
		DVD+RW	Up to 10800 KB/s (8X)
		CD-R Write	Up to 6000 KB/s (40X)
		CD-RW	600 KB/s (4X)
		CD-RW (High speed)	1500 KB/s (10X)
		CD-RW (Ultra speed)	Up to 3600 KB/s (24X)
CD-RW (Ultra speed+)		Up to 4800 KB/s (32X)	
DVD+R		Up to 21600 KB/s (16X)	
DVD+R DL (v1.2)		Up to 16200 KB/s (12X)	
DVD+R DL (v1.1)		Up to 10800 KB/s (8X)	
DVD Media Write Transfer	DVD+RW (Volume 2 v1.0)	Up to 10800 KB/s (8X)	
	DVD+RW (Volume 1 v1.3)	Up to 5400 KB/s (4X)	
	DVD-R (v2.1 rev. 6.0)	Up to 16200 KB/s (12X)	
	DVD-R (v2.1 rev. 4.0)	Up to 21600 KB/s (16X)	
	DVD-R DL (v3.0 rev. 5.0)	Up to 10800 KB/s (8X)	
	DVD-R DL (v3.0 rev. 3.0)	Up to 10800 KB/s (8X)	
	DVD-RW (v1.2 rev. 3.0)	8100 KB/s (6X)	
	DVD-RW (v1.2 rev. 2.0)	Up to 5400 KB/s (4X)	
DVD-RAM (v2.2 rev. 5.0)	Up to 16200 KB/s (12X)		
DVD-RAM (v2.2 rev. 2.0)	Up to 6750 KB/s (5X)		
	<b>Media</b>	<b>Read</b>	<b>Write</b>
	CD-ROM	Yes	No
	CD-R	Yes	No

### Technical Specifications - Removable Storage

<b>Media Compatibility</b>	CD-RW	Yes	No
	DVD-ROM	Yes	No
	DVD-ROM DL	Yes	No
	DVD-RAM	Yes	No
	DVD+R	Yes	No
	DVD+R DL	Yes	No
	DVD+RW	Yes	No
	DVD-R	Yes	No
	DVD-RW	Yes	No
	DVD-R DL	Yes	No
Source	SATA DC power receptacle		
<b>Power Supply</b>	DC Power Requirement	5 VDC $\pm$ 5%	100 mV ripple p-p
		12 VDC $\pm$ 5%	200 mV ripple p-p
	DC Current	5 VDC	<1000 mA (typical) 1600 mA (max.)
		12 VDC	1200 mA (typical) 2000 mA (max.)
	Total Drive Power (Standby Mode)	< 2.5W	
<b>Rear Panel</b>	SATA Power Connector, 15-pin		
	SATA Data Connector, 7-pin		
<b>Environmental conditions</b> (all conditions non-condensing)	Markings to identify each connector		
	Operating Temperature	41° to 122° F (5° to 50° C)	
	Storage Temperature	-22° F to 140° F (-30° C to 60° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)	
<b>HP DVD-ROM Drive</b>			
<b>AMO Part Number</b>	AR629AA		
<b>Height</b>	5.25-inch, half-height, tray-load		
<b>Orientation</b>	Either horizontal or vertical		
<b>Interface type</b>	Serial ATA		
<b>Dimensions</b> (W x H x D)	5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm)		
<b>Weight</b> (max)	2.1 lb (950 kg)		
	CD Media Read Access	Random	< 120 ms typical
		Full Stroke	< 200 ms typical
	DVD Media Read Access	Random	< 130 ms typical
		Full Stroke	< 240 ms typical
		CD-ROM, CD-R Read	Up to 6000 KB/s (40X)
		CD-RW Read	Up to 4800 KB/s (32X)

### Technical Specifications - Removable Storage

<b>Performance</b>	CD Media Read Transfer	Digital/Analog Audio Playback	Up to 2400 KB/s (16X)
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)
	DVD Media Read Transfer	Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)
		Video CD Playback	Up to 2400 KB/s (16X)
		DVD-ROM SL Read	Up to 21600 KB/s (16X)
		DVD-ROM DL Read	Up to 10800 KB/s (8X)
		DVD Video Playback	Up to 10800 KB/s (8X)
		DVD Video SL (other than playback)	Up to 21600 KB/s (16X)
		DVD Video DL (other than playback)	Up to 10800 KB/s (8X)
		DVD-R	Up to 21600 KB/s (16X)
DVD+R	Up to 21600 KB/s (16X)		
DVD-RW	Up to 10800 KB/s (8X)		
DVD-R DL	Up to 10800 KB/s (8X)		
DVD+RW	Up to 10800 KB/s (8X)		
<b>Media Compatibility</b>	<b>Media</b>	<b>Read</b>	<b>Write</b>
	CD-ROM	Yes	No
	CD-R	Yes	No
	CD-RW	Yes	No
	DVD-ROM	Yes	No
	DVD-ROM DL	Yes	No
	DVD-RAM	Yes	No
	DVD+R	Yes	No
	DVD+R DL	Yes	No
	DVD+RW	Yes	No
	DVD-R	Yes	No
	DVD-RW	Yes	No
	DVD-R DL	Yes	No
	Source	SATA DC power receptacle	
<b>Power Supply</b>	DC Power Requirement	5 VDC ± 5%	100 mV ripple p-p
		12 VDC ± 5%	200 mV ripple p-p
	5 VDC	1000 mA (typical) 1600 mA (max.)	
DC Current	12 VDC	1200 mA (typical) 2000 mA (max.)	
		Total Drive Power (Standby Mode)	< 2.5W

### Technical Specifications - Removable Storage

<b>Rear Panel</b>	SATA Power Connector, 15-pin	
	SATA Data Connector, 7-pin	
	Markings to identify each connector	
<b>Environmental conditions</b> (all conditions non-condensing)	Operating Temperature	41° to 122° F (5° to 50° C)
	Storage Temperature	-22° F to 140° F (-30° C to 60° C)
	Relative Humidity	10% to 90%
	Maximum Wet Bulb Temperature	86° F (30° C)
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)

### HP Slim SuperMulti DVD Writer Drive

<b>Height</b>	12.7mm height		
<b>Orientation</b>	Either horizontal or vertical		
<b>Interface type</b>	SATA/ATAPI		
<b>Disc recording capacity</b>	Up to 8.5 GB DL or 4.7 GB standard		
<b>Dimensions</b> (W x H x D)	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)		
<b>Weight</b> (max)	0.42 lb (190 g)		
	DVD-RAM	Up to 5X	
<b>Write speeds</b>	DVD-R DL	Up to 4X	
	DVD+R	Up to 8X	
	DVD+RW	Up to 4X	
	DVD+R DL	Up to 4X	
	DVD-R	Up to 8X	
	DVD-RW	Up to 6X	
	CD-R	Up to 24X	
	CD-RW	Up to 16X	
	DVD-RAM	Up to 5X	
	DVD-RW, DVD+RW	Up to 8X	
	DVD-R DL, DVD+R DL	Up to 6X	
	<b>Read speeds</b>	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	
Random		DVD: < 140 ms (typical), CD: < 125 ms (typical)	

### Technical Specifications - Removable Storage

<b>Access time</b> (typical reads, including settling)	Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)
	Stop Time	< 4 seconds
	Cache Buffer	2 MB (minimum)
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s - default)
<b>Power</b>	Source	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum) 12 VDC (< 600 mA typical, 1400 mA maximum)
	Total Drive Power (standby mode)	< 2.5 Watt
<b>Audio output</b>	Line-Out	0.7 VRMS
	Signal-to-Noise Ratio	74 dB
	Channel Separation	65 dB
<b>Environmental conditions</b> (operating - non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 90%
	Maximum Wet Bulb Temperature	86° F (30° C)

### HP Slim DVD-ROM Drive

<b>Height</b>	12.7mm	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA/ATAPI	
<b>Dimensions (W x H x D)</b>	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)	
<b>Weight (max)</b>	0.42 lb (190 g)	
<b>Read speeds</b>	DVD+R/-R/+RW/-RW/+R DL /-R DL	Up to 4X
	DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X

### Technical Specifications - Removable Storage

<b>Access time</b> (typical reads, including settling)	Random DVD	DVD: < 140 ms (typical), CD: < 125 ms (typical)
	Random CD	DVD: < 250 ms (seek), CD: < 210 ms (seek)
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s)
<b>Power</b>	Source	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC $\pm$ 5%-100 mV ripple p-p
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum
	Total Drive Power (standby mode)	< 2.5 Watt
<b>Audio output</b>	Line-Out	0.7 VRMS
	Signal-to-Noise Ratio	74 dB
	Channel Separation	65 dB
<b>Environmental</b> (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	5% to 85%
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)

### HP 22-n-1 Media Card Reader

<b>USB Interface</b>	USB 2.0 High-speed interface
	<b>Note:</b> Requires the USB cable to be connected to the internal USB 2.0 port or a USB 2.0 PCI card.
<b>Advance protocol support</b>	Supports hardware ECC (Error Correction Code) function
	Supports hardware CRC (Cyclic Redundancy Check) function
	Supports MS 4-bit parallel transfer mode
	Supports MS-PRO 4-bit parallel transfer mode
	Supports MS PRO-HG Duo 4-bit parallel transfer mode
	Supports SD 4-bit parallel transfer mode
	Supports high-speed 50Mhz SD 4-bit card (version 2.0)
	Supports high-speed 52Mhz MMC 8-bit card (version 4.2)
	Supports CF v4.0 with PIO mode 6 and Ultra DMA mode
	CompactFlash Type I
CompactFlash Type II	

### Technical Specifications - Removable Storage

	Microdrive
	MultiMediaCard (MMC)
	Reduced Size MultiMediaCard (RS MMC)
	MultiMediaCard 4.2 (MMC Plus, including MMC Plus HC)
	Reduced Size MultiMediaCard 4.2 (MMC Mobile, including MMC Mobile HC)
	Secure Digital Card (SD)
	Secure Digital High Capacity (SDHC)
	miniSD
<b>Supported media type</b>	miniSD High Capacity
	Micro SD (T-Flash)
	Micro SD HC
	Memory Stick
	Memory Stick Select
	Memory Stick Duo (MS Duo)
	Memory Stick PRO (MS PRO)
	Memory Stick PRO Duo (MS PRO Duo)
	Memory Stick PRO-HG Duo
	MagicGate Memory Stick (MG)
	MagicGate Memory Stick Duo
	xD-Picture Card
<b>Supported media type with card adapter</b>	Memory Stick Micro (M2)
	MMC Micro

### Environmental

	Operational Environmental Extremes	Test Parameters/Conditions - Power applied, unit operating on system $\pm 5\%$ nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours
	Storage Environmental Extremes	Test Parameters/Conditions 140°F (60°C) @ 80% R.H. for 96 hours -22°F (-30°C) @ 20% R.H. for 48 hours No power applied

### *Technical Specifications - Removable Storage*

Delta °C < 1.0°C/min  
Delta % R.H. < 1.5% R.H./min

#### **Approvals**

USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0

Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3

FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T

### Technical Specifications – Memory

#### System Memory Support

The HP Compaq Elite 8300 Business PC supports the 2nd and 3rd generation Intel® Core™ processor families. 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 processor includes an integrated memory controller (IMC). The IMC supports DDR3 protocols with two independent, 64-bit wide channels each accessing one or two DIMMs.

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

**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.

#### Memory Configurations: Ultra Slim Desktop

Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.

**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.

Total Memory	Socket	
	Channel A (black)	Channel B (black)
<b>2 GB</b> (dual channel)	2 GB	Unpopulated
<b>4 GB</b> (dual channel)	2 GB	2 GB
<b>8 GB</b> (dual channel)	4 GB	4 GB
<b>16 GB</b> (dual channel)	8 GB	8 GB

### Technical Specifications – Memory

#### Memory Configurations: Small Form Factor / Microtower / Convertible Minitower

Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.

**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.

Total Memory	Socket			
	Channel A (black)		Channel B (black)	
	1 (black)	2 (white)	3 (white)	4 (white)
<b>2 GB (dual channel)</b>	2 GB	unpopulated	Unpopulated	unpopulated
<b>4 GB (dual channel)</b>	2 GB	unpopulated	2 GB	unpopulated
<b>8 GB (dual channel)</b>	2 GB	2 GB	2 GB	2 GB
<b>16 GB (dual channel)</b>	8 GB	4 GB	4 GB	4 GB

### Technical Specifications - Communications

#### Intel 82579LM GbE Network Connection (integrated)

<b>Connector</b>	RJ-45
<b>System Interface</b>	Integrated on PCA
<b>Controller</b>	Intel 82579LM GbE platform LAN connect networking controller
<b>Memory</b>	24 KB FIFO packet buffer memory
<b>Data rates supported</b>	10/100/1000 Mbps
<b>IEEE Compliance</b>	802.1P 802.1Q 802.2 802.3 802.3ab 802.3az 802.3u
<b>Bus architecture</b>	PCI Express and SMBus
<b>Data transfer mode</b>	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
<b>Power requirement</b>	Requires 3.3V and 1.05V or just 3.3V with integrated regulators Power consumption 0.697 Watts
<b>Boot ROM support</b>	Yes
<b>Network transfer mode</b>	Full-duplex Half-duplex (not supported for the 1000BASE-T transceiver)
<b>Network transfer rate</b>	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
<b>Environmental</b>	Operating Temperature: 0° to 85° C Operating Humidity: 60% RH
<b>Management</b>	WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostic.
<b>Alerting</b>	ASF 2.0 support; AMT 7.0 support

### Technical Specifications - Communications

#### Intel Gigabit CT Desktop Network Interface Controller

<b>Connector</b>	RJ-45
<b>System Interface</b>	PCI Express x1
<b>Controller</b>	Intel WG82574L Gigabit Ethernet Controller
<b>Memory</b>	Integrated Dual 48K configurable transmit receive FIFO Buffers
<b>Data rates supported</b>	10/100/1000 Mbps
<b>Compliance</b>	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
<b>Bus architecture</b>	PCI-E 1.0a
<b>Data path width</b>	X1, 250 MB/s, Bi-directional interface
<b>Data transfer mode</b>	Bus-master DMA
<b>Hardware certifications</b>	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
<b>Power requirement</b>	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
<b>Boot ROM support</b>	Yes
<b>Network Transfer Rate</b>	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)
<b>Environmental</b>	Operating Temperature: 32° to 131°F (0° to 55° C) Operating Humidity: 85% at 131° F (55° C)
<b>Dimensions</b>	4.75 x 2.25 x 0.8 in (12.1 x 5.7 x 2.0 cm)
<b>Management</b>	WOL, PXE, DMI, WFM 2.0

#### HP 802.11 b/g/n Wireless Network Connection

<b>Dimensions (L x H)</b>	2.8 x 2.2 in (7.0 x 5.7 cm)
<b>Weight</b>	0.08 lbs (40 g)
<b>Controller</b>	Ralink RT2790
<b>System interface</b>	PCI Express x1
<b>Network standard</b>	802.11 b/g/n
<b>Frequency band</b>	2.400 - 2.497 GHz
<b>Operating temperature</b>	14° to 149°F, operating (-10° to 65°C, operating)
<b>Storage temperature</b>	-40° to 176°F, non-operating (-40° to 80°C, non-operating)
<b>Humidity</b>	10-90% operating 5-95% non-operating
<b>Operating voltage</b>	3.3V +/- 9% 12V +/- 8%

### Technical Specifications - Communications

	<b>Platform/WLAN Mode</b>	<b>Power Consumption</b>
<b>Power Consumption</b>	Maximum Power Consumption:	10 Watts
	Transmit Only	4 Watts maximum averaged power over 1 second
	Transmit Packet or Active Scanning	1000 mA peak current for 100 microseconds or longer
	Receive Only Mode or Idle without IEEE PSP mode enabled	3 Watts maximum averaged over 1 second
	Idle, with IEEE PSP mode enabled	1.0 Watts maximum averaged over 1 second
	Transmit Disabled (turned off in software)	50 mW maximum, averaged over 1 second
	Platform in S3 or S4 (power removed from Low Profile PCI Express Card)	5 mW maximum, averaged over 1 second
<b>Output Power</b> (approximate)	802.11b mode	+19 dBm +/- 1.0 dB maximum
	802.11g mode	+17 dBm +/- 1.0 dB maximum
	EWC mode	+17 dBm +/- 1.0 dB maximum (total power in all transmit chains)
<b>Security</b>	IEEE and WiFi compliant 64 / 128 bit WEP encryption	
	AES: CCM	
	802.1x authentication	
	WPA: 802.1x, WPA-PSK and TKIP	
	WPA2 certification	
	IEEE 802.11i	
<b>Antenna</b>	Cisco Certified Extensions, all versions through V5	
	HP part number 497317-003	
<b>Certifications</b>	Wi-Fi certified	
<b>Certifications for use by country</b>	United States, Canada, Peru, Taiwan	

### Intel Centrino Advance-N 6205 Wireless Network Interface Connection (USDT only)

<b>Wireless LAN Standards</b>	IEEE 802.11a/b/g/n IEEE 802.11 e, 802.11i, 802.11d, 802.11d, 802.11h
<b>Interoperability</b>	Wi-Fi certified (802.11 a/b/g/n WMM, WPA, WPA2 and WPS) Tested with wireless access points from several major manufacturers OS compatible with Microsoft Windows, Win7 and XP Cisco Compatible Extensions Program compliant (802.11a/b/g only) with Microsoft Windows XP and Windows 7
<b>Frequency Band</b>	2.4 GHz and 5 GHz
<b>Antenna Structure</b>	2 transmit; 2 receive (2x2)

### Technical Specifications - Communications

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

### *Technical Specifications - Communications*

#### **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

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

#### HP Thin USB Powered Speakers

<b>On/Off/Volume Controls</b>	Right side of right speaker
<b>Power LED</b>	Front of right speaker (green)
<b>Frequency Response</b>	F0 to 20kHz
<b>Watts</b>	2/3 watt (normal/maximum)
<b>Dimensions/Speaker</b> (H x W x D)	5.72 x 3.74 x 0.96 in 14.52 x 9.50 x 2.45 cm
<b>Net Weight</b>	0.68 lbs 0.31kg
<b>Color</b>	Black
<b>Environmental</b> (all conditions non-condensing)	Operating Temperature: 14° to 104° F (-10° to 40° C) Relative Humidity 40% to 90%
<b>Speaker Cable Length</b>	Input Cord: 5.91 ft (1800 mm) L-channel Cord: 3.28 ft (1000 mm) USB Cord: 5.91 ft (1800 mm)

### *Technical Specifications - Audio*

#### **SRS Premium Sound Technology**

**SRS Premium Sound™** is a state-of-the-art solution suite which optimizes the audio experience for all business applications including VoIP, computer based training, business presentations and digital content creation for any speaker configuration (notebook/desktop speakers or headphones). SRS Premium Sound delivers natural and immersive surround sound complete with deep, enveloping bass and crystal clear dialog which allows users to clearly hear audio and voice in communications or presentations and ensures that digital content can be experienced with uncompromised quality.

#### **SRS Premium Sound Features**

- Premium audio experience for all applications including VoIP, Video Conferencing, Webcasts, Multimedia Presentations and Digital Content Creation
- Natural and Immersive sound from two speakers or headphones
- Custom-tuned solutions to provide superior natural sound from desktop speakers and headphones
- Crystal clear dialog
- Deep, rich bass
- Intuitive user interface with presets for ease of use

#### **SRS Premium Sound Benefits**

- Turn your desktop into a multimedia powerhouse!
- Bring your business communication to life with natural sounding voice and clear dialog
- Increase productivity by making computer based training, webcasts and VoIP available anytime and anywhere with crystal clear audio
- Make presentations shine with rich, expansive sound without the need for external speakers
- Take digital content creation to a new level with deep bass, enhanced fidelity and immersive surround sound which ensures that your content is heard with uncompromised quality and detail

### Technical Specifications - Input/Output Devices

#### HP USB Standard Keyboard

	Keys	104, 105, 106, 107, 109 layout (depending upon country)
<b>Physical characteristics</b>	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg)
	Operating voltage	+ 5VDC $\pm$ 5%
	Power consumption	50-mA maximum (with three LEDs ON)
<b>Electrical</b>	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	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
<b>Mechanical</b>	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
	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)
<b>Environmental</b>	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	<b>Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

### Technical Specifications - Input/Output Devices

<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	
<b>Kit contents</b>	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

### HP PS/2 Standard Keyboard

<b>Physical Characteristics</b>	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg) minimum
	Operating voltage	+ 5VDC $\pm$ 5%
<b>Electrical</b>	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
	Languages	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	<b>Mechanical</b>	Switch type
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)
<b>Environmental</b>		Operating shock
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration

### Technical Specifications - Input/Output Devices

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

**Approvals** UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

**Ergonomic compliance** ANSI HFS 100, ISO 9241-4, and TUVGS

## HP USB Smart Card (CCID) Keyboard

### Introduction:

Boost your security, simplify access procedures and reduce the costs associated with managing networks by preventing unauthorized access to your computers and networks using smartcard technology with the HP Smart Card (CCID) Keyboard.

The USB Smart Card (CCID) Keyboard is a full-sized keyboard that takes advantage of digital signatures and certificates to secure the environment for transactions performed on both public and private networks. The USB Smart Card (CCID) Keyboard works with all smart cards that comply with ISO standard 7816.

Smart cards are easy-to-use credit card-sized devices which require multiple forms of information to be validated before you gain access to your accounts or resources. Used worldwide, smart cards strengthen access to a network or other resource using dual-factor authentication. Implementing a two-factor authentication (or multi-factor authentication) process reduces the risk of unauthorized access by verifying and validating your identity in one of the following ways:

- Something you know – a combination of username and password or PIN
- Something you have – a smart card or security token.

Something you have (smart card) plus something you know (PIN), improves user-access security within corporate network environments. Smart cards are used in government agencies, healthcare companies and the finance industry.

HP ProtectTools Smart Card Manager provides authentication software for the smart card. The Smart Card Reader module works with the HP ProtectTools Security Manager and enables the user to setup, use, and manage the smart card. This allows strengthened security with HP patented technology.

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

### Key Benefits:

Keys	104, 105, 106, 107, 109 layout (depending upon country)
Form factor	USB basic smart card keyboard
Colors	Carbonite/Silver
Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in 46.3 x 16.1 x 3.3 cm
Weight	2 lb (0.9 kg) minimum

### Physical Characteristics



### Technical Specifications - Input/Output Devices

<b>Electrical</b>	Operating voltage	+ 5VDC ± 5%	
	Power consumption	100-mA maximum (with four LEDs ON)	
	System interface	USB Type A plug connector	
	ESD	CE level 4, 15-kV air discharge	
	EMI - RFI	Conforms to FCC rules for a Class B computing device	
	Microsoft PC 99 - 2001	Functionally compliant	
	Languages	30+ available	
	Keycaps	Standard design	
<b>Mechanical</b>	Switch actuation	55 g nominal peak force with tactile feedback	
	Switch life	20 million keystrokes (using Hasco modified tester)	
	Switch type	Contamination-resistant membrane	
	Key-leveling mechanisms	For all double-wide and greater-length keys	
	Cable length	6 ft (1.8 m)	
	Microsoft PC 99 - 2001	Mechanically compliant	
	Acoustics	43-dBA maximum sound pressure level	
	Operating temperature	50° to 122° F (10° to 50° C)	
<b>Environmental</b>	Non-operating temperature	-22° to 140° F (-30° to 60° C)	
	Operating humidity	10% to 90% (non-condensing at ambient)	
	Non-operating humidity	20% to 80% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence	
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence	
	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)	
	<b>SmartCard Function</b>	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	
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	

### Technical Specifications - Input/Output Devices

Interface modes	CCID protocol
Reader performance interface	USB connection
Electro-magnetic standards	Europe USA
	2004/108/EC USAFCC part 15
<b>Approvals</b>	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF
<b>Ergonomic Compliance</b>	ISO 9241-4, TUVGS
<b>Kit Contents</b>	Keyboard, I/O Security and Documentation CD, warranty card

### HP USB & PS2 Washable Keyboard

<b>Physical Characteristics</b>	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg) minimum
	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)
<b>Electrical</b>	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
<b>Mechanical</b>	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	-4° to 149° F (-20° to 65° C)
	Operating humidity	10% to 95% (non-condensing at ambient)
	Non-operating humidity	0% to 95% (non-condensing at ambient)
<b>Environmental</b>	Operating shock	40 g, six surfaces

### Technical Specifications - Input/Output Devices

#### 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

#### 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

<b>Keyboard</b>	Dimensions (H x L x W)	1.47 x 18.06 x 6.43 in (37.3 x 458.8 x 163.2 mm)
	Weight – Without Two AA Alkaline Batteries	Weight - Without Two AA Alkaline Batteries 1.96 lb (890 g)

<b>Mouse</b>	Dimensions (H x L x W)	1.51 x 4.69 x 2.71 in (38.4 x 119 x 68.9 mm)
	Weight – Without Two AA Alkaline Batteries	0.17 lb (80 g)

<b>Receiver</b>	Dimensions (H x L x W)	0.31 x 0.72 x 2.24 in (8 x 18.4 x 57 mm)
	Weight	0.27 oz (7.6 g)
	Cable Length – Minimum	6 ft (1.8 m)

Range 32.8 ft (10 m)

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.*

<b>System Requirements</b>	Product Safety	UL; CSA /TUV (Europe only); CE Mark
	Ergonomics	ANSI; ISO (Europe only); GS Mark (Germany only)
	EMC	FCC; CISPR; ACA; BSMI; MIC; VCCI
	CE Mark	EN 55022:1998; EN 55024
	Design Guidelines for PCs	PC 99 - connector overmold colors; PC 2001 - full functionality
	Telecom	All local telecom requirements and approvals for intended markets

### Technical Specifications - Input/Output Devices

USA	FCC Part 15 Equipment Certificate; CFR 47, Part 15; other local requirements
Country Support	US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria, Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, and Thailand.

### HP PS/2 Optical 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)

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)

#### Environmental

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	400 ± 20% DPI
Tracking speed	10 in/s (25.4 cm/s) maximum
Acceleration	100 in/s/s (2.54 m/s/s)
Switch actuation	61 g nominal peak force

### Technical Specifications - Input/Output Devices

<b>Mechanical</b>	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
	Cable length	6 ft (1.8 m)
	Microsoft PC99 - 2001	Mechanically compliant
	Width	8 mm
	Diameter	1.01 in (25.6 mm)
<b>Scroll wheel</b>	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
<b>Regulatory Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

### HP USB Optical Mouse

<b>Dimensions</b> (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
<b>Weight</b>	0.27 lb (0.12 kg)
<b>Cable length</b>	72.8 in (185 cm)
<b>System requirements</b>	Available USB port

### HP USB Laser Mouse

<b>Scroll Wheel</b>	24	
<b>Maximum Rotation Speed</b>	48 rats/sec	
<b>Switch Type</b>	Wheel	
<b>Switch Life</b>	Button - 3,000,000	
	Wheel - 1,000,000 times	
	Tilt switch - 500,000 times	
<b>Environmental</b>	Operating Temperature	32° to 104° F (0° to 40° C)
	Non-operating Temperature	-4° to 140° F (-20° to 60° C)
	Operating Humidity	10% to 90% (non-condensing at ambient)

### Technical Specifications - Input/Output Devices

	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
<b>Electrical</b>	Operating Voltage	+ 5VDC $\pm$ 5%
	Power Consumption	
	MTBF	> 150,000 hrs
	ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
	EMI-RFI	FCC Class B
	PC98	PC 99 Compliant
<b>Mechanical</b>	Resolution	800dpi
	Tracking Speed	25 cm/sec
	Acceleration	0.5mm
	Switch Actuation	0.6N (60gf)
	Switch Life	Button - 3,000,000 Wheel - 1,000,000 times Tilt switch - 500,000 times
	Cable Length	1850mm
	PC98-99	PC99 compliant
<b>Regulatory Approvals</b>	UL60950-1, UL 94, UL 746 (A-E), UL 796 TUV/GS: EN 60950-1, EN 60825-1 FCC Class B, UL 1950, cUL, TUV GS, CE, C-tick, VCCI, BSMI, RRL	

### HP USB PS/2 Washable Mouse

<b>Dimensions (H x L x W)</b>	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)	
<b>Weight</b>	4.44 oz (126 g)	
<b>Environmental</b>	<b>Operating temperature</b>	-32° to 104°F (0° to 40° C)
	<b>Non-operating temperature</b>	-4° to 140°F (-20° to 60° C)
	<b>Operating humidity</b>	10% to 90% (non-condensing at ambient)
	<b>Non-operating humidity</b>	10% to 90% non-condensing

### Technical Specifications - Input/Output Devices

	<b>Operating shock</b>	40 g, 6 surfaces
	<b>Non-operating shock</b>	80 g, 6 surfaces
	<b>Operating vibration</b>	2 g peak acceleration
	<b>Non-operating vibration</b>	4 g peak acceleration
	<b>Drop (out of box)</b>	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
<b>Electrical</b>	<b>Operating voltage</b>	5 VDC $\pm$ 10%
	<b>Power consumption</b>	100mA
	<b>System consumption</b>	PS/2 mini-din connector or USB
	<b>ESD</b>	CE level 2 8 kV air discharge
	<b>EMI-RFI</b>	Conforms to FCC rules for a Class B computing device
	<b>Microsoft® PC99 – 2001</b>	Functionally compliant
<b>Mechanical</b>	<b>Resolution</b>	1000 $\pm$ 20% DPI
	<b>Tracking speed</b>	14 in/s ( 35.56 cm/s) maximum
	<b>Acceleration</b>	2 g
	<b>Switch actuation</b>	70 g nominal peak force
	<b>Switch life</b>	3,000,000 operations (using Hasco modified tester)
	<b>Switch type</b>	Low force micro-switches
	<b>Cable length</b>	8.8 ft total 70 cm+ 2m extension
	<b>Microsoft PC99 – 2001</b>	Mechanically compliant
<b>Scroll wheel</b>	<b>Width</b>	6 mm
	<b>Diameter</b>	1 in (25.4 mm)
	<b>Maximum rotation speed</b>	48 rats/sec
	<b>Switch type</b>	Light force micro-switch
	<b>Switch life</b>	3 million operations
	<b>Mechanical life</b>	Minimum 200,000 revolutions
<b>Regulatory approvals</b>	<b>Compliant</b>	FCC, CE Mark, ICES-003-B, IP66/NEMA4X
<b>Compatibility</b>	<b>Operating system support</b>	Windows 7, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32* (No driver is required for this device. Native support is provided by the operating system.), xpe, ce.net, Linux, XP-64

\* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: <http://www.windowsvista.com/upgradeadvisor>. For Windows Vista system requirements, visit: <http://www.windowsvista.com/systemrequirements>.

### 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

	USDT	SFF	MT/CMT
Standard Efficiency	N/A	240W active PFC	320W active PFC
High Efficiency*	Integrated graphics: 135W active PFC 87% efficient Discrete graphics: 180W active PFC 87% efficient	240W active PFC 87/90/87% efficient at 20/50/100% load	320W active PFC 87/90/87% efficient at 20/50/100% load
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	135W: 2.4A 180W: 2.9A	4A	5.5A
Current Leakage (NFPA 99)	< 250 µA	< 275 µA	< 450 µA
Power Supply Fan	N/A	92mm 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	6.7 x 2.6 x 1.5 in	N/A	N/A

### *Technical Specifications – Power*

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)

	USDT	SFF	MT	CMT
<b>Chassis (H x W x D)</b>	2.6 x 9.9 x 10 in 66 x 252 x 254 mm	4.0 x 13.3 x 14.9 in 100 x 338 x 379 mm	14.9 x 7.0 x 17.0 in 377 x 177 x 431 mm	17.6 x 7.00 x 18.0 in 448 x 178 x 445 mm
<b>System Volume</b>	257.5 cu in 4.2 L	782.77 cu in 12.8 L	782.77 cu in 12.8 L	2160 cu in 35.4 L
<b>System Weight*</b>	6.8 lb 3.1 kg	16.7 lb 7.6 kg	20.5 lb 9.3 kg	24.5 lb 11.2 kg
<b>Max Supported Weight (desktop orientation)</b>	77.0 lb 35.0 kg	77.0 lb 35.0 kg	N/A	77.0 lb 35.0 kg
<b>Tower Stand (H x W x D)</b>	1.1 x 4.9 x 6.7 in 27 x 125 x 170 mm	1.1 x 7.0 x 7.9 in 29 x 178 x 200 mm	N/A	N/A
<b>Packaging (H x W x D)</b>	8.6 x 15.7 x 19.7 in 218 x 398 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	24.25 x 12.3 x 22.1 in 616 x 313 x 562 mm
<b>Shipping Weight*</b>	14.4 lb 6.5 kg	17.9 lb 8.1 kg	28.8 lb 13.1 kg	34.0 lb 15.4 kg
<b>Palletization Profile</b>	6-units per layer 10-layer max. 60-units per pallet	4-units per layer 10-layer max. 40-units per pallet	4-units per layer 8-layer max. 32-units per pallet	6-units per layer 4-layer max. 24-units per 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
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

### Technical Specifications – Miscellaneous Features

#### Additional Features

##### 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

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

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

IOEDC: I/O Error Detection Circuitry

Detects errors in Read/Write buffers on HDD cache RAM

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

Interface in F10 setup provides confirmation of SMART IV support.

### Technical Specifications - Environmental Data

#### 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

#### Ultra Slim Desktop

Energy Consumption (typically configured)	115 VAC	230 VAC	100 VAC
Normal Operation	18.95 W	20.01 W	18.66 W
Sleep (Energy Star low power mode)	2.09 W	2.182 W	2.099 W
Off	1.128 W	1.228 W	1.127 W

#### NOTE:

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured model.

Heat Dissipation (typically configured)*	115 VAC	230 VAC	100 VAC
Normal Operation	65 BTU/hr	68 BTU/hr	64 BTU/hr
Sleep	7 BTU/hr	7 BTU/hr	7 BTU/hr
Off	4 BTU/hr	4 BTU/hr	4 BTU/hr

\* 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)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.74	27.5
Fixed Disk (random writes)	4.53	32.8

#### Batteries

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

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

#### Battery Size

CR2032 (coin cell)

#### Battery Type

Lithium

#### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.

### Technical Specifications - Environmental Data

- 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 Silver 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 0.04% post consumer recycled plastic (by wt.)
- This product is 93.7% recyclable when properly disposed of at end of life.

### Packaging Materials

- External:
  - Corrugated 1966 g
- Internal:
  - Polyethylene low density Foam 154 g
- The corrugated packaging material contains at least 38.38% recycled content.
- The Polyethylene low density Foam packaging material contains at least 60.42% recycled content.

### Small Form Factor

<b>Energy Consumption</b>	115 VAC	230 VAC	100 VAC
Normal Operation	31.07 W	31.42 W	31.31 W
Sleep (Energy Star low power mode)	2.14 W	2.37 W	2.11 W
Off	0.88 W	1.06 W	0.86 W
<b>Heat Dissipation*</b>	115 VAC	230 VAC	100 VAC
Normal Operation	106.25 BTU/hr	107.4 BTU/hr	107.08 BTU/hr
Sleep	7.3 BTU/hr	8.10 BTU/hr	7.2 BTU/hr
Off	3 BTU/hr	3.6 BTU/hr	2.9 BTU/hr

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

### Technical Specifications - Environmental Data

#### Declared Noise Emissions

(in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.74	27.5
Fixed Disk (random writes)	4.53	32.8

#### Batteries

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

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

#### Battery Size

CR2032 (coin cell)

#### Battery Type

Lithium

#### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level 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 0.04% post consumer recycled plastic (by wt.)
- This product is 93.7% recyclable when properly disposed of at end of life.

#### Packaging Materials

- External:
  - Corrugated 1966 g
- Internal:
  - Polyethylene low density Foam 154 g
- The corrugated packaging material contains at least 38.38% recycled content.
- The Polyethylene low density Foam packaging material contains at least 60.42% recycled content.

### Technical Specifications - Environmental Data

#### Microtower

Energy Consumption (typically configured)	115 VAC	230 VAC	100 VAC
Normal Operation	33.6464 W	34.7426 W	33.7985 W
Sleep (Energy Star low power mode)	2.3283 W	2.5323 W	2.3149 W
Off	0.8531 W	1.0106 W	0.8386 W

#### NOTE:

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured model.

Heat Dissipation (typically configured)*	115 VAC	230 VAC	100 VAC
Normal Operation	115 BTU/hr	119 BTU/hr	116 BTU/hr
Sleep	8 BTU/hr	9 BTU/hr	8 BTU/hr
Off	3 BTU/hr	3 BTU/hr	3 BTU/hr

\* 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)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.9	28
Fixed Disk (random writes)	3.9	29

#### Batteries

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

Batteries used in the product do not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight:

#### Battery Size

CR2032 (coin cell)

#### Battery type

Li-Ion

#### Additional Information

- 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 0.13% post consumer recycled plastic (by wt.)

### Technical Specifications - Environmental Data

- This product is 92.4% recyclable when properly disposed of at end of life.

#### Packaging Materials

- External
  - Corrugated Carton - 1950 g
- Internal
  - Polyethylene low density foam - 205 g
- The corrugated packaging material contains at least 31.38% recycled content.
- The Polyethylene low density Foam packaging material contains at least 60.42% recycled content.

### Convertible Minitower

<b>Energy Consumption</b> (typically configured)	115 VAC	230 VAC	100 VAC
Normal Operation	31.4797 W	31.2721 W	31.5603 W
Sleep (Energy Star low power mode)	2.1754 W	2.3982 W	2.1609 W
Off	0.9116 W	1.1064 W	0.8938 W

#### **NOTE:**

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured model.

<b>Heat Dissipation</b> (typically configured)*	115 VAC	230 VAC	100 VAC
Normal Operation	108 BTU/hr	107 BTU/hr	108 BTU/hr
Sleep	7 BTU/hr	8 BTU/hr	7 BTU/hr
Off	3 BTU/hr	4 BTU/hr	3 BTU/hr

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

### Technical Specifications - Environmental Data

#### Declared Noise Emissions

(in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.8	21
Fixed Disk (random writes)	3.8	21

#### Batteries

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

Batteries used in the product do not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight:

#### Battery Size

CR2032 (coin cell)

#### Battery type

Li-Ion

#### Additional Information

- 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 0.05% post consumer recycled plastic (by wt.)
- This product is 95.1% recyclable when properly disposed of at end of life.

#### Packaging Materials

- External
  - Corrugated: 1900g
- Internal
  - Polyethylene low density foam: 230g
- The corrugated carton packaging material contains at least 53.5% recycled content.
- The Polyethylene low density foam packaging material is made from 60.42% recycled content.

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## All Models

### 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).

### Technical Specifications - Environmental Data

#### Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at:

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

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

#### Packaging

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

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

#### End-of-life Management and Recycling

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

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) 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>

### *Technical Specifications - Environmental Data*

Eco-label certifications

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

ISO 14001 certificates:

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

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After-Market Options (availability may vary by region)

### Communication Devices

	USDT	SFF/MT/CMT	Part Number
Intel Gigabit CT Desktop NIC (PCIe x1)		X	FH969AA
Broadcom NetXtreme GbE Ethernet Plus NIC (PCIe x1)		X	FS215AA
HP Wireless 802.11 b/g/n NIC (PCIe x1)		X	FH971AA

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

### Graphics Solutions

	USDT	SFF/MT/CMT	Part Number
AMD Radeon HD 6350 Graphics (PCIe x16)		X	QK638AA
AMD Radeon HD 7450 Graphics Card		X	B1R44AA
Nvidia NVS 300 Graphics (PCIe x16)		X	BV456AA
Nvidia NVS 310 Graphics (PCIe x16)		X	A7U59AA
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

	USDT	SFF/MT/CMT	Part Number
HP 300GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive Includes 3.5"adapter		X	FM802AA
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 160-GB SATA 3.0Gb/s Solid State Drive	X	X	BW321AA
HP eSATA Adapter		X	FH966AA
HP Removable SATA Hard Drive Enclosure (frame & carrier)		X	RY102AA
HP Removable SATA Hard Drive Enclosure (carrier only)		X	RY103AA

After-Market Options (availability may vary by region)

### Input Devices

	USDT	SFF/MT/CMT	Part Number
HP PS/2 Standard Keyboard	X	X	DT527A
HP USB Standard Keyboard	X	X	DT528A
HP USB Keyboard with USB ports	X	X	BT330AA
HP USB Gray Keyboard	X	X	DT529A
HP USB Smart Card (CCID) Keyboard	X	X	BV813AA
HP USB Keyboard and Mouse Kit	X	X	RC465AA
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 PS/2 Optical Mouse	X	X	EY703AA
HP USB Optical Mouse	X	X	DC172AT
HP USB Laser Mouse	X	X	GW405AT
HP USB Travel Mouse	X	X	RH304AA
HP Wireless Keyboard and Mouse Combination	X	X	NB896AA

### System Memory

	USDT	SFF/MT/CMT	Part Number
HP 2 GB DIMM		X	AT024A6
HP 4 GB DIMM		X	VH638AA
HP 2 GB SO-DIMM	X		VH640AT
HP 4 GB SO-DIMM	X		VH641AT

### Multimedia Devices

	USDT	SFF/MT/CMT	Part Number
HP Thin USB Powered Speakers	X	X	KK912AA
HP DVD-ROM Drive		X	AR629AA
HP SuperMulti DVD Writer Drive		X	AR630AA
HP Blu-ray Writer Drive		X	AR482AA
HP Slim DVD-ROM Drive	X		VP033AA
HP Slim SuperMulti DVD Writer Drive	X		VP034AA
HP USB HD 720P Business Webcam	X	X	QP896AA
HP Business Headset	X	X	QK550AA

### Removable Media Storage

	USDT	SFF/MT/CMT	Part Number
HP USB External Diskette Drive	X	X	DC141B
HP 22-n-1 Media Card Reader		X	AR941AA

After-Market Options (availability may vary by region)

### Security Devices

	USDT	SFF/MT/CMT	Part Number
HP/Kensington MicroSaver Cable Lock	X	X	PC766A
HP Business PC Security Lock	X	X	PV606AA
HP USDT Rear Port Controller Cover	X		VN571AA
HP SFF Solenoid Lock and Hood Sensor		SFF only	BP428AA
HP CMT Solenoid Lock and Hood Sensor		MT/CMT only	DE618A
HP SFF Wall Mount/Security Sleeve		SFF only	VN570AA
HP Keyed Lock Cable	X	X	BV411AA

### Stands and Accessories

	USDT	SFF/MT/CMT	Part Number
HP Integrated Work Center Stand (USDT)	X		GN783AA
HP Integrated Work Center Stand (SFF)		SFF only	TBA
HP USDT Tower Stand	X		VN568AA
HP SFF Tower Stand		SFF only	VN569AA
HP Mobile Meeting Room	X		QS946AA#ABA
HP Executive Meeting Room	X		QS947AA#ABA
HP Serial Port Adapter (RS-232 compatible)		X	PA716A
HP 5.25" Blank Bezel Kit (50 pack)		X	DC177B
HP FireWire IEEE 1394 Card		X	PA997A

### 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

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

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May 2012