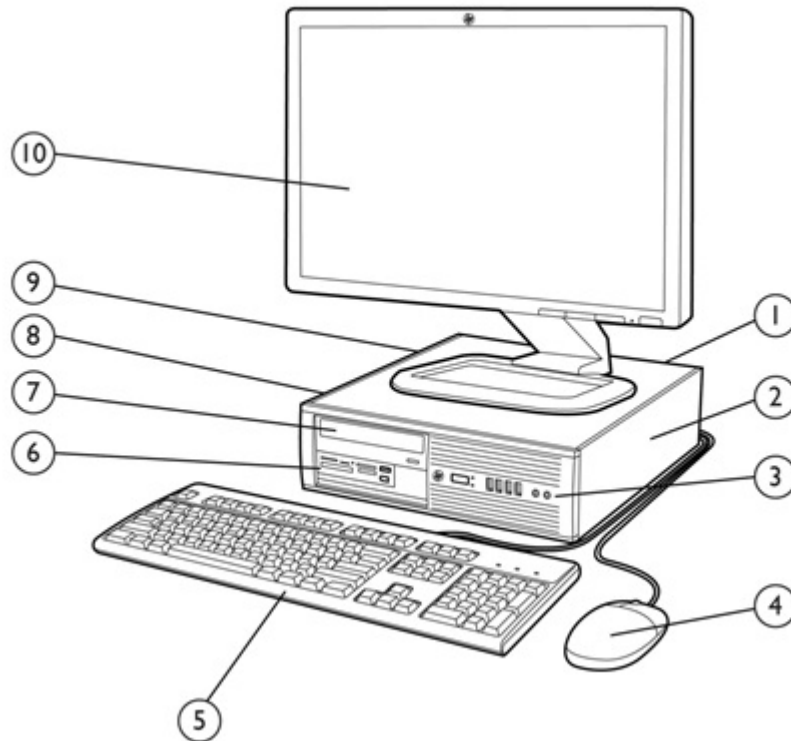


### Overview

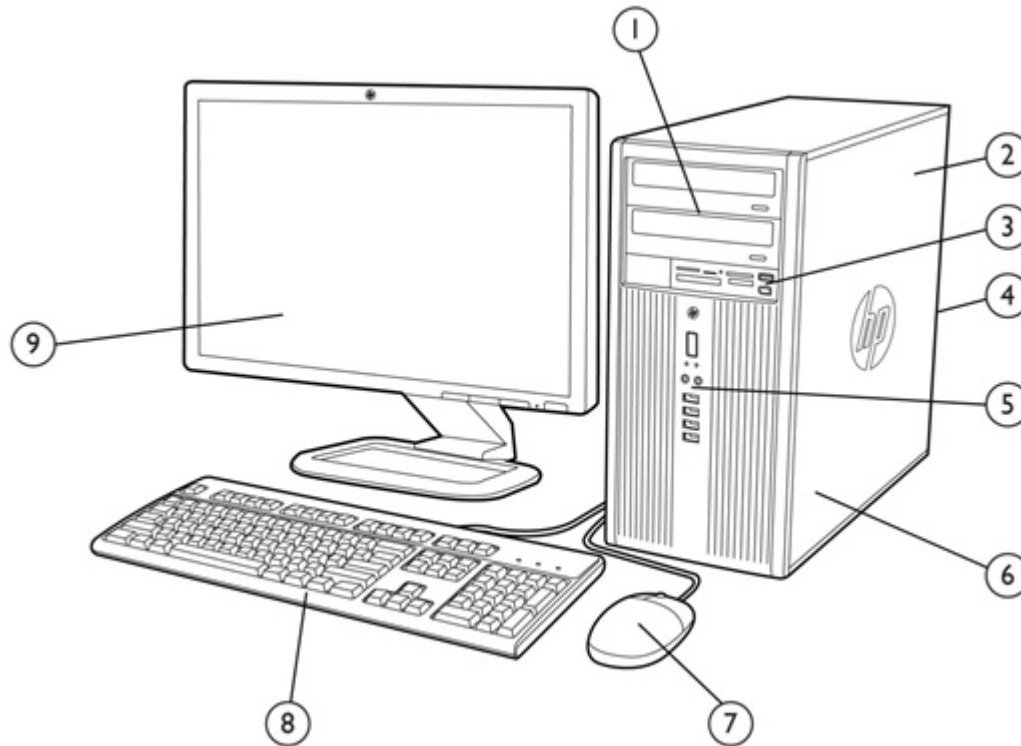
### HP COMPAQ PRO 6300 SMALL FORM FACTOR BUSINESS PC



- 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, (2) PCI Express x1 and (1) 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 an optional 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 PRO 6300 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
- 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, (2) PCI Express x1 and (1) PCI Express x16 graphics
- 7 HP Mouse
- 8 HP Keyboard
- 9 HP Monitor (sold separately)

### Overview

#### At A Glance

- Choice of two professional chassis form factors: Small Form Factor and Microtower.
- UEFI BIOS developed and engineered by HP for better security, manageability and software image stability
- Intel Q75 Express chipset supporting Intel 2nd and 3rd generation Core processors featuring Intel HD Graphics
- 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
- Standard efficiency or 90% high efficiency energy saving power supplies available
- ENERGY STAR® qualified models certified EPEAT® Gold
- 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

Windows 8 Pro (64-bit)\*

Windows 8 (64-bit)\*

Windows® 7 Ultimate (32-bit)\*\*

Windows® 7 Ultimate (64-bit)\*\*

Windows® 7 Professional (32-bit)\*\*

Windows® 7 Professional (64-bit)\*\*

Windows® 7 Professional (32-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*

Windows® 7 Professional (64-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*

Windows® 7 Home Premium (32-bit)\*\*

Windows® 7 Home Premium (64-bit)\*\*

Windows® 7 Home Basic (32-bit)\*\*

FreeDOS 2.0

Novell SUSE Linux Enterprise Desktop 11

\*Not all features are available in all editions of Windows 8. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See <http://www.microsoft.com>.

\*\*Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://windows.microsoft.com/en-us/windows7/products/home> for details.

\*\*\*This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

### CHIPSET

Intel® Q75 Express

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

### INTEL® STANDARD MANAGEABILITY

Includes DASH 1.0/1.1 compliance plus:

- System Defense
- Agent Presence
- SOL/IDE Redirection
- CISCO NAC/SDN support
- ME Wake on LAN
- Host Based Configuration
- ME Firmware Rollback
- IPv6 Support

DASH 1.0/1.1 compliance:

- Boot Control
- HW Inventory
- SW Inventory
- Power State Management
- HW Alerting

### PROCESSOR

#### Intel® 3rd Generation Core™ i7 Processors

##### Intel® Core™ i7-3770 Processor

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

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4000

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel's Stable Image Platform Program (SIPP)

#### Intel® 3rd Generation Core™ i5 Processors

##### Intel® Core™ i5-3570 Processor

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

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 2500

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel's Stable Image Platform Program (SIPP)

##### Intel® Core™ i5-3470 Processor

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

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 2500

Supports DDR3 memory up to 1600 MT/s data rate

Supports Intel's Stable Image Platform Program (SIPP)

#### Intel® 3rd Generation Core™ i3 Processors

##### Intel® Core™ i3-3240

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

Intel HD Graphics 2500

Supports DDR3 memory up to 1600 MT/s data rate

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

#### Intel® Core™ i3-3225

3.3 GHz base frequency, 3 MB cache, 2 cores, 4 threads  
Intel HD Graphics 4000  
Supports DDR3 memory up to 1600 MT/s data rate

#### Intel® Core™ i3-3220

3.3 GHz base frequency, 3 MB cache, 2 cores, 4 threads  
Intel HD Graphics 2500  
Supports DDR3 memory up to 1600 MT/s data rate

#### **Intel® 2nd Generation Core™ i3 Processors**

##### Intel® Core™ i3-2130 Processor

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

##### Intel® Core™ i3-2120 Processor

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

#### **Intel® Pentium® Processors**

##### Intel® Pentium® G870 Processor

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

##### Intel® Pentium® G860 Processor

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

##### Intel® Pentium® G640 Processor

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

#### **Intel® Celeron® Processors**

##### Intel® Celeron® G550 Processor

2.6 GHz base frequency, 2 MB cache, 2 cores, 2 threads  
Intel HD Graphics  
Supports DDR3 memory up to 1066 MT/s data rate

##### Intel® Celeron® G540 Processor

2.5 GHz base frequency, 2 MB cache, 2 cores, 2 threads  
Intel HD Graphics  
Supports DDR3 memory up to 1066 MT/s data rate

##### Intel® Celeron® G460 Processor

1.70 GHz base frequency, 1.5 MB cache, 1 core, 1 thread  
Intel HD Graphics  
Supports DDR3 memory up to 1066 MT/s data rate

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

#### Intel® Celeron® G1620 Processor

2.7 GHz base frequency, 2 MB cache, 2 core, 2 thread

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

#### Intel® Celeron® G1610 Processor

2.6 GHz base frequency, 2 MB cache, 2 core, 2 thread

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

## GRAPHICS

### **Integrated on all models (depends on processor)**

Intel HD Graphics: Basic, 2000, 2500, 4000

### **Optional Discrete Graphics Solutions**

AMD Radeon HD 6350 (512 MB) PCIe x16  
(includes a DMS-59 to Dual VGA Y Cable)

AMD Radeon HD7450 (1 GB) PCIe x16  
(includes a DVI to VGA adapter cable)

NVIDIA NVS 300 (512 MB) PCIe x16  
(Includes a DMS-59 to Dual VGA Y Cable)

NVIDIA NVS 310 (512 MB) PCIe x16

NVIDIA GeForce GT630 (2 GB) FH PCIe x16  
(includes a DP to DVI-D adapter and a DVI-I to VGA adapter)

**\*NOTE:** Only fits in the MT platform.

### **Adapters and Cables**

DisplayPort to DisplayPort Cable

DisplayPort to DVI-D Adapter

DisplayPort to HDMI Adapter

DisplayPort to VGA Adapter

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

### STORAGE

#### SATA Hard Drive

250 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

1 TB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

#### SATA Self-encrypting Drive

320 GB, 7200 rpm, SATA, 3.5"

#### SATA Self-encrypting Solid State Drive

256 GB, SATA, 3.5"

#### SATA Solid State Drive

120 GB, SATA (with 3.5" adapter)

128 GB, SATA (with 3.5" adapter)

#### Optical Disc Drive

DVD-ROM

SuperMulti DVD Writer

#### Media Card Reader

14-in-1

### MEMORY

#### Type

DDR3 non-ECC; up to 1600 MT/s

#### Maximum

32 GB

#### # of Slots

4

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

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



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

### NETWORKING/COMMUNICATIONS

#### Ethernet (RJ-45)

Intel 82579LM Gigabit Network Connection (standard)  
Intel Pro Gigabit CT Desktop PCIe x1 Network Card (optional)

#### Wireless

802.11b/g/n PCIe x1 (optional)

### AUDIO/MULTIMEDIA

High Definition Audio with Realtek ALC221 codec (all ports are stereo)  
Microphone\* and headphone front ports (3.5mm)  
Line-out and Line-In rear Ports\* (3.5mm)  
Multi-streaming capable\*  
Internal Speaker (standard)  
Thin USB power speakers  
USB HD 720P Business Webcam  
Business Headset

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

### KEYBOARDS AND POINTING DEVICES

#### Keyboard

PS/2 Keyboard  
USB Keyboard  
USB Smart Card (CCID) Keyboard  
USB and PS/2 Washable Keyboard  
Wireless Keyboard and Mouse Combo  
(Keyboard contains 25% post-consumer recycled plastic content)

#### Mice

PS/2 Optical Mouse  
USB Optical Mouse  
USB Laser Mouse  
USB and PS/2 Washable Mouse

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

#### HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Compaq 6300 Pro Series PC into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Supports UEFI specification 2.1
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- 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 Compaq business PCs 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

Trusted Platform Module (TPM) 1.2

SATA port disablement (via BIOS)

Drive lock

Serial, parallel, USB enable/disable (via BIOS)

Optional USB Port Disable at factory (user configurable via BIOS)

Removable media write/boot control

Power-On password (via BIOS)

Setup password (via BIOS)

HP Solenoid Hood Lock / Sensor

Support for chassis padlocks and cable lock devices

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

### POWER

	SFF	MT
<b>Power Supply</b>		
240 W, active PFC, 90% high efficiency	X	
240 W active PFC, standard efficiency	X	
320 W, active PFC, 90% high efficiency		X
320 W active PFC, standard efficiency		X

### ENVIRONMENTAL & REGULATORY

- Energy Star® qualified models available
- EPEAT® registered where applicable/supported. See [www.epeat.net](http://www.epeat.net) for registration status by country.
- Low Halogen
- TAA compliant

### PORTS

#### I/O Ports – Standard

- 4 – USB 3.0 (rear)
- 4 – USB 2.0 (front)
- 2 – USB 2.0 (rear)
- 1 – Serial RS-232 compatible
- 2 – PS/2 (color-coded support for keyboard (purple) and mouse (green))
- 1 – VGA
- 1 – DisplayPort 1.1
- 1 – Microphone and Headphone (front)
- 1 – Audio-in and Audio-out (rear)
- 1 – RJ-45 (accesses the integrated network interface controller)

#### I/O Ports – Optional

- 1 – Serial RS-232 compatible
- 1 – Parallel
- 1 – eSATA

### BAYS

	SFF	MT
3.5" external <i>(For Media Card Reader unless used for secondary data drive)</i>	1 each	1 each
5.25" external	1 each 8.19" depth	2 each 8.19" depth
3.5" internal HDD	1 each	2 each

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

### SLOTS

	<b>SFF</b>	<b>MT</b>
PCI (5 volt)	1 each 2.5" low profile 6.6" length 25W max. power	1 each 4.2" full height 6.6" length 25W max. power
PCI Express x1 (2.0)	2 each 2.5" low profile 6.6" length 10W max. power	2 each 4.2" full height 6.6" length 10W max. power
PCI Express x16 (3.0 – Primary)	1 each 2.5" low profile 6.6" length 25W max. power	1 each 4.2" full height 6.6" length 75W max. power

### FORM FACTORS AVAILABLE

Small Form Factor  
Microtower

### 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.

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

#### OPERATING SYSTEMS

##### Preinstalled

Windows 8 Pro (64-bit)\*  
Windows 8 (64-bit)\*  
Windows® 7 Ultimate (32-bit)\*\*  
Windows® 7 Ultimate (64-bit)\*\*  
Windows® 7 Professional (32-bit)\*\*  
Windows® 7 Professional (64-bit)\*\*  
Windows® 7 Professional (32-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*  
Windows® 7 Professional (64-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*  
Windows® 7 Home Premium (32-bit)\*\*  
Windows® 7 Home Premium (64-bit)\*\*  
Windows® 7 Home Basic (32-bit)\*\*

FreeDOS 2.0  
Novell SUSE Linux Enterprise Desktop 11

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

##### Supported

Windows 8 Enterprise (32 bit or 64-bit)\*  
Windows 8 Pro (32-bit)\*  
Windows 8 (32-bit)\*  
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

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

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

##### Test & Document

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

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

\*Not all features are available in all editions of Windows 8. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See <http://www.microsoft.com>.

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

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

\*\*\*This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

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

- Intel Gigabit CT Desktop NIC
- Broadcom NetXtreme Gigabit Ethernet Plus
- HP Client Security
- HP Blu-ray Writer playback of commercial movies
- DisplayPort video interface
- HP 2nd serial port adapter
- Power Management features
- Systems configured with Linux do not qualify for ENERGY STAR®

### SOFTWARE

Included	Windows 8	Windows 7
<b>Security</b>	HP Client Security <ul style="list-style-type: none"> <li>● Credential Manager</li> <li>● Password Manager</li> <li>● Face Recognition (with optional WebCam)</li> <li>● SpareKey</li> <li>● Device Access Manager w/JITA</li> <li>● Drive Encryption*</li> </ul> Computrace (user optional)** Windows Defender	HP Client Security <ul style="list-style-type: none"> <li>● Credential Manager</li> <li>● Password Manager</li> <li>● Face Recognition (with optional WebCam)</li> <li>● Device Access Manager w/ JITA</li> <li>● Drive Encryption (McAfee)</li> <li>● File Sanitizer</li> <li>● Security Manager</li> </ul> Computrace (user optional)** Microsoft Security Essentials
<b>Windows Applications</b>	Internet Explorer Store Desktop Photos Mail Games Calendar People (contacts) Messaging SkyDrive Music Video Camera News Sports Weather Maps Finance Bing (Search)	IE 10 - Home with Bing (Search)

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

<b>Productivity</b>	Buy Office	Buy Office
<b>HP Additions</b>	HP Registration HP Getting Started with Windows 8 HP ePrint*** HP Support Assistant CyberLink Media Suite Windows 8 CyberLink Media Suite CyberLink YouCam**** CyberLink YouCam Windows 8**** CyberLink PowerDVD SD, BD CyberLink Power2Go CyberLink Photo Director HP Mobile Connect Evernote Skype DTS Sound + DTS Studio Sound	CyberLink Media Suite CyberLink YouCam CyberLink PhotoDirector CyberLink Power 2 Go CyberLink Power DVD HP Magic Canvas Evernote DTS Sound + DTS Studio Sound
<b>Desktop Applications</b>	HP Wireless Hotspot HP Support Assistant PDF Complete, corporate edition	PDF Complete Corporate Edition WinZip Basic Adobe Flash Player
<b>HP Documentation (eDOCS)</b>	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	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
<b>HP Support Applications</b>	HP EUDI Support Environment HP Help and Support HP Setup v9.0 HP Support Assistant	HP EUDI Support Environment HP Help and Support HP Recovery Manager HP Recovery Disk Creator HP Setup v9.0 HP Support Assistant

\*Available via download

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

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

\*\*\*\*Preinstalled on models with webcam

\*\*\*\*\*Optional

### Technical Specifications - Graphics

#### Intel HD Graphics

##### VGA Controller

Integrated

##### DisplayPort

1.1a; integrated, multimode capable; supports HDCP and audio over DisplayPort

##### Bus Type

Intel® Flexible Display Interface (Intel® FDI) - a proprietary link for carrying display traffic from the Processor Graphics controller to the PCH display I/Os.

##### Memory

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.

##### Maximum Graphics Memory

Microsoft Windows XP  
Up to 1GB

Microsoft Windows 7  
Up to 1.7GB

Windows 8  
Up to 1.8GB

**Note:** the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.

##### Multi-display Support

Integrated dual independent monitor support facilitated via one VGA port and one DisplayPort integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. Support for DVI, HDMI, dual link DVI or second VGA monitor provided by optional HP DisplayPort adapters (see complete listing of available optional adapters elsewhere in this QuickSpec).

The system can support greater than two monitors with the addition of an optional discrete graphics card. Both integrated graphics and discrete graphics can be utilized simultaneously.

##### 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.



### Technical Specifications - Graphics

- 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 3D 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, 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:** Discrete graphics adapters can also access and use shared system memory, aka non-local video memory, through the PCI Express bus. Because system memory is accessed across the system bus, accessing it is much slower than accessing local memory.

Discrete graphics adapters generally share a portion of system memory with the CPU. Typically, these adapters do not ask for

### Technical Specifications - Graphics

dedicated use of system memory for graphics, thus leaving more resources available for the rest of the system.

#### Key Benefits

- 512 MB of DDR3 dedicated on-board graphics frame buffer 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

**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 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

### Technical Specifications - Graphics

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

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:** Discrete graphics adapters can also access and use shared system memory, aka non-local video memory, through the PCI Express bus. Because system memory is accessed across the system bus, accessing it is much slower than accessing local memory.

Discrete graphics adapters generally share a portion of system memory with the CPU. Typically, these adapters do not ask for dedicated use of system memory for graphics, thus leaving more resources available for the rest of the system.

#### Key Benefits

- 1GB of DDR3 dedicated on-board graphics frame buffer 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.
- Low Halogen construction

#### Form Factor

PCI Express x16 (generation 2.0)  
Low Profile, half length, 2.3" x 6.6"  
Full height bracket utilized when configured to MT

### Technical Specifications - Graphics

<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
<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

### Technical Specifications - Graphics

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:** Discrete graphics adapters can also access and use shared system memory, aka non-local video memory, through the PCI Express bus. Because system memory is accessed across the system bus, accessing it is much slower than accessing local memory.

Discrete graphics adapters generally share a portion of system memory with the CPU. Typically, these adapters do not ask for dedicated use of system memory for graphics, thus leaving more resources available for the rest of the system.

#### Key Benefits

- 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 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</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

### Technical Specifications - Graphics

<b>Processor (HDVP)</b>	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
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

The NVIDIA® NVS™ 310 Graphics Card is a PCI Express low profile form factor graphics add-in card targeted as an active low cost graphics solution for the corporate business and enterprise markets.

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

#### Performance and Features

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

- DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits [NR078AA](#), [FH973AT](#), [BP937AA](#), [AS615AA](#).
- For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.

<b>Form Factor (H x L)</b>	Low Profile: 2.713 x 6.15 in
<b>Bus Type</b>	PCI Express x16, 2.0 compliant
<b>Graphics Controller</b>	NVIDIA® NVS 310
<b>Memory Size</b>	512 MB DDR3
<b>Memory Clock</b>	875MHz

### Technical Specifications - Graphics

<b>Memory Bandwidth</b>	14 GB/s
<b>Connectors</b>	2 x DisplayPort 1.2
<b>Maximum Resolution</b>	Up to 2560 x 1600 (digital display) per display.
<b>Display Output</b>	Up to 2 displays in the following configurations DisplayPort output: <ul style="list-style-type: none"> <li>• Drives two DisplayPort enabled digital display at resolutions up to 2560 x 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card</li> <li>• Supports 2 monitors up to resolution of 1920 x 1200 at 60 Hz with reduced blanking using DisplayPort 1.2 multi stream topology technology.</li> </ul> DVI-D output: <ul style="list-style-type: none"> <li>• Drives two digital display at resolutions up to 1920 x 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors</li> <li>• Drives two digital display at resolutions up to 2560 x 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors</li> </ul> HDMI output: <ul style="list-style-type: none"> <li>• NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 x 1080P at 60 Hz using DisplayPort to HDMI cable adaptors</li> </ul> VGA display output: <ul style="list-style-type: none"> <li>• Drives two analog display at resolutions up to 1920 x 1200 at 60 Hz using DisplayPort to VGA cable adaptors</li> </ul>
<b>Max. Power</b>	19.5 W

### Display Resolutions and Refresh Rates

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

Resolution	Maximum Refresh Rates (Hz) by Connection			
	DisplayPort to VGA	DisplayPort to DVI-D	DisplayPort to HDMI	DisplayPort
640 x 480	85	60	60	60
800 x 600	85	60	60	60
1024 x 768	85	60	60	60
1280 x 720	85	60	60	60
1280 x 1024	85	60	60	60
1440 x 900	75	60	60	60
1600 x 1200	60	60	60	60
1680 x 1050	60	60	60	60
1920 x 1080	60-R	60-R	60	60
1920 x 1200	60-R	60-R		60
1920 x 1440				60
2048 x 1536				60
2560 x 1600				60

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

### Technical Specifications - Graphics

#### NVIDIA GeForce GT 630 Graphics Card

##### Introduction

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card Graphics Card provides a full height, PCI Express x16 graphics add-in card solution based on the NVIDIA Kepler Architecture GPU. The card is designed to support three display connections through its DVI, and two DisplayPort connectors.

An ideal solution for desktop PC customers seeking enhanced 2D and advanced 3D graphics performance, the NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards are an excellent choice for business users who want run multiple displays from a single graphics board. Engage in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

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

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

**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

- 2 GB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory
- Features the latest NVIDIA Kepler Architecture GPU Support
- Run multiple displays from a single graphics board
- DisplayPort 1.2 hardware ready for future multi-monitor support
- Provides Dual-Link (DL) DVI-I and two multimode DisplayPort output ports (useable at the same time)
- Also supports legacy displays using adapters:
  - DVI to VGA adapter (1 included)
  - HP DP to DVI-D adapter FH973AA (1 included)
  - HP DP to HDMI adapter BP937AA (optional)
  - HP DP to VGA adapter AS615AA (optioal)
  - HP DP to dual link DVI-D adapter NR078AA (optional)
- Supports Audio over DisplayPort for users who need audio with video thru the DisplayPort connector. Audio is also supported with the optional HP DP to HDMI adapter (BP937AA).
- Audio is also supported using DVI to HDMI adapters (Adapters not available from HP)
- Conforms to full PCI Express 3.0A specification for full height form factor (x16 lanes native PCI Express implementation)
- HDCP supported on DVI and DisplayPort outputs
- DirectX11 support in hardware for optimal performance in DX11 applications
- OpenGL 4.2 support in hardware for optimal performance with OpenGL applications

#### NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card

Memory	Peak theoretical memory bandwidth
2 GB DDR3 128 bit	28.5 GB/s

##### Compatibility





### Technical Specifications - Graphics

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card is compatible with the HP Compaq 6005 Pro MT, HP Compaq 6200 Pro MT, HP Compaq 8200 Elite MT/CMT, HP Compaq Elite 8300 MT/CMT, HP Pro 6300 MT, HP Pro 3330 MT, HP Pro 3335 MT, HP Pro 3340 MT.

**NOTE:** Not all models are available in all regions.

#### Service and Support

Your Option Limited Warranty is a one (1) year (HP Option Limited Warranty Period) parts replacement warranty on any HP-branded or Compaq-branded options (HP Options). If your HP Option is installed in an HP Hardware Product, HP may provide warranty service either for the HP Option Limited Warranty Period or the remaining Limited Warranty Period of the HP Hardware Product in which the HP Option is being installed, whichever period is the longer but not to exceed three (3) years from the date you purchased the HP Option.

**Output connectors** 1 - Dual link DVI; 2 - Multimode Display Port outputs

**Board display options** Supports three displays

Specification	Description
Graphics Chip	NVIDIA Kepler Architecture GPU
Core clock	875 MHz
Memory clock	891 MHz
Frame buffer	2GB DDR3, 128 bit wide

#### Board configuration

**Bus type** PCI Express (x16 lanes) 3.0

**Maximum vertical refresh rate** 85 Hz

**Display support** Integrated 400 MHz RAMDAC

**Display max resolution** 2560 x 1600 digital, 2048 x 1536 analog

#### 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 Connection	Digital Connection
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	60
2048x1536	75	60
2560x1600	N/A	60

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

### 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 6300 Pro Series supports the latest SATA 6.0Gb/s specification.

#### HP Drive Lock

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

#### SMART IV Technology

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

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

#### Native Command Queuing

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

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

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



Storage Drive Support						
	SFF			MT		
	MCR	ODD	HDD	MCR	ODD	HDD
# of supported devices	1	1	2	1	2	2
Drive position	1	2	1,3	3	1,2	4,5

## Controller

### Hard Drive Controller

These systems provide 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). These systems can also support an external SATA (eSATA) device through an optional bracket/cable assembly.

### SATA Interfaces

1 ea. SATA 3.0  
 1 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.

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

#### 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> 55ms (TYP)
	<b>Write:</b> 55ms (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>Environmental</b> (all conditions, non-condensing)	<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>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

	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)
CD Media Read Transfer	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)
	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 Media Write Transfer	CD-RW	600 KB/s (4X)
	CD-RW (High speed)	1500 KB/s (10X)
	CD-RW (Ultra speed)	Up to 3600 KB/s (24X)
	DVD+R	Up to 21600 KB/s (16X)
	DVD+R DL (v1.2)	Up to 16200 KB/s (8X)
	DVD+R DL (v1.1)	Up to 10800 KB/s (8X)
	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 Media Write Transfer	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	Up to 6750 KB/s (5X)
<b>Media</b>	<b>Read</b>	<b>Write</b>
CD-ROM	Yes	No
CD-R	Yes	Yes
CD-RW	Yes	Yes
DVD-ROM	Yes	No

### Technical Specifications - Removable Storage

<b>Media Compatibility</b>	DVD-ROM DL	Yes	No
	DVD-RAM	Yes	Yes
	DVD+R	Yes	Yes
	DVD+R DL	Yes	Yes
	DVD+RW	Yes	Yes
	DVD-R	Yes	Yes
	DVD-RW	Yes	Yes
	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
	5 VDC	<1000 mA (typical)	
	DC Current	12 VDC	1600 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)	
	Digital/Analog Audio Playback	Up to 2400 KB/s (16X)	

### Technical Specifications - Removable Storage

<b>Performance</b>	CD Media Read Transfer	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 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
<b>Power Supply</b>	Source	SATA 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 (max.)	
		12 VDC	1200 mA (typical) 2000 mA (max.)	
<b>Rear Panel</b>		Total Drive Power (Standby Mode)	< 2.5W	
	SATA Power Connector, 15-pin			
	SATA Data Connector, 7-pin			
Markings to identify each connector				

### Technical Specifications - Removable Storage

<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)

### Technical Specifications – Memory

#### System Memory Support

The HP Compaq Pro 6300 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
- DDR3-1600 (PC3-12800) DIMMs are supported but limited to the 1333 MT/s data transfer rate when not configured with IvyBridge generation chipset.

**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:

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		Channel B	
	1 (black)	2 (white)	3 (white)	4 (white)
<b>2 GB</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>	4 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 8.0 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	



### 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
<b>Full Duplex</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>	FO to 20kHz
<b>Watts</b>	2/3 watt (normal/maximum)
<b>Dimensions/Speaker (H x W x D)</b>	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 (all conditions non-condensing)</b>	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 - 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)
Non-operating humidity	20% to 80% (non-condensing at ambient)	
<b>Environmental</b>	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 Client Security Smart Card Manager provides authentication software for the smart card. The Smart Card Reader module works with the HP Client Security Manager and enables the user to setup, use, and manage the smart card. This allows strengthened security with HP patented technology.

### Key Benefits:

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

### Physical Characteristics

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

### 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 2004/108/EC USA USAFCC part 15
<b>Approvals</b>	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF	
<b>Ergonomic Compliance</b>	ISO 9241-4, TUVGS	
<b>Kit Contents</b>	Keyboard, I/O Security and Documentation CD, warranty card	

### HP USB PS/2 Washable Keyboard

	Keys	104 (US) layout or 105 (EU) layout (depending upon country)
<b>Physical Characteristics</b>	Dimensions (L x W x H)	17.67x 6.62 x 1.38 in (449 x 168 x 35 mm)
	Weight	1.7 lb (0.77 kg) minimum
	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)
<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	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 95% (non-condensing at ambient)
	Non-operating humidity	0% to 95% (non-condensing at ambient)
<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

**Operating system support** Windows® 7, Windows Vista, Windows XP Professional

**Approvals** UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X

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

### HP Wireless Keyboard and Mouse

<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	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.

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

**System Requirements** 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.

#### Environmental

Keyboard contains 25% post-consumer recycled plastic material.

### 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

Operating voltage 5 VDC ± 10%

Power consumption 100mA

System consumption PS/2 mini-din connector

#### Electrical

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)

### Technical Specifications - Input/Output Devices

<b>Mechanical</b>	Switch actuation	61 g nominal peak force
	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
<b>Scroll wheel</b>	Diameter	1.01 in (25.6 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	1 million operations
<b>Regulatory Approvals</b>	Mechanical life	Minimum 200,000 revolutions
	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)

### Technical Specifications - Input/Output Devices

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

#### Electrical

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

#### Mechanical

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

#### Regulatory Approvals

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</b> (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)
<b>Weight</b>	4.44 oz (126 g)
<b>Environmental</b>	Operating temperature -32° to 104°F (0° to 40° C) 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	10% to 90% non-condensing
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
<b>Electrical</b>	Operating voltage	5 VDC $\pm$ 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector or USB
	ESD	CE level 2 8 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC99 – 2001	Functionally compliant
<b>Mechanical</b>	Resolution	1000 $\pm$ 20% DPI
	Tracking speed	14 in/s ( 35.56 cm/s) maximum
	Acceleration	2 g
	Switch actuation	70 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Cable length	8.8 ft total 70 cm+ 2m extension
	Microsoft PC99 – 2001	Mechanically compliant
<b>Scroll wheel</b>	Width	6 mm
	Diameter	1 in (25.4 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	3 million operations
	Mechanical life	Minimum 200,000 revolutions
<b>Regulatory approvals</b>	Compliant	FCC, CE Mark, ICES-003-B, IP66/NEMA4X
<b>Compatibility</b>	Operating system support	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

	SFF	MT
<b>Standard Efficiency</b>	240W active PFC	320W active PFC
<b>High Efficiency*</b>	240W active PFC 87/90/87% efficient @ 20/50/100% load	320W active PFC 87/90/87% efficient @ 20/50/100% load
<b>Operating Voltage Range</b>		90 - 264 VAC
<b>Rated Voltage Range</b>		100 - 240 VAC
<b>Rated Line Frequency</b>		50/60 Hz
<b>Operating Line Frequency Range</b>		47 - 63 Hz
<b>Rated Input Current</b>	4A	5.5A
<b>Rated Input Current with Energy Efficient* Power Supply</b>	4A	5.5A
<b>Current Leakage (NFPA 99)</b>	< 275 µA	< 450 µA
<b>Power Supply Fan</b>		92mm variable speed
<b>Power cord length</b>		6.0 ft. (1.83 m)
Total Cord Length	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)

#### SFF

#### MT

<b>Chassis (H x W x D)</b>	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
<b>System Volume</b>	790.3 cu in 12.8 L	1757.48 cu in 28.8 L
<b>System Weight*</b>	16.7 lb 7.6 kg	20.5 lb 9.3 kg
<b>Max Supported Weight (desktop orientation)</b>	77.0 lb 35.0 kg	N/A
<b>Tower Stand (H x W x D)</b>	1.1 x 7.0 x 7.9 in (29 x 178 x 200 mm)	N/A
<b>Packaging (H x W x D)</b>	9.0 x 19.8 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
<b>Shipping Weight*</b>	17.9 lb 8.1 kg	28.8 lb 13.1 kg
<b>Palletization Profile</b>	4-units per layer 10-layer max. 40-units per pallet	4-units per layer 8-layer max. 32-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

#### Environmental Data

#### Eco-Label Certifications & declarations

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

- 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.
- The configuration used for the Energy Consumption and Declared Noise Emissions data for the Small Form Factor Desktop model is based on a typically configured product.
- The configuration used for the Energy Consumption and Declared Noise Emissions data for the Microtower Desktop model is based on a typically configured product.

#### System Configuration

#### Energy Consumption

#### SFF

	115 VAC	230 VAC	100 VAC
Normal Operation	41.77 W	41.64 W	41.67 W
Sleep (Energy Star® low power mode)	1.92 W	2.21 W	1.91 W
Off	0.66 W	0.89 W	0.64 W

#### MT

Normal Operation	48.49 W	49.54 W	47.99 W
Sleep (Energy Star® low power mode)	1.887 W	2.117 W	1.852 W
Off	0.641 W	0.847 W	0.621 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\*

#### SFF

	115 VAC	230 VAC	100 VAC
Normal Operation	143 BTU/hr	142 BTU/hr	142 BTU/hr
Sleep	6 BTU/hr	7 BTU/hr	6 BTU/hr
Off	2 BTU/hr	3 BTU/hr	2 BTU/hr

#### MT

Normal Operation	166 BTU/hr	169 BTU/hr	164 BTU/hr
Sleep	6 BTU/hr	7 BTU/hr	6 BTU/hr
Off	2 BTU/hr	3 BTU/hr	2 BTU/hr

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

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

### Technical Specifications - Environmental Data

	(Typically configured)	<b>Sound Power (LWAd, bels)</b>	<b>Sound Pressure (LpAm, decibels)</b>
<b>SFF</b>	Idle	3.8	28
	Fixed Disk (random writes)	3.9	28
<b>MT</b>	Idle	3.8	28
	Fixed Disk (random writes)	3.9	29

#### Longevity and Upgrading

**SFF** This product can be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

**MT** This product can be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.  
Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

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

Batteries used in the product do not contain:

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

Battery size:

CR2032 (coin cell)

Battery type:

Lithium

#### Additional Information

##### SFF

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold where HP registers commercial desktop products. See <http://www.epeat.net> for registration status in your country.
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 3.5% post-consumer recycled plastic (by wt.)
- This product is 93.82% recyclable when properly disposed of at end of life.

##### MT

- 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

### Technical Specifications - Environmental Data

- 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 5.6% post-consumer recycled plastic (by wt.)
- This product is 94.78% recyclable when properly disposed of at end of life.

#### Packaging Materials

##### SFF

- External:
  - PAPER/Corrugated 2300 g
- Internal:
  - PLASTIC/Polyethylene low density 56 g
  - PLASTIC/EPS (Expanded Polystyrene) 63.4 g
  - PLASTIC/Polypropylene 15 g
- The corrugated packaging material contains at least 30.66% recycled content.
- The PLASTIC/Polyethylene low density packaging material contains at least 5% recycled content.
- The PLASTIC/EPS (Expanded Polystyrene) packaging material contains at least 5% recycled content.
- The PLASTIC/Polypropylene packaging material contains at least 5% recycled content.

##### MT

- External:
  - PAPER/Corrugated 2278 g
- Internal:
  - PLASTIC/EPS (Expanded Polystyrene) 114 g
  - PLASTIC/Polyethylene low density 56 g
  - PLASTIC/Polypropylene 15 g
- The PAPER/Corrugated packaging material is made from 30.6% recycled content.
- The PLASTIC/EPS (Expanded Polystyrene) material is made from at least 0% recycled content.
- The PLASTIC/Polyethylene low density packaging material contains at least 0% recycled content.
- The PLASTIC/EPS (Expanded Polystyrene) packaging material contains at least 0% recycled content.

#### RoHS Compliance

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

#### Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at: [http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen\\_specifications.html](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

### Technical Specifications - Environmental Data

- 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>  
Eco-label certifications

### Technical Specifications - Environmental Data

<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

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

### Graphics Solutions

	Part Number
AMD Radeon HD 6350 Graphics (PCIe x16)	QK638AA
AMD Radeon HD 7450 Graphics Card	B1R44AA
Nvidia NVS 300 Graphics (PCIe x16)	BV456AA
Nvidia NVS 310 Graphics (PCIe x16)	A7U59AA
HP DisplayPort Cable Kit	VN567AA
HP DisplayPort To Dual Link DVI-D Adapter	NR078AA
HP DisplayPort To DVI-D Adapter	FH973AA
HP DisplayPort to HDMI Adapter	BP937AA
HP DisplayPort to VGA Adapter	AS615AA
HP DMS-59 to Dual DVI Cable	DL139A
HP DMS-59 to Dual DisplayPort Adapter	XP688AA

### Data Storage Drives and Accessories

	Part Number
HP 300GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive Includes 3.5"adapter	FM802AA
HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK554AA
HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK555AA
HP 160-GB SATA 3.0Gb/s Solid State Drive	QV064AA*
	*Not available in all regions.
HP eSATA Adapter	FH966AA
HP Removable SATA Hard Drive Enclosure (frame & carrier)	RY102AA
HP Removable SATA Hard Drive Enclosure (carrier only)	RY103AA

After-Market Options (availability may vary by region)

### Input Devices

	<b>Part Number</b>
HP PS/2 Standard Keyboard	DT527A
HP USB Standard Keyboard	DT528A
HP USB Keyboard with USB ports	BT330AA
HP USB Gray Keyboard	DT529A
HP USB Smart Card (CCID) Keyboard	BV813AA
HP USB Keyboard and Mouse Kit	RC465AA
HP USB Washable Keyboard	VF097AA
HP USB and PS/2 Washable Mouse	BM866AA
HP USB and PS/2 Washable Keyboard and Mouse Kit	BU207AA
HP PS/2 Optical Mouse	EY703AA
HP USB Optical Mouse	DC172AT
HP USB Laser Mouse	GW405AT
HP USB Travel Mouse	RH304AA
HP Wireless Keyboard and Mouse Combination (Keyboard contains 25% post-consumer recycled plastic material)	NB896AA

### System Memory

	<b>Part Number</b>
HP 2GB DDR3-1600 (PC3-12800) DIMM	B4U35AA
HP 4GB DDR3-1600 (PC3-12800) DIMM	B4U36AA
HP 8GB DDR3-1600 (PC3-12800) DIMM	B4U37AA

### Multimedia Devices

	<b>Part Number</b>
HP Thin USB Powered Speakers	KK912AA
HP DVD-ROM Drive	AR629AA
HP SuperMulti DVD Writer Drive	AR630AA
HP Blu-ray Writer Drive	AR482AA
HP USB HD 720P Business Webcam	QP896AA
HP Business Headset	QK550AA
HP USB Business Speakers	D9J19AA

### Removable Media Storage

	<b>Part Number</b>
HP USB External Diskette Drive	DC141B

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

#### Security Devices

	Part Number
HP/Kensington MicroSaver Cable Lock	PC766A
HP Business PC Security Lock	PV606AA
HP SFF Solenoid Lock and Hood Sensor	BP428AA
HP MT Solenoid Lock and Hood Sensor	DE618A
HP SFF Wall Mount/Security Sleeve	VN570AA
HP Keyed Lock Cable	BV411AA

#### Stands and Accessories

	Part Number
HP Integrated Work Center Stand (SFF)	QP897AA
HP SFF Tower Stand	VN569AA
HP Serial Port Adapter (RS-232 compatible)	PA716A
HP Parallel Port Adapter	KD061AA
HP 5.25" Blank Bezel Kit (50 pack)	DC177B
HP FireWire IEEE 1394 Card	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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