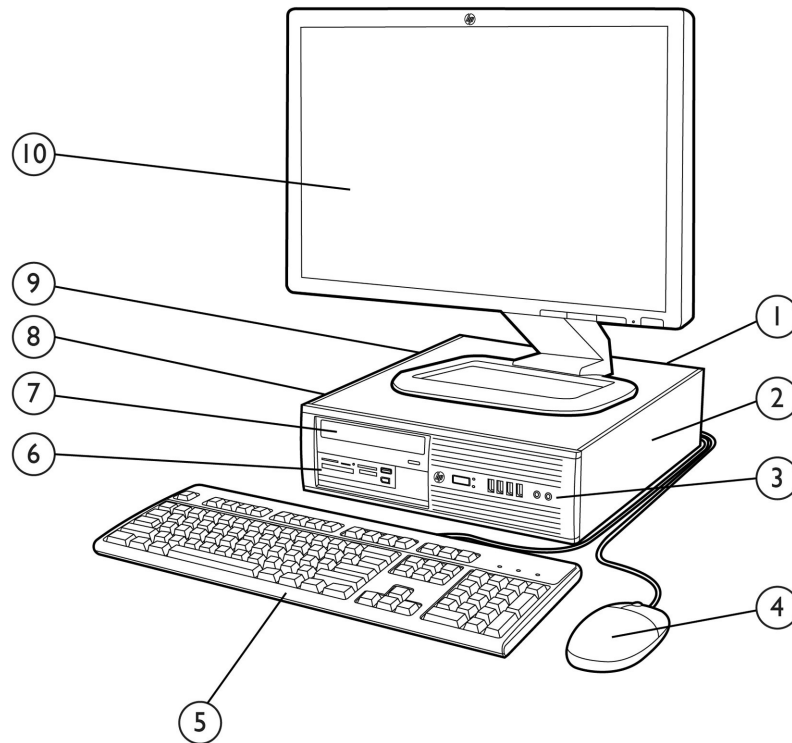


Overview

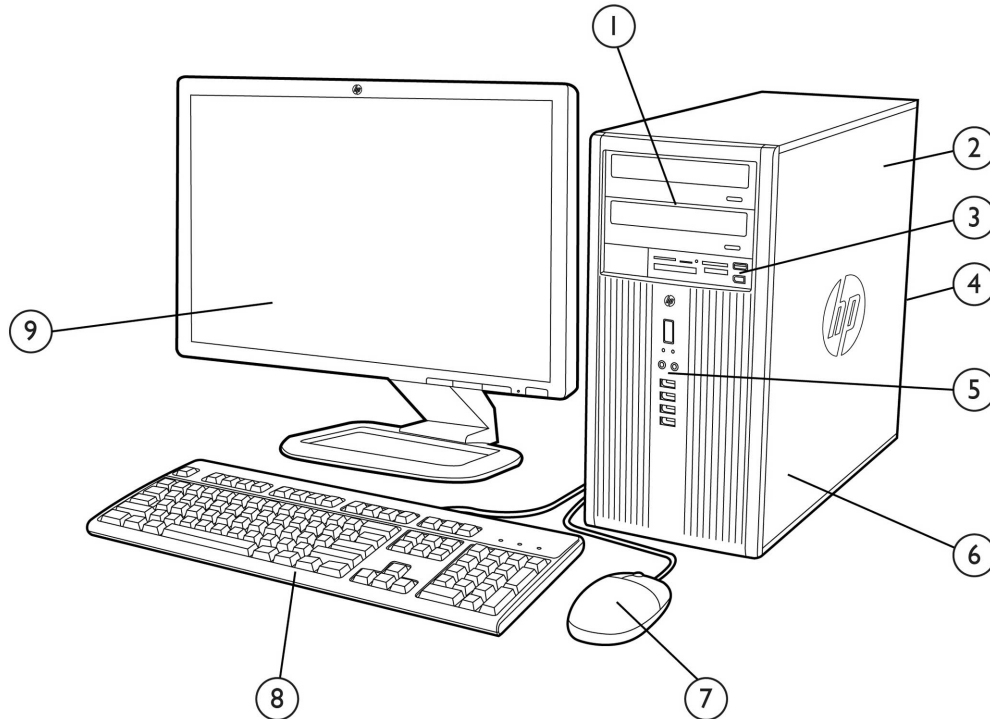
HP Compaq 6200 Pro Small Form Factor Business PC



- 1 Rear I/O includes (6) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort v1.1a 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, dedicated headphone output, and a microphone/headphone jack
- 4 HP Mouse
- 5 HP Keyboard
- 6 3.5" external drive bay supporting a media card reader or a secondary hard disk drive
- 7 5.25" external drive bay supporting an optical disk drive
- 8 3.5" internal drive bay supporting primary hard disk drive
- 9 240W standard or 90% high efficiency Power Supply
- 10 HP Monitor (sold separately)

Overview

HP Compaq 6200 Pro 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 hard disk drives
- 2 320W standard or 90% high efficiency Power Supply
- 3 3.5" external drive bay supporting the HP Media Card Reader
- 4 Rear I/O includes (6) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort v1.1a and VGA video interfaces, and 3.5mm audio in/out jacks
- 5 Front I/O includes (4) USB 2.0 ports, dedicated headphone output, and a microphone/headphone 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: SFF & MT
- PC chassis and all internal components and modules are 100% free of brominated flame retardants (BFRs) and Polyvinyl Chloride (PVC).
- UEFI BIOS developed and engineered by HP for better security, manageability and software image stability
- Intel Q65 Express chipset supporting Intel 2nd generation Core processors and featuring Intel HD Graphics)
- Intel 82579LM GbE integrated network connection
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Integrated dual independent monitor support via VGA and digital DisplayPort v1.1a video interfaces
- Standard efficiency or 90% high efficiency energy saving power supplies available ENERGY STAR qualified
- Guaranteed lengthy purchase lifecycles and image stability
- Software image fully compatible across all models and form factors
- Created using industry leading Design for Environment standards
- Selected configurations with global availability easily set up and ordered through HP.com Business to Business portals (<http://h10019.www1.hp.com/business-site/index.html>)
- Tailored HP Factory Express deployment and lifecycle services available (<http://h71028.www7.hp.com/enterprise/cache/97688-0-0-225-121.aspx>)
- Protected by HP Services, including standard warranties up to 5-5-5 (terms and conditions vary by country; certain restrictions and exclusions apply)
- Tool-less serviceability features for easier upgrades and repairs

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

Operating Systems

Preinstalled

Genuine Windows Vista Home Basic ¹
Genuine Windows Vista Business ¹
Free Linux 2.0

Genuine Windows 7 Professional Edition (32-bit or 64-bit)
Genuine Windows 7 Ultimate Edition (32-bit or 64-bit)
FreeLnx

Genuine Windows 7 Professional Edition (32-bit or 64-bit)²
Genuine Windows 7 Ultimate Edition (32-bit or 64-bit)
Free Linux 2.0

Supported

Genuine Windows XP Professional Edition
Genuine Windows 7 Home Basic Edition (32-bit)
Genuine Windows 7 Home Premium Edition (32-bit or 64-bit)
Genuine Windows Vista Enterprise Edition¹
Genuine Windows 7 Enterprise Edition

Certified

Novell SUSE Linux Enterprise Desktop 11†

¹ Certain Windows Vista product features require advanced or additional hardware. Refer to the following web sites for details:
www.microsoft.com/windowsvista/getready/hardwarereqs.mspx
www.microsoft.com/windowsvista/getready/capable.mspx

Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: www.windowsvista.com/upgradeadvisor

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

- Intel Gigabit CT Desktop NIC
- Broadcom NetXtreme Gigabit Ethernet Plus
- HP 22-in-1 Media Card Reader
- HP ProtectTools
- HP Blu-ray Writer playback of commercial movies
- DisplayPort video interface
- HP 2nd serial port adapter
- Power Management features
- Systems configured with Linux do not qualify for ENERGY STAR

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

Value Added Software (included with all models; not included when configured with FreeDOS)

HP Vision Diagnostics

PDF Complete Special Edition

Microsoft Office Starter Edition 2010

Value Added Software (included with select models; not included when configured with FreeDOS)

HP Power Assistant v2.0

HP Virtual Rooms

Computer Setup Utility

Corel WinDVD

Roxio Creator Business

Mozilla Firefox for Solutions 2011

Norton Internet Security 2011 ¹

HP Direct Connect

HP MyRoom

Box Online Storage - 10GB

¹ Includes a 60 day subscription for virus definition and minor program revision updates. Internet access required to receive updates.

HP Business PC Services and Feature

HP Stable Platform Program

Factory Express Deployment and Lifecycle Services

Intel Stable Platform Program

Trusted Platform Module (TPM v1.2 *)

Business-to-Business Portals

HP Global Series Services

* TPM module disabled where restricted by law, i.e. Russia.

Service and Support

On-site warranty and service¹: This limited warranty and service offering delivers parts, labor and on-site repair for terms up to 5 years. Response time is next business day² and includes free telephone support³ 24 x 7. Global coverage² 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.

¹ Terms and conditions may vary by country. Certain restrictions and exclusions apply

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

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

Chipset

Intel Q65 Express

Processor

Intel® Celeron® Processors

Intel Celeron G440 Processor

1.60 GHz, 1M cache, 1 core/1 thread

Intel HD Graphics

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

Intel Celeron G460 Processor

1.80 GHz, 1M cache, 1 core/2 threads
Intel HD Graphics

Intel® Pentium® Processors

Intel Pentium G620 Processor

2.60 GHz, 3M cache, 2 cores/2 threads
Intel HD Graphics

Intel Pentium G630 Processor

2.70 GHz, 3M cache, 2 cores/2 threads
Intel HD Graphics

Intel Pentium G840 Processor

2.80 GHz, 3M cache, 2 cores/2 threads
Intel HD Graphics

Intel Pentium G850 Processor

2.90 GHz, 3M cache, 2 cores/2 threads
Intel HD Graphics

Intel Pentium G860 Processor

3.00 GHz, 3M cache, 2 cores/2 threads
Intel HD Graphics

Intel® 2nd Generation Core™ i3 Processors

Intel Core i3-2100 Processor

3.10 GHz, 3M cache, 2 cores/4 threads
Intel HD Graphics 2000

Intel Core i3-2105 Processor

3.10 GHz, 3M cache, 2 cores/4 threads
Intel HD Graphics 3000

Intel Core i3-2120 Processor

3.30 GHz, 3M cache, 2 cores/4 threads
Intel HD Graphics 2000

Intel Core i3-2130 Processor

3.40 GHz, 3M cache, 2 cores/4 threads
Intel HD Graphics 2000

Intel® 2nd Generation Core™ i5 Processors

Intel Core i5-2400 Processor

3.10 GHz, 6M cache, 4 cores/4 threads
Intel HD Graphics 2000
Intel Stable Image Platform Program (SIPP)

Intel Core i5-2500 Processor

3.30 GHz, 6M cache, 4 cores/4 threads
Intel HD Graphics 2000
Intel Stable Image Platform Program (SIPP)

Intel® 2nd Generation Core™ i7 Processors

Intel Core i7-2600 Processor

3.40 GHz, 8M cache, 4 cores/8 threads
Intel HD Graphics 2000
Intel Stable Image Platform Program (SIPP)

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

System Memory Support

The HP Compaq 6200 Elite Series supports the 2nd generation Intel® Core™ processor family. Based on a new PC micro-architecture, the processor is designed for a two-chip platform consisting of a processor and Platform Controller Hub (PCH). Unlike previous generations, the 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 unbuffered DDR3 memory with a maximum of two UDIMMs 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 1066 MT/s (PC3-8500) and 1333 MT/s (PC3-10600)
- 64-bit wide channels
- DDR3 I/O voltage of 1.5V
- Maximum memory bandwidth of 10.6 GB/s in single-channel mode or 21 GB/s in dual-channel mode assuming DDR3 1333 MT/s (PC3-10600)
- The largest memory capacity possible is 32GB using four (4) 8GB DIMMs

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

Memory Configurations:

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

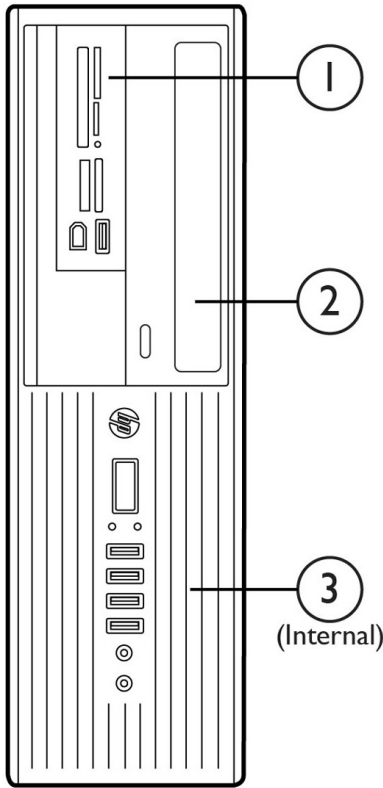
NOTE:

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.

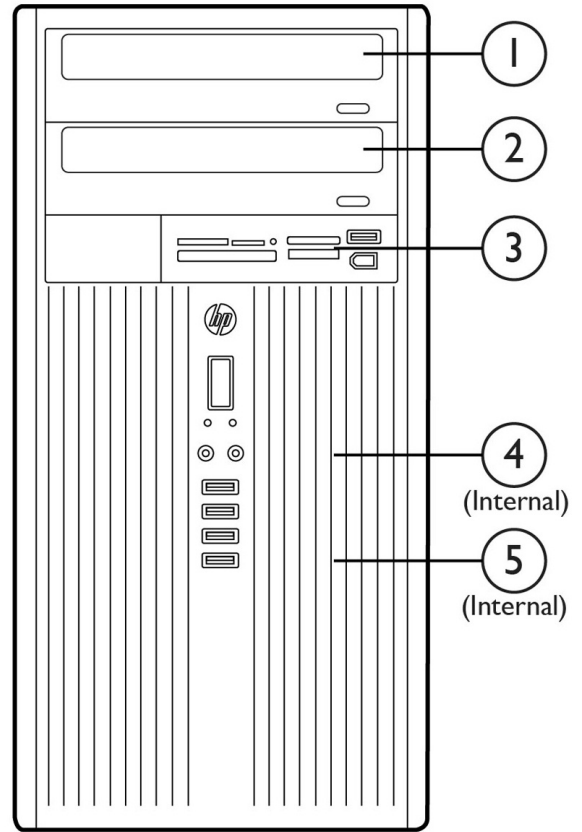
Total Memory	Slot			
	Channel A		Channel B	
	1 (black)	2 (white)	3 (white)	4 (white)
2 GB	2 GB	unpopulated	unpopulated	unpopulated
4 GB (dual channel)	2 GB	unpopulated	2 GB	unpopulated
8 GB (dual channel)	2 GB	2 GB	2 GB	2 GB
16 GB (dual channel)	4 GB	4 GB	4 GB	4 GB

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

Small Form Factor



Microtower



Storage Drive Support

	SFF			MT		
	MCR	ODD	HDD	MCR	ODD	HDD
Quantity Supported	1	1	2	1	2	2
Position	1	2	1,3	3	1,2	4,5

Data Storage Drives

160-GB Hard Disk Drives

HP 160GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive

Includes 3.5" adapter

250-GB Hard Disk Drives

HP 250-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

300-GB Hard Disk Drives

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

HP 300GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive
Includes 3.5" adapter

320-GB Hard Disk Drives

HP 320-GB 7.2K rpm SATA 3.0Gb/s 2.5" Self-Encrypting Drive
Includes 3.5" adapter

500-GB Hard Disk Drives

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

750-GB Hard Disk Drives

HP 750-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

1-TB Hard Disk Drives

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

Solid State Drives

HP 80-GB SATA 3.0Gb/s Solid State Drive
Includes 3.5" adapter

HP 120-GB SATA 3.0Gb/s Solid State Drive
Includes 3.5" adapter when installed in SFF, MT

HP 128-GB SATA 3.0Gb/s Solid State Drive
Includes 3.5" adapter when installed in SFF, MT

HP 160-GB SATA 3.0Gb/s Solid State Drive
Includes 3.5" adapter

HP 256-GB SATA 3.0Gb/s Solid State Drive
Includes 3.5" adapter when installed in SFF, MT

Optical Disc Drives

HP DVD-ROM Drive¹

HP SuperMulti DVD Writer Drive^{1,2,3}

HP Blu-ray Writer Drive

¹ For playing DVDs, Corel WinDVD 8

² For writing CDs, choice of Sonic/Roxio Easy Media Creator 9 or Roxio Business Creator 10

³ For writing CDs and DVDs, video editing and authoring DVDs, choice of Sonic/Roxio Easy Media Creator 9 or Roxio Business Creator 10

Media Card Readers

HP 22-n-1 Media Card Reader

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

Security Solutions and Capabilities

- Trusted Platform Module (TPM) 1.2¹
- 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
- Intel Identify Protection Technology (IPT):

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

¹ TPM module disabled where use is restricted by law; for example, Russia.

Network Interface Connections

- Intel 82579LM integrated GbE Network Connection
- Intel Gigabit CT Desktop NIC (PCIe x1)
- HP 802.11 b/g/n Wireless NIC (PCIe x1)

Graphics

- Intel HD Graphics 2000/3000 (integrated)
- AMD FirePro 2270 Graphics (PCIe x16)
- AMD Radeon HD 6350 Graphics (PCIe x16)
- AMD Radeon HD 6450 Graphics (PCIe x16)
- AMD Radeon HD 6570 Graphics (PCIe x16)
- [Available on the Microtower only](#)
- Nvidia NVS 295 Graphics (PCIe x16)
- Nvidia NVS 300 Graphics (PCIe x16)
- Nvidia NVS 300 Graphics (PCIe x1)
- Nvidia NVS 310 Graphics (PCIe x16)
- NVIDIA GeForce 405 Graphics (PCIe x16)
- [Available in China only](#)

- HP DisplayPort Cable
- HP DisplayPort to DVI-D Adapter

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

HP DisplayPort to HDMI Adapter

HP DisplayPort to VGA Adapter

Surround View (enable/disable via F10)*

* For Windows 7 systems, this enables the Surround View option that allows the integrated graphics controller and an AMD PCI Express graphics card to work at the same time for multi-monitor support.

Multi-Media

High Definition Audio with Realtek ALC261 codec (all ports are stereo)

Microphone/Headphone* and dedicated headphone front ports (3.5mm)

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

Multi-streaming capable*

Internal Speaker (standard)

HP Thin USB Powered Speakers

HP USB HD 720P Business Webcam

HP Business Headset

SRS Premium Sound

* The front microphone port is re-taskable as a Line-in, Microphone-in or Headphone-in 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.

Input/Output Devices

HP PS/2 Standard Keyboard

HP USB Standard Keyboard

HP USB Keyboard with USB ports

HP USB Smart Card (CCID) Keyboard

HP USB Mini Keyboard

HP USB and PS/2 Washable Keyboard

HP PS/2 Optical Mouse

HP USB Optical Mouse

HP USB Laser Mouse

HP USB and PS/2 Washable Mouse

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

Miscellaneous Devices and Configurations

- HP FireWire IEEE 1394 PCIe x1 Card
- HP SuperSpeed USB 3.0 PCIe x1 Card
- HP Serial Port Adapter (RS-232 compatible); provides 2nd Serial Port
- HP Parallel Port Adapter
- HP eSATA Port Adapter
- HP SFF Tower Stand

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 6450 Graphics (PCIe x16)	QM229AA
AMD Radeon HD 6570 Graphics (PCIe x16) (Available in Microtower only)	QP027AA
Nvidia Quadro NVS 295 Graphics (PCIe x16)	FY943AA
Nvidia Quadro NVS 300 Graphics (PCIe x16)	BV456AA
Nvidia NVS 300 Graphics (PCIe x1)	BV457AA
Nvidia GeForce 405 Graphics (PCIe x16) (Available in China only)	QM194AA

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 160GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive Includes 3.5" adapter	EW222AA
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 750-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QR469AA
HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK555AA

HP 128-GB SATA 3.0Gb/s Solid State Drive	QV063AA
HP 160-GB SATA 3.0Gb/s Solid State Drive	QV064AA
HP 180-GB SATA 3.0Gb/s Solid State Drive	C1N42AA

NOTE: Use of HP System Software Recovery Disks (SSRD) is not supported on 128GB SSD models due to minimum image size requirements (≥ 140 GB) for the SSRD.

After-Market Options (availability may vary by region)

HP eSATA Adapter	FH966AA
HP Removable SATA Hard Drive Enclosure (frame & carrier)	RY102AA
HP Removable SATA Hard Drive Enclosure (carrier only)	RY103AA

Input Devices

	Part Number
HP PS/2 Standard Keyboard	DT527A
HP USB Standard Keyboard	DT528A
HP USB Keyboard with USB ports	BT330AA
HP USB Mini Keyboard	AS601AA
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 2.4GHz Wireless Keyboard and Mouse	NB896AA
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System Memory

	Part Number
HP 1 GB DIMM	AT023AA
HP 2 GB DIMM	AT024AA
HP 4 GB DIMM	VH638AA

After-Market Options (availability may vary by region)

Multi-Media Devices

	Part Number
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

Removable Media Storage

	Part Number
HP USB External Diskette Drive	DC141B
HP 22-n-1 Media Card Reader	AR941AA

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

HP Client Automation Software

	Part Number
HP Client Automation - Standard Edition (single seat)	T3488AA
HP Client Automation - Standard Edition (10 seats)	TA599AA
HP Client Automation - Standard Edition (100 seats)	TA600AA
HP Client Automation - Standard Edition (500 seats)	TA601AA
HP Client Automation - Standard Edition (1,000 seats)	T3489AA

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
HP SuperSpeed USB 3.0 Card	BM867AA

Technical Specifications

Weights & Dimensions

(configured with 1 HDD and 1 ODD)

	SFF	MT
Chassis (H x W x D)	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)
System Volume	782.77 cu in (12.8 L)	1757.48 cu in (28.8 L)
Tower Stand (H x W x D)	1.1 x 7.0 x 7.9 in (29 x 178 x 200 mm)	N/A
Packaging (H x W x D)	9.0 x 19.7 x 23.4 in (229 x 500 x 594 mm)	19.7 x 12.2 x 23.6 in (500 x 310 x 600 mm)
System Weight*	16.7 lb (7.6 kg)	20.5 lb (9.3 kg)
Shipping Weight*	17.9 lb (8.1 kg)	28.8 lb (13.1 kg)
Max Supported Weight (desktop orientation)	77.0 lb (35.0 kg)	N/A

I/O Ports

USB 2.0	Front - four (4) ports Rear - six (6) ports
Serial	one RS-232 compatible port standard second port available optionally
Parallel	one port available as an option
eSATA	one port available as an option
PS/2	color coded support for keyboard (purple) and mouse (green)
Video	VGA and DisplayPort v1.1a provide integrated dual independent monitor support
DVI output	available via optional DisplayPort to DVI Adapter
Audio	Front - microphone & headphone Rear - line input (supports microphone or line input), line out All ports are 3.5mm in diameter NOTE: See Audio/Visual section for information on re-taskable audio ports.
NIC	Industry standard RJ-45 port accesses the integrated network interface controller

Technical Specifications

Slots	SFF	MT
Conventional PCI Revision 2.3 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 2.0	2 each x1 slots 2.5" low profile 6.6" length 10W max. power 1 each x16 slot 2.5" low profile 6.6" length 25W max. power	2 each x1 slots 4.2" full height 6.6" length 10W max. power 1 each x16 slot 4.2" full height 6.6" length 75W max. power

Bays	SFF	MT
3.5" external	1 bay available for Media Card Reader unless used for a secondary hard drive	
5.25" external	1 each 8.19" depth	2 each 8.19" depth
Internal HDD Bays	1 each 3.5" drives	2 each 3.5" drives

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	2 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

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

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

Technical Specifications

ROM BIOS Information

Key features of the HP BIOS include:

- Deployment and manageability - HP BIOS provides several technologies that help integrate the HP Compaq 6200 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.

Other 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.
 - System Management BIOS v2.6
 - 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
-

Technical Specifications

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

Additional Features

Description

Towerable Orientation	SFF 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 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
Drive Protection System	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

Technical Specifications

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 - Audio

High Definition Audio

Type	Integrated
HD Stereo Codec	Realtek 2-channel ALC261 codec
Audio I/O Ports	Front microphone-In (150-K ohm Input Impedance) Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load) Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. All ports are 3.5mm in diameter
Internal Speaker Amplifier	For the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.
Multi-streaming Capable	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
Sampling	8 kHz - 192 kHz
Wavetable Syntheses (software)	Yes - Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)
Internal Audio Speaker Power Rating	1.5 W
Internal Speaker	Yes
External Speaker Jack (Line-Out)	Yes

Technical Specifications - Audio

HP Thin USB Powered Speakers

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

SRS Premium Sound Technology

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

SRS Premium Sound Features

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

SRS Premium Sound Benefits

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

Technical Specifications - Communications

Intel 82579LM GbE Network Connection (integrated)

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

Technical Specifications - Communications

Intel Gigabit CT Desktop Network Interface Controller

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

HP 802.11 b/g/n Wireless Network Connection

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

Technical Specifications - Communications

Power Consumption

Platform/WLAN Mode

Power Consumption

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
Output Power (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)

Receive Sensitivity

Mode

Data Rate

Sensitivity

802.11b	1 Mbps	-94 dBm
802.11b	11 Mbps	-85 dBm
802.11g	6 Mbps	-91 dBm
802.11g	18 Mbps	-85 dBm
802.11g	48 Mbps	-75 dBm
802.11g	54 Mbps	-72 dBm
EWC (2.4 GHz)	6.5 Mbps	-87 dBm
EWC (2.4 GHz)	54 Mbps	-82 dBm
EWC (2.4 GHz)	81 Mbps	-78 dBm
EWC (2.4 GHz)	162 Mbps	-74 dBm
EWC (2.4 GHz)	270 Mbps	-68 dBm
EWC (2.4 GHz)	300 Mbps	-64 dBm

Data Transfer Rate

Data Rate (MCS)

Minimum Throughput

1 Mbps (802.11 b)	700 kbps
2 Mbps (802.11 b)	1.4 Mbps
5.5 Mbps (802.11 b)	3.5 Mbps
11 Mbps (802.11 b)	5.9 Mbps
12 Mbps (802.11 g)	6 Mbps
18 Mbps (802.11 g)	9 Mbps
24 Mbps (802.11 g)	12 Mbps
36 Mbps (802.11 g)	18 Mbps
48 Mbps (802.11 g)	21 Mbps
54 Mbps (802.11 g)	22.5 Mbps
6.5 Mbps (20 MHz EWC)	4.5 Mbps

Technical Specifications - Communications

13 Mbps (20 MHz EWC)	9 Mbps
19.5 Mbps (20 MHz EWC)	13.5 Mbps
26 Mbps (20 MHz EWC)	18 Mbps
39 Mbps (20 MHz EWC)	27 Mbps
52 Mbps (20 MHz EWC)	36 Mbps
58.5 Mbps (20 MHz EWC)	40 Mbps
65 Mbps (20 MHz EWC)	45 Mbps
78 Mbps (20 MHz EWC)	54 Mbps
104 Mbps (20 MHz EWC)	72 Mbps
117 Mbps (20 MHz EWC)	81 Mbps
130 Mbps (20 MHz EWC)	91 Mbps
13.5 Mbps (40 MHz EWC)	8 Mbps
27 Mbps (40 MHz EWC)	16 Mbps
40.5 Mbps (40 MHz EWC)	24 Mbps
54 Mbps (40 MHz EWC)	32 Mbps
81 Mbps (40 MHz EWC)	48 Mbps
108 Mbps (40 MHz EWC)	64 Mbps
121.5 Mbps (40 MHz EWC)	72 Mbps
135 Mbps (40 MHz EWC)	81 Mbps

Security

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
Cisco Certified Extensions, all versions through V5

Antenna

HP part number 497317-003

Certifications

Wi-Fi certified

Certifications for use by country

United States, Canada, Peru, Taiwan

Technical Specifications - Graphics

Intel HD Graphics (integrated)

3D/2D Controller	Microsoft DirectX 10.1 based with support for Pixel Shader 4.1
VGA Controller	Integrated
DisplayPort	v1.1a; 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. Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content.
Memory	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.
HW Video Decode	Hardware Accelerated decode for MPEG2 encrypted video; support for PAVP
Maximum Color Depth	32 bits/pixel
Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 75 Hz at 2048x1536. Varies with mode and configuration. See table below.
Multi-display Support	Integrated dual independent monitor support facilitated via one VGA port and one DisplayPort v1.1a 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).
Graphics/Video API Support	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. DirectX 10.1 support in hardware OpenGL 3.0 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 Rates (Hz)	
	Analog	Digital
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R

Technical Specifications - Graphics

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 FirePro 2270 Graphics Card

Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
Graphics Controller	AMD FirePro 2270 GPU
Output Connector	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Supports dual digital displays with optional DMS-59 to dual DVI cable.
Core Clock	600MHz
Memory Clock	600MHz
Memory Frame Buffer	512MB, DDR3, 64-bit wide
Supported Graphics APIs	DirectX 11 support in hardware OpenGL 4.0 support in hardware

Display Resolutions and Refresh Rates

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

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

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

AMD Radeon HD 6350 Graphics Card

Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
Graphics Controller	AMD HD 6350 GPU
Output Connector	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA cable. Supports dual DVI displays with optional DMS-59 to dual DVI cable.
Core Clock	650MHz
Memory Clock	800MHz
Memory Frame Buffer	512MB, DDR3, 64-bit wide
Supported Graphics APIs	HDCP supported on DVI output using optional DMS-59 to dual DVI cable. DirectX 11 support in hardware. OpenGL 4.0 support in hardware.

Display Resolutions and Refresh Rates

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

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

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

AMD Radeon HD 6450 Graphics Card

Form Factor	PCI Express x16 (Generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
Graphics Controller	AMD HD 6450 GPU
Output Connector	One (1) DisplayPort 1.1 One (1) Dual Link DVI-I Includes a DVI to VGA adapter. Other optional adapter kits are available to support DVI-D, and HDMI monitor inputs (see a complete listing of available optional adapters elsewhere in this QuickSpec). Supports audio with video through the DisplayPort 1.1 connector. DisplayPort v1.2 support will be provided in a future driver update.
Core Clock	625MHz
Memory Clock	800MHz
Memory Frame Buffer	512MB, DDR3, 64-bit wide
Display Maximum Resolution	Digital: 2560 x 1600 Analog: 2048 x 1536 (see chart below for more resolutions)
Supported Graphics APIs	HDCP supported on DisplayPort 1.1 and DVI output. DirectX 11 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 when using a dual link DVI or DisplayPort monitor connection

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

AMD Radeon HD 6570 Graphics Card

Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Includes full height bracket when configured in MT chassis.
Graphics Controller	AMD HD 6570 GPU
Output Connector	Two (2) DisplayPort 1.1 One (1) Dual Link DVI-I Includes a DVI-I to VGA adapter. Other optional adapter kits are available to support DVI-D, and HDMI monitor inputs (see complete listing of available optional adapters elsewhere in this QuickSpec). Supports audio with video through the DisplayPort 1.1 connector. Audio is also supported with an optional DisplayPort to HDMI Adapter. DisplayPort 1.2 support will be provided in a future driver update.
Core Clock	650MHz
Memory Clock	900MHz
Memory Frame Buffer	1GB of DDR3, 128-bit wide
Supported Graphics APIs	HDCP supported on DisplayPort and DVI output. 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

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 NVS 295 Graphics Card

Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
Graphics Controller	NVIDIA NVS 295 Graphics Board
Output Connectors	Two (2) DisplayPort Includes two (2) DisplayPort to VGA Adapters
Memory Frame Buffer	256 MB DDR3 SDRAM
Display Output	Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking (through DisplayPort to DVI-D (single link) cable)
Supported Graphics APIs	OpenGL 3.0 in hardware DirectX 10.0 in hardware

NVIDIA NVS 300 PCIe x1 512MB Graphics Card

Form Factor	PCI Express x1 Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
Graphics Controller	Nvidia GT218 GPU
Memory Frame Buffer	512MB DDR3, 64-bit wide Single DMS-59 connector
Output Connectors	Supports dual analog displays with included DMS-59 to dual VGA Y cable. Support dual digital displays with an optional adapters (see complete listing of available optional adapters elsewhere in this QuickSpec).
Core Clock	520MHz
Memory Clock	790MHz
Supported Graphics APIs	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

Technical Specifications - Graphics

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 300 PCIe x16 512MB Graphics Card

Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
Graphics Controller	Nvidia GT218 GPU
Memory Frame Buffer	512MB DDR3, 64-bit wide
Output Connectors	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA cable. Supports dual DVI displays with an optional DMS59 to dual DVI cable.
Core Clock	520MHz
Memory Clock	790MHz
Supported Graphics APIs	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.

Technical Specifications - Graphics

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

Performance and Features

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

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

Form Factor (H x L)	Low Profile: 2.713 × 6.15 in
Bus Type	PCI Express x16, 2.0 compliant
Graphics Controller	NVIDIA® NVS 310
Memory Size	512 MB DDR3
Memory Clock	875MHz
Memory Bandwidth	14 GB/s
Connectors	2 × DisplayPort 1.2
Maximum Resolution	Up to 2560 × 1600 (digital display) per display.
Display Output	Up to 2 displays in the following configurations DisplayPort output: <ul style="list-style-type: none"> • Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card • Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort 1.2 multi stream topology technology. DVI-D output: <ul style="list-style-type: none"> • Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors • Drives two digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors HDMI output: <ul style="list-style-type: none"> • NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors VGA display output: <ul style="list-style-type: none"> • Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors
Max. Power	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

Technical Specifications - Graphics

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.

NVIDIA GeForce 405 Graphics Card

Form Factor	PCI Express x16 (Generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to CMT or MT
Graphics Controller	NVIDIA GeForce 405
Output Connectors	One (1) VGA analog One (1) DVI-I digital
Memory Frame Buffer	512MB DDR3, 64-bit wide
Maximum Resolution	Analog: 1920 x 1440 x 32bpp @ 75Hz Digital: 1600 x 1200 x 32bpp @ 60Hz

Technical Specifications – Hard Disk Data 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 6200 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 Data Storage

HP 160-GB 7.2K SATA 3.0Gb/s 2.5" Hard Disk Drive

Capacity	160,041,885,696 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 2.0 (3.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	312,581,808
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 2.0 ms Average: 12 ms Full-Stroke: 22 ms
Height (nominal)	0.374 in/9.5 mm
Width (nominal)	Media diameter: 2.5 in/63.5 mm Physical size: 2.75 in/70 mm
Operating Temperature	41° to 131° F (5° to 55° C)

HP 160-GB 10K SATA 3.0Gb/s 2.5" Hard Disk Drive

Capacity	160,041,885,696 bytes
Rotational Speed	10,000 rpm
Interface	Serial ATA 2.0 (3.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	312,581,808
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 2.0 ms Average: 12 ms Full-Stroke: 22 ms
Height (nominal)	0.6 in (1.53 cm)
Width (nominal)	Media diameter: 2.5 in/63.5 mm Physical size: 2.75 in/70 mm
Operating Temperature	41° to 131° F (5° to 55° C)

Technical Specifications – Hard Disk Data Storage

HP 250-GB 7.2K SATA 3.0Gb/s 2.5" Hard Disk Drive

Capacity	250,059,350,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 2.0 (3.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	488,397,168
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 2.0 ms Average: 12 ms Full-Stroke: 22 ms
Height (nominal)	0.374 in/9.5 mm
Width (nominal)	Media diameter: 2.5 in/63.5 mm Physical size: 2.75 in/70 mm
Operating Temperature	41° to 131° F (5° to 55° C)

HP 250-GB 7.2K SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	250,059,350,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	488,397,168
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 1.0 ms Average: 8.5 ms Full-Stroke: 18 ms
Height (nominal)	1 in/2.54 cm
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

Technical Specifications – Hard Disk Data Storage

HP 300-GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive

Capacity	300,069,052,416 bytes
Rotational Speed	10,000 rpm
Interface	Serial ATA 2.0 (3.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	586,072,368
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 0.7 ms Average: 4.4 ms Full-Stroke: 9.5 ms
Height (nominal)	0.6 in (1.53 cm)
Width (nominal)	Media diameter: 2.5 in (6.36 cm) Physical size: 2.75 in (6.99 cm)
Operating Temperature	41° to 131° F (5° to 55° C)

HP 320-GB 7.2K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive

Capacity	320,072,933,376 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 2.0 (3.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	488,397,168
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 2.0 ms Average: 12 ms Full-Stroke: 22 ms
Height (nominal)	0.374 in/9.5 mm
Width (nominal)	Media diameter: 2.5 in/63.5 mm Physical size: 2.75 in/70 mm
Operating Temperature	41° to 131° F (5° to 55° C)

Technical Specifications – Hard Disk Data Storage

HP 320-GB 7.2K rpm SATA 3.0Gb/s 2.5" Self-Encrypting Hard Disk Drive

Capacity	320,072,933,376 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 2.0 (3.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	488,397,168
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 2.0 ms Average: 12 ms Full-Stroke: 22 ms
Height (nominal)	0.374 in/9.5 mm
Width (nominal)	Media diameter: 2.5 in/63.5 mm Physical size: 2.75 in/70 mm
Operating Temperature	41° to 131° F (5° to 55° C)

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

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

Technical Specifications – Hard Disk Data Storage

HP 750-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	750,107,862,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	976,773,168
Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 2.0 ms Average: 11 ms Full-Stroke: 21 ms
Height (nominal)	1 in/2.54 cm
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

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

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

Technical Specifications – Solid State Data Storage

HP 80-GB Solid State Drive

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

NOTE:
For solid state disk drives, GB means 1 billion bytes. 16GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity varies by content and will be less than 15.8GB.

HP 120-GB Solid State Drive

Unformatted Capacity	120 GB
Architecture	Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller
Interface	Serial ATA 2.0 (3.0 Gb/s)
Dimensions (W x H x D)	2.74 x 0.37 x 4 in (6.98 x 0.95 x 10.2 cm)
Weight	0.18 lb (80 g)
Bandwidth Performance	Sustained Sequential Read: Up to 250 MB/s
	Sustained Sequential Write: Up to 70 MB/s
	Random Read: Up to 35K IOPs
	Random Write: Up to 6.6K IOPs
Latency	Read: 65-ms
	Write: 85-ms
Power	DC power requirement: 5 VDC 5%-100 mV ripple p-p
	Total power consumption: 0.15W (active); 0.075W (idle)

Technical Specifications – Solid State Data Storage

Useful Drive Life	35TB written, up to 20GB/day for 5 years
	Operating Temperature: 32° to 158° F (0° to 70° C)
	Relative Humidity: 5% to 95%
Environmental (all conditions, non-condensing)	Maximum Wet Bulb Temperature (operating): 84° F (29° C)
	Shock: 1,500 G/0.5-ms

NOTE:
For solid state disk drives, GB means 1 billion bytes. 16GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity varies by content and will be less than 15.8GB.

HP 160-GB Solid State Drive

Unformatted Capacity	160-GB
Architecture	Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller
Interface	Serial ATA 2.0 (3.0 Gb/s)
Dimensions (W x H x D)	2.74 x 0.37 x 4 in/6.98 x 0.95 x 10.2 cm
Weight	0.18 lb/80 g
	Sustained Sequential Read: Up to 250 MB/s
	Sustained Sequential Write: Up to 70 MB/s
Bandwidth Performance	Random Read: Up to 35K IOPs
	Random Write: Up to 6.6K IOPs
	Read: 65-ms
Latency	Write: 85-ms
	DC power requirement: 5 VDC 5%-100 mV ripple p-p
Power	Total power consumption: 0.15W (active); 0.075W (idle)
Useful Drive Life	35TB written, up to 20GB/day for 5 years
	Operating Temperature: 32° to 158° F (0° to 70° C)
	Relative Humidity: 5% to 95%
Environmental (all conditions, non-condensing)	Maximum Wet Bulb Temperature (operating): 84° F (29° C)
	Shock: 1,500 G/0.5-ms

NOTE:
For solid state disk drives, GB means 1 billion bytes. 16GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity varies by content and will be less than 15.8GB.

Technical Specifications - Input/Output Devices

HP USB Standard Keyboard

Physical characteristics	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	
Electrical	Operating voltage	+ 5VDC \pm 5%	
	Power consumption	50-mA maximum (with three LEDs ON)	
	System interface	USB Type A plug connector	
	ESD	CE level 4, 15-kV air discharge	
	EMI - RFI	Conforms to FCC rules for a Class B computing device	
	Microsoft® PC 99 - 2001	Functionally compliant	
	Mechanical	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)	
Switch type		Contamination-resistant switch membrane	
Key-leveling mechanisms		For all double-wide and greater-length keys	
Cable length		6 ft (1.8 m)	
Microsoft PC 99 - 2001		Mechanically compliant	
Acoustics		43-dBA maximum sound pressure level	
Environmental		Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)	
	Non-operating humidity	20% to 80% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence		

Technical Specifications - Input/Output Devices

	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	
Kit contents	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

HP PS/2 Standard Keyboard

Physical Characteristics	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
Electrical	Operating voltage	+ 5VDC \pm 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	PS/2 6-pin mini din connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
	Mechanical	Languages
Keycaps		Low-profile design
Switch actuation		55-g nominal peak force with tactile feedback
Switch life		20 million keystrokes (using Hasco modified tester)
Switch type		Contamination-resistant switch membrane
Key-leveling mechanisms		For all double-wide and greater-length keys
Cable length		6 ft 1.8 m
Microsoft PC 99 - 2001		Mechanically compliant
Acoustics		43-dBA maximum sound pressure level
Environmental		Operating temperature
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)

Technical Specifications - Input/Output Devices

Operating shock	40 g, six surfaces
Non-operating shock	80 g, six surfaces
Operating vibration	2-g peak acceleration
Non-operating vibration	4-g peak acceleration
Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence

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

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

HP USB Smart Card (CCID) Keyboard

Introduction:

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

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

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

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

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

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

Key Benefits:

- Protects against unauthorized access with smart card technology
- Delivers even greater security when combined with a HP ProtectTools smart card and the HP ProtectTools Security Software
- Combination of username and password or pin with a smart card or security token
- Secures online transactions using digital signatures and certificates
- Conforms to industry standards for ease of setup and use
- Delivers long product life and quiet operation with high-impact materials and lubricated keys
- Spill drain feature

Physical Characteristics **Keys** 104, 105, 106, 107, 109 layout
(depending upon country)

Technical Specifications - Input/Output Devices

	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
Electrical	Operating voltage	+ 5VDC \pm 5%
	Power consumption	100-mA maximum (with four LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
Mechanical	Languages	30+ available
	Keycaps	Standard design
	Switch actuation	55 g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
SmartCard Function	Support	All ISO 7816 smart cards
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)
	Chipset	SCM STCIII
	Standard APIs supported	PC/SC, EMV2000, CT-API

Technical Specifications - Input/Output Devices

Power	USB Port	
	Short circuit detection (protects smart card and reader)	
	Power supply compliant with ISO7816 and EMV (5V, 60 mA)	
	Supports 3-V and 5-V cards	
Power consumption	100-mA maximum draw	
Communication	From card	9600 bps to 330,000 bps
	From computer	12 Mbps (USB transfer speed)
Landing mechanism	Contact device	Friction contact
	Card insertions rating	Up to 100,000 insertion cycles
Interface modes	CCID protocol	
Reader performance interface	USB connection	
Electro-magnetic standards	Europe	2004/108/EC
	USA	USAFCC part 15
Approvals	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF	
Ergonomic Compliance	ISO 9241-4, TUVGS	
Kit Contents	Keyboard, I/O Security and Documentation CD, warranty card	
Smart Card Compatibility	HP	HP ProtectTools Smart Card
	American Express	Amex Blue
	Axalto (Schlumberger)	Cryptoflex 8K
		Cryptoflex 16K
		Cryptoflex 32K
		Cryptoflex 32K e-gate
		Cyberflex Access 64K
		Cyberflex Access 32K
		Cyberflex 32K e-gate
		Cyberflex 64K
		Cyberflex Palmera
		Payflex-S
		Payflex 1K
		Payflex 2K
		Payflex 4K
		Payflex 8K
		Prismera
		US DoD CAC
		PrimeFlex Store 8K
		PrimeFlex Store 2K
	Cardlogix	CLXSU004KK4
		CLXSU008KK5
	Safenet, Inc.	Model 300
		Model 330
	De-La Rue	VisaCash

Technical Specifications - Input/Output Devices

Gemplus	Gem Expresso GKK32K Gemclub Memo GemClub Micro GemXplore GemSafe
Infineon	SLE66C322P SLE4406 SLE4406E SLE4406E SE SLE4418 SLE4428 SLE4432 SLE4436E SLE4442 SLE5536
SafLink (Litronic)	Forte
Shart	Java Card
Oberthur	CosmopolIIC v4 CosmopolIIC v4.1 Cosmo ID-One GalatIIC v2.1 US DoD CAC
Memory Cards	
Atmel	AT24C01ASC AT24C02SC AT24C04SC AT24C08SC AT24C16SC AT24C32SC AT24C64SC AT24C128SC AT24C256SC AT24C512SC AT88SC153 AT88SC1608
ISSI	IS23SC4418 IS23SC4428
ST	14C02
Telefonkarte	SLE4406 SLE4436 SLE5536
XICOR	X24026

HP USB & PS2 Washable Keyboard

Technical Specifications - Input/Output Devices

Physical Characteristics	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	
Electrical	Operating voltage	+ 5VDC ±5%	
	Power consumption	50-mA maximum (with three LEDs ON)	
	System interface	USB Type A plug connector	
	ESD	CE level 4, 15-kV air discharge	
	EMI - RFI	Conforms to FCC rules for a Class B computing device	
	Microsoft® PC 99 - 2001	Functionally compliant	
	Mechanical	Keycaps	Stepped -profile design
Switch actuation		55-g nominal peak force with tactile feedback	
Switch life		20 million keystrokes	
Switch type		Contamination-resistant switch membrane	
Key-leveling mechanisms		For all double-wide and greater-length keys	
Cable length		7 ft 2.2 m	
Microsoft PC 99 - 2001		Mechanically compliant	
Acoustics		43-dBA maximum sound pressure level	
Environmental		Operating temperature	50° to 122° F 10° to 50° C
		Non-operating temperature	-4° to 149° F -20° to 65° C
	Operating humidity	10% to 95% (non-condensing at ambient)	
	Non-operating humidity	0% to 95% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence	
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence	
Approvals	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X		

Technical Specifications - Input/Output Devices

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

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
Environmental	Operating temperature -32° to 104°F 0° to 40° C
	Non-operating temperature -4° to 140°F -20° to 60° C
	Operating humidity 10% to 90% (non condensing at ambient)
	Non-operating humidity 10% to 90% (non condensing at ambient)
	Operating shock 40 g, 6 surfaces
	Non-operating shock 80 g, 6 surfaces
	Operating vibration 2 g peak acceleration
	Non-operating vibration 4 g peak acceleration
	Drop 80 cm height onto asphalt tile over concrete or equivalent, 5-drop (out of box) in 5 direction except the cable face
Electrical	Operating voltage 5 VDC ± 10%
	Power consumption 100mA
	System consumption PS/2 mini-din connector
	ESD CE level 4, 15 kV air discharge
	EMI-RFI Conforms to FCC rules for a Class B computing device
	Microsoft PC99 - 2001 Functionally compliant
Mechanical	Resolution 400 ± 20% DPI
	Tracking speed 10 in/s (25.4 cm/s) maximum
	Acceleration 100 in/s/s (2.54 m/s/s)
	Switch actuation 61 g nominal peak force
	Switch life 3,000,000 operations (using Hasco modified tester)
	Switch type Low force micro-switches

Technical Specifications - Input/Output Devices

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

HP USB Optical Mouse

Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in
	3.8 x 11.6 x 6.3 cm
Weight	0.27 lb
	0.12 kg
Cable length	72.8 in
	185 cm
System requirements	Microsoft Windows 95, 98, 2000, Me, XP and Vista Available USB port

HP USB Laser Mouse

Scroll Wheel	24	
Maximum Rotation Speed	48 rats/sec	
Switch Type	Wheel	
Switch Life	Button – 3,000,000	
	Wheel – 1,000,000 times	
	Tilt switch – 500,000 times	
Environmental	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

Electrical	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
	Operating Voltage	+ 5VDC \pm 5%
	Power Consumption	
	MTBF	> 150,000 hrs
	ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
Mechanical	EMI-RFI	FCC Class B
	PC98	PC 99 Compliant
	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

Technical Specifications - Removable Storage

HP Blu-ray Writer Drive

AMO Part Number	AR482AA	
Height	5.25-inch, half-height, tray-load	
Orientation	Either horizontal or vertical	
Interface type	SATA	
Disc capacity	50 GB DL or 25 GB standard	
Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 19.0 cm)	
Weight (max)	2.0 lb (907 g)	
	DVD-ROM	8.5GB DL or 4.7GB standard
	Blu-ray	50GB DL or 25GB standard
	Full Stroke DVD	< 250 ms (seek)
	Full Stroke CD	< 210 ms (seek)
	Blu-ray	< 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
Disc Capacity	Startup Time	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
	CD-ROM Read	CD-ROM up to 40X
		CD-R up to 40X
		CD-RW up to 40X
	DVD-ROM Read	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
	Blu-ray	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
Power	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 maximum 12 VDC -600 mA typical, 1400 mA maximum
	Temperature (operating)	41° to 122° F (5° to 50° C)
Environmental (all conditions non-condensing)	Relative Humidity (operating)	10% to 90%
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)

HP SuperMulti DVD Writer Drive

AMO Part Number	AR630AT		
Height	5.25-inch, half-height, tray-load		
Orientation	Either horizontal or vertical		
Interface type	Serial ATA		
Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
Weight (max)	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-RW	600 KB/s (4X)
CD Media Write Transfer	CD-RW (High speed)	1500 KB/s (10X)
	CD-RW (Ultra speed)	Up to 3600 KB/s (24X)
	CD-RW (Ultra speed+)	Up to 4800 KB/s (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-R (v2.1 rev. 6.0)	Up to 16200 KB/s (12X)
DVD Media Write Transfer	DVD-R (v2.1 rev. 4.0)	Up to 21600 KB/s (16X)
	DVD-R DL (v3.0 rev. 5.0)	Up to 10800 KB/s (8X)
	DVD-R DL (v3.0 rev. 3.0)	Up to 10800 KB/s (8X)
	DVD-RW (v1.2 rev. 3.0)	8100 KB/s (6X)
	DVD-RW (v1.2 rev. 2.0)	Up to 5400 KB/s (4X)
	DVD-RAM (v2.2 rev. 5.0)	Up to 16200 KB/s (5X)
	DVD-RAM (v2.2 rev. 2.0)	Up to 6750 KB/s (5X)
Media	Read	Write
CD-ROM	Yes	No
CD-R	Yes	Yes

Technical Specifications - Removable Storage

Media Compatibility	CD-RW	Yes	Yes
	DVD-ROM	Yes	No
	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		
Power Supply	DC Power Requirement	5 VDC \pm 5%	100 mV ripple p-p
		12 VDC \pm 5%	200 mV ripple p-p
	DC Current	5 VDC	<1000 mA (typical) 1600 mA (max.)
		12 VDC	1200 mA (typical) 2000 mA (max.)
	Total Drive Power (Standby Mode)	< 2.5W	
Rear Panel	SATA Power Connector, 15-pin		
	SATA Data Connector, 7-pin		
	Markings to identify each connector		
Environmental conditions (all conditions non-condensing)	Temperature (operating)	41° to 122° F (5° to 50° C)	
	Temperature (storage)	-22° F to 140° F (-30° C to 60° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)	

HP DVD-ROM Drive

AMO Part Number	AR629AA		
Height	5.25-inch, half-height, tray-load		
Orientation	Either horizontal or vertical		
Interface type	Serial ATA		
Dimensions (W x H x D)	5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm)		
Weight (max)	2.1 lb (950 kg)		
	CD Media Read Access	Random	< 120 ms typical
		Full Stroke	< 200 ms typical

Technical Specifications - Removable Storage

Performance	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 Media Read Transfer	CD-RW Read	Up to 4800 KB/s (32X)
		Digital/Analog Audio Playback	Up to 2400 KB/s (16X)
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)
		Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)
		Video CD Playback	Up to 2400 KB/s (16X)
		DVD-ROM SL Read	Up to 21600 KB/s (16X)
	DVD Media Read Transfer	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)

Media	Read	Write
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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

Media Compatibility

Source	SATA DC power receptacle	
DC Power Requirement	5 VDC ± 5%	100 mV ripple p-p
	12 VDC ± 5%	200 mV ripple p-p
	5 VDC	1000 mA (typical) 1600 mA (max.)

Power Supply



Technical Specifications - Removable Storage

	DC Current	12 VDC	1200 mA (typical) 2000 mA (max.)
		Total Drive Power (Standby Mode)	< 2.5W
Rear Panel	SATA Power Connector, 15-pin SATA Data Connector, 7-pin Markings to identify each connector		
	Temperature (operating)	41° to 122° F (5° to 50° C)	
Environmental conditions (all conditions non-condensing)	Temperature (storage)	-22° F to 140° F (-30° C to 60° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)	

HP 22-n-1 Media Card Reader

	USB 2.0 High-speed interface
USB Interface	NOTE: Requires the USB cable to be connected to the internal USB 2.0 port or a USB 2.0 PCI card.
	Supports hardware ECC (Error Correction Code) function
	Supports hardware CRC (Cyclic Redundancy Check) function
	Supports MS 4-bit parallel transfer mode
	Supports MS-PRO 4-bit parallel transfer mode
Advance protocol support	Supports MS PRO-HG Duo 4-bit parallel transfer mode
	Supports SD 4-bit parallel transfer mode
	Supports high-speed 50Mhz SD 4-bit card (version 2.0)
	Supports high-speed 52Mhz MultiMediaCard 8-bit card (version 4.2)
	Supports CF v4.0 with PIO mode 6 and Ultra DMA mode
	CompactFlash Type I
	CompactFlash Type II
	Microdrive
	MultiMediaCard
	Reduced Size MultiMediaCard (RS MultiMediaCard)
	MultiMediaCard 4.2 (MultiMediaCard Plus, including MultiMediaCard Plus HC)
	Reduced Size MultiMediaCard 4.2 (MultiMediaCard Mobile, including MultiMediaCard Mobile HC)

Technical Specifications - Removable Storage

Supported media type

Secure Digital Card (SD)
Secure Digital High Capacity (SDHC)
miniSD
miniSD High Capacity
Micro SD (T-Flash)
Micro SD HC
Memory Stick
Memory Stick Select
Memory Stick Duo (MS Duo)
Memory Stick PRO (MS PRO)
Memory Stick PRO Duo (MS PRO Duo)
Memory Stick PRO-HG Duo
MagicGate Memory Stick (MG)
MagicGate Memory Stick Duo
Picture Card

**Supported media type with
card adapter**

Memory Stick Micro (M2)
MultiMediaCard Micro

Technical Specifications - Eco 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

Small Form Factor

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	30.9181 W	31.1382 W	30.9441 W
Sleep (Energy Star low power mode)	2.0709 W	2.2871 W	2.0928 W
Off	0.8967 W	1.0717 W	0.8803 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*	115 VAC	230 VAC	100 VAC
Normal Operation	106 BTU/hr	106 BTU/hr	106 BTU/hr
Sleep	7 BTU/hr	8 BTU/hr	7 BTU/hr
Off	3 BTU/hr	4 BTU/hr	3 BTU/hr

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

Declared Noise Emissions

(in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.8	28
Fixed Disk (random writes)	3.8	28

Batteries

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

Batteries used in the product do not contain:

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

Battery Size

CR2032 (coin cell)

Battery type

Lithium

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking

Technical Specifications - Eco Data

- 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 4.10% post consumer recycled plastic (by wt.)
- This product is 93.8% recyclable when properly disposed of at end of life.

Packaging Materials

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

Microtower

Energy Consumption (typically configured)	115 VAC	230 VAC	100 VAC
Normal Operation	31.8271 W	32.8944 W	31.7856 W
Sleep (Energy Star low power mode)	2.0348 W	2.2596 W	2.0193 W
Off	0.8515 W	1.0293 W	0.8358 W

NOTE:

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

Heat Dissipation (typically configured)*	115 VAC	230 VAC	100 VAC
Normal Operation	109 BTU/hr	112 BTU/hr	109 BTU/hr
Sleep	7 BTU/hr	8 BTU/hr	7 BTU/hr
Off	3 BTU/hr	4 BTU/hr	3 BTU/hr

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

Technical Specifications - Eco Data

Declared Noise Emissions

(in accordance with ISO 7779 and ISO 9296)

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

Batteries

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

Batteries used in the product do not contain:

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

Battery Size

CR2032 (coin cell)

Battery type

Li-Ion

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold where HP registers commercial desktop products. See <http://www.epeat.net> for registration status in your country.
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0.13% post consumer recycled plastic (by wt.)
- This product is 92.4% recyclable when properly disposed of at end of life.

Packaging Materials

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

All Models

RoHS Compliance

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

Technical Specifications - Eco Data

Material Usage

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

http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

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

Packaging

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

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

End-of-life Management and Recycling

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

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

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment: Global Citizenship Report
<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Technical Specifications - Eco Data

Eco-label certifications

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

ISO 14001 certificates:

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

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