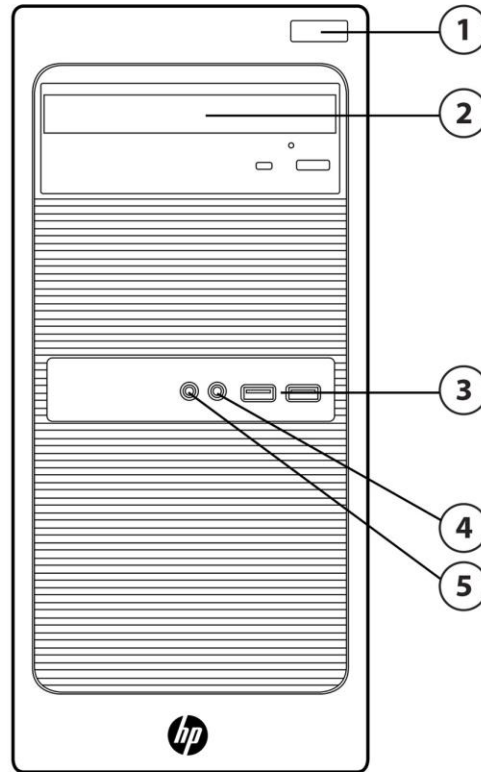


Overview

HP 406 G1 Microtower Business PC



Front

1. Power Button
2. Drive bay supporting an optical disk drive (optional)
3. Two USB 2.0 Ports
4. Audio Line Out Port
5. Microphone In Port

Not Shown

- Slots
- (1) PCI Express x16 graphics connector
 - (1) PCI Express x1 accessory connector
 - (1) PCI 2.3 accessory connector
- Bays
- (1) 3.5" internal storage drive bay
 - (1) 2.5" internal storage drive bay
- Rear I/O
- (4) USB 3.0 ports
 - (2) USB 2.0 ports
 - (1) VGA video port
 - (1) RJ-45 network connector
 - (1) Audio in jack
 - (1) Audio out jack
 - (1) Microphone in jack
 - (2) PS/2 ports

Overview

At A Glance

- Microtower form factors
- Expandable, upgradable chassis and system board
- Intel Q85 chipset supporting Intel 4th generation Core processors, featuring integrated Intel HD Graphics
- UEFI BIOS supporting security, manageability and software image stability
- Realtek RTL8111G Giga-bit integrated network connection
- Up to 32GB DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Multi-independent monitor support via VGA video interface
- Integrated Hi-Definition Audio with internal amplifier
- 300W active PFC and high efficiency energy saving power supply options
- ENERGY STAR® qualified models certified EPEAT® Gold

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

OPERATING SYSTEM

Preinstalled (Windows)

Windows 10 Pro 64*

Windows 10 Home 64*

Windows 8.1 Pro 64*

Windows 8.1 64*

Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)**

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

Windows 7 Professional 64*

Pre-installed (Other)

FreeDOS 2.0

Novell SUSE Linux Enterprise Desktop 11

Web-supported

Windows 10 Pro 64*

Windows 10 Home 64*

Windows 8.1 Pro 64*

Windows 8.1 64*

Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)**

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

Windows 7 Professional 64*

*Note: Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.microsoft.com>.

**This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 10 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

***This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

PROCESSORS

Intel® 4th Generation Core™ i7 Processors

Intel® Core™ i7-4770 Processor

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

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® 4th Generation Core™ i5 Processors

Intel® Core™ i5-4570 Processor

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

6 MB cache, 4 cores, 4 threads

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

Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate

Intel® 4th Generation Core™ i3 Processors

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

Intel® Pentium Processors

Intel® Pentium G3220 Processor
Up to 3.0 GHz Max. (3.0 GHz is base frequency)
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate

CHIPSET

Intel Q85 Chipset

GRAPHICS

Intel HD Graphics on all models (integrated on processor)

Intel HD Graphics 4600
Intel® Core™ i7-4770 Processor
Intel® Core™ i5-4570 Processor

Intel HD Graphics 4400
Intel® Core™ i3-4130 Processor

Intel HD Graphics
Intel® Pentium G3220 Processor

STORAGE*

SATA Drives

500 GB, 7.2K rpm, SATA 6.0 Gb/s, SMART IV, 3.5"
1 TB, 7.2K rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

***NOTE:** For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

Optical Disc Drives

DVD Writer
DVD-ROM

MEMORY

Form Factor	Type	Maximum	# of Slots
Microtower	DDR3 non-ECC	32 GB	4 DIMMs

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

Up to 1600 MT/s

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. Memory modules support data transfer rates up to 1600 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)

Realtek RTL8111G Gigabit integrated network connection (standard)

AUDIO/MULTIMEDIA

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

Microphone and headphone front ports (3.5mm)

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

Internal speaker (standard)

KEYBOARDS AND POINTING DEVICES

Keyboard

HP PS/2 Keyboard

HP USB Keyboard

Mice

HP PS/2 Mouse

HP USB Mouse

SECURITY

Trusted Platform Module (TPM) 1.2 (Common Criteria EAL4+ certified)

SATA port disablement (via BIOS)

Drivelock (via BIOS)

Removable media write/boot control

Power-On password (via BIOS)

Administrator password (via BIOS)

Support for chassis padlocks and cable lock devices

ENVIRONMENTAL & REGULATORY

ENERGY STAR® qualified models available

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

PORTS

I/O Ports - Standard

USB 2.0

2 (front); 2 (rear); 1 (internal)

USB 3.0

4 (rear)

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

PS/2	1 keyboard (purple) 1 mouse (green)
Video	1 VGA
NOTE: When configured with an Intel Celeron, Pentium or 4th generation Intel Core i3 CPU only two of the available video output ports are active	
Audio	Front: 1 headphone; 1 mic Rear: 1 Audio line in; 1 Audio line out; 1 mic 3.5mm diameter
RJ-45 Network Interface	1
Expansion Slot	
PCI Express x1 (v2.0)	1 4.2" full height 6.6" length 10W max. power
PCI Express x16 (v2.0)	1 4.2" full height 6.6" length 75W max. power
PCI (v2.3)	1

BAYS

5.25" ODD	1
2.5" internal storage drive	1
3.5" internal storage drive	1

SERVICE AND SUPPORT

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

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

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

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

Technical Specifications –Software and eDocumentation

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Included	Windows 7	Windows 8.1
Security	McAfee Livesafe 2013 (Select Models only)	McAfee Livesafe 2013 (Select Models only) Microsoft Defender
MultiMedia	Cyberlink Power DVD, BD Cyberlink Power2Go	Cyberlink Power DVD, BD Cyberlink Power2Go
HP Value Add	HP ePrint Driver ¹ HP Support Assistant HP Recovery Manager	HP ePrint Driver ¹ HP Recovery Manager HP Support Assistant
3rd Party	PDF Complete, Corporate Edition	
Microsoft Products	Office 2013 (Select Models only)	Office 2013 (Select Models only)

¹ Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see <http://www.hp.com/go/eprintcenter>). Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary

Technical Specifications - Graphics

Intel HD Graphics

VGA Controller Integrated

Bus Type N/A

RAMDAC N/A

Memory Intel graphics do not have dedicated memory but utilizes some of the computer's system memory. The amount of memory used for graphics depends on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content.

Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.

Maximum Graphics Memory	Microsoft Windows 7	Windows 8.1
	Up to 1.7GB	Up to 1.8GB

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

Maximum Color Depth 32 bits/pixel

Graphics/Video API Support 4th Generation Core processors:

- The Processor Graphics contains a refresh of the seventh generation graphics core enabling substantial gains in performance and lower power consumption. Up to 16 EU support.
- Next Generation Intel Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience
 - Encode/transcode HD content
 - Playback of high definition content including Blu-ray Disc
 - Superior image quality with sharper, more colorful images
- DirectX Video Acceleration (DXVA) support for accelerating video processing
 - Full AVC/VC1/MPEG2 HW Decode
- Advanced Scheduler 2.0, 1.0
- Windows 7, Windows 8, Linux OS Support
- DirectX 11.1
- OpenGL 4.0
- Open CL 1.2

Supported Display Resolutions and Refresh Rates

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

Resolution	Refresh Rates
800x600	60 Hz
1024x768	60 Hz
1152x864	60 Hz
1280x600	60 Hz
1280x720	60 Hz
1280x800	60 Hz
1280x960	60 Hz
1280x1024	60 Hz
1360x768	60 Hz
1366x768	60 Hz

Technical Specifications - Graphics

1400x1050	60 Hz
1440x900	60 Hz
1600x900	60 Hz
1600x1200	60 Hz
1680x1050	60 Hz
1920x1080	60 Hz
1920x1200	60 Hz
1920x1440	60 Hz
2560x1440	60 Hz
2560x1600	60 Hz

Technical Specifications - Hard Disk and Solid State Storage

Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP-406 G1 Microtower Business PC supports the latest SATA 6.0Gb/s specification.

SMART IV Technology

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

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

Native Command Queuing

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

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

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	

Technical Specifications - Hard Disk and Solid State Storage

	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 - Removable Storage

HP DVD Writer Drive

Height	5.25-inch, half-height, tray-load			
Orientation	Either horizontal or vertical			
Interface type	SATA			
Dimensions W x H x D (max)	5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm) max			
Weight (max)	2.1 lb (950g)			
Performance	CD-ROM Read Access	Random	120 ms typical	
		Full Stroke	200 ms typical	
	DVD-ROM Read Access	Random	130 ms typical	
		Full Stroke	240 ms typical	
	CD Media Read Transfer	CD-ROM, CD-R Read	Up to 6000 KB/s (40X)	
		CD-RW Read	Up to 4800 KB/s (32X)	
		Digital/Analog Audio Playback	Up to 2400 KB/s (16X)	
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)	
		Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)	
		Video CD Playback	Up to 2400 KB/s (16X)	
		DVD Media Read Transfer	DVD-ROM SL Read	Up to 21600 KB/s (16X)
			DVD-ROM DL Read	Up to 10800 KB/s (8X)
			DVD Video Playback	Up to 10800 KB/s (8X)
			DVD Video SL (other than playback)	Up to 21600 KB/s (16X)
	DVD Video DL (other than playback)		Up to 10800 KB/s (8X)	
	DVD+/-R		Up to 21600 KB/s (16X)	
	CD Media Write Transfer	DVD+/-R DL	Up to 10800 KB/s (8X)	
		DVD+/-RW	Up to 10800 KB/s (8X)	
		CD-R	Up to 6000 KB/s (40X)	
		CD-RW	Up to 600 KB/s (4X)	
DVD Media Write Transfer	CD-RW (High speed)	Up to 1500 KB/s (10X)		
	CD-RW (Ultra speed)	Up to 3600 KB/s (24X)		
	DVD+/-R	Up to 21600 KB/s (16X)		
	DVD+/-R DL	Up to 10800 KB/s (8X)		
	DVD+RW	Up to 10800 KB/s (8X)		
	DVD-RW	Up to 8100 KB/s (6X)		
Media Compatibility	Media	Read	Write	
	CD-ROM	Yes	No	
	CD-R	Yes	Yes	
	CD-RW	Yes	Yes	
	DVD-ROM	Yes	No	
	DVD-ROM DL	Yes	No	
DVD+/-R	Yes	Yes		

Technical Specifications - Removable Storage

	DVD+/-R DL	Yes	Yes
	DVD+/-RW	Yes	Yes
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 (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 (all conditions non-condensing)	Operating Temperature	41° to 122° F (5° to 50° C)
	Storage Temperature	-22° F to 140° F (-30° C to 60° C)
	Relative Humidity	10% to 90%
	Maximum Wet Bulb Temperature	86° F (30° C)

HP DVD-ROM Drive

Height	5.25-inch, half-height, tray-load		
Orientation	Either horizontal or vertical		
Interface type	SATA		
Dimensions W x H x D (max)	5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm) max		
Weight (max)	2.1 lb (950g)		
Performance	CD-ROM Read Access	Random Full Stroke	120 ms typical 200 ms typical
	DVD-ROM Read Access	Random Full Stroke	130 ms typical 240 ms typical
	CD Media Read Transfer	CD-ROM, CD-R Read CD-RW Read Digital/Analog Audio Playback	Up to 6000 KB/s (40X) Up to 4800 KB/s (32X) 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 Media Read Transfer	DVD-ROM SL Read DVD-ROM DL Read DVD Video Playback DVD Video SL (other than playback) DVD Video DL	Up to 21600 KB/s (16X) Up to 10800 KB/s (8X) Up to 10800 KB/s (8X) Up to 21600 KB/s (16X) Up to 10800 KB/s (8X)

Technical Specifications - Removable Storage

(other than playback)

DVD+/-R Up to 21600 KB/s (16X)

DVD+/-R DL Up to 10800 KB/s (8X)

DVD+/-RW Up to 10800 KB/s (8X)

Media Compatibility

Media

CD-ROM

CD-R

CD-RW

DVD-ROM

DVD-ROM DL

DVD+/-R

DVD+/-R DL

DVD+/-RW

Read

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Write

No

No

No

No

No

No

No

No

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 (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

(all conditions
non-condensing)

Operating Temperature 41° to 122° F (5° to 50° C)

Storage Temperature -22° F to 140° F (-30° C to 60° C)

Relative Humidity 10% to 90%

**Maximum Wet Bulb
Temperature** 86° F (30° C)

Technical Specifications – Memory

System Memory Support

The HP 406 G1 Microtower Business PC supports the 4th generation Intel® Core™ processor family. Based on a new PC micro-architecture, the processor is designed for a two-chip platform consisting of a processor and Platform Controller Hub (PCH). Unlike previous generations, the 4th generation Intel® Core™ processor includes an Integrated Memory Controller (IMC). The IMC supports DDR3/DDR3L protocols with two independent, 64-bit wide channels each accessing one or two DIMMs.

Two channels of non-ECC DDR3/DDR3L unbuffered dual in-line memory modules (UDIMM) or DDR3/DDR3L unbuffered small outline dual in-line memory modules (SO-DIMM) with a maximum of two DIMMs per channel

- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- Memory data transfer rates of up to 1600 MT/s; actual supported data transfer rate determined by the configured processor.
- 64-bit wide channels
- DDR3/DDR3L system memory I/O voltage of 1.5V
- Theoretical maximum memory bandwidth of:
 - 21.3 GB/s in dual-channel mode assuming 1333 MT/s
 - 25.6 GB/s in dual-channel mode assuming 1600 MT/s

Platform Memory Support

- The Microtower (MT) platforms support up to four (4) industry-standard DDR3-SDRAM DIMMs.

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

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

Technical Specifications - Networking and Communications

Realtek RTL8111G Network Adapter		
Connector	RJ-45	
System Interface	Integrated on PCA	
Controller	Realtek RTL8111G Gigabit Ethernet Controller	
Memory	16 KB FIFO packet buffer memory	
Data rates supported	10/100/1000 Mbps	
IEEE Compliance	802.1P 802.1Q 802.3 802.3ab 802.3az 802.3u	
Bus architecture	PCI Express	
Data transfer mode	PCIe-based interface for active state operation (S0 state)	
Power requirement	Requires 3.3V and 1V or just 3.3V with integrated regulators Power consumption 0.425 W	
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:	32° to 158° F (0° to 70° C)
	Operating Humidity:	60% RH
Management	WOL, auto MDI crossover, PXE, Multi-port teaming, Advanced cable diagnostic	

Technical Specifications - Audio

High Definition Audio

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

Technical Specifications – Keyboards and Pointing Devices

HP USB Keyboard

	Keys	104, 105, 106, 107, 109 layout (depending upon country)
Physical characteristics	Dimensions (L x W x H)	18.12 x 6.47 x 0.96 in (46.03 x 16.43 x 2.44 cm)
	Weight	2 lb (0.9 kg)
	Operating voltage	+ 5VDC ± 5%
Electrical	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
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
Mechanical	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
	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)
Environmental	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence	
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
Ergonomic compliance	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, KC	
Kit contents	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

Technical Specifications – Keyboards and Pointing Devices

HP PS/2 Keyboard

	Keys	104, 105, 106, 107, 109 layout (depending upon country)
Physical Characteristics	Dimensions (L x W x H)	18.22 x 6.47 x 1.1 in (46.28 x 16.43 x 2.79 cm)
	Weight	2 lb (0.9 kg) minimum
	Operating voltage	+ 5VDC ± 5%
Electrical	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
Mechanical	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	50-dBA maximum sound pressure level
Environmental	Operating temperature	32° to 104° F (0° to 40° C)
	Non-operating temperature	-22° to 149° F (-30° to 65° C)
	Operating humidity	15% to 80% (non-condensing at ambient)
	Non-operating humidity	15% to 90% (non-condensing at ambient)
	Operating shock	N/A
	Non-operating shock	65 inch 2.9 ms, six surface; 30g 266 inch/second; 50g 266 inch/second six surface
	Operating vibration	2-g peak acceleration
	Non-operating vibration	Starting at 5 Hz, vary the frequency of vibration from 5 to 500 Hz and back to 5 Hz at a Logarithmic sweep rate of 1 octave per minute.
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	29.93 in (76 cm) on concrete, 16-drop sequence
Approvals	CUL, ICES-003 Class B, FCC, CE Mark, TUV GS, VCCI, BSMI, C-Tick, KC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

Technical Specifications – Keyboards and Pointing Devices

HP PS/2 Mouse

Dimensions (H x L x W)	1.46 x 2.48 x 4.53 in (3.70 x 6.29 x 11.50 cm)
Weight	3.53 oz (100g; +10g/- 5 g)
	Operating temperature -32° to 104°F (0° to 40° C)
	Non-operating temperature -4° to 140°F (-20° to 60° C)
	Operating humidity 10% to 90% (non condensing at ambient)
	Non-operating humidity 10% to 90% (non condensing at ambient)
Environmental	Operating shock 40 g, 6 surfaces
	Non-operating shock 80 g, 6 surfaces
	Operating vibration 2 g peak acceleration
	Non-operating vibration 4 g peak acceleration
	Drop (out of box) 80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
	Operating voltage 5 VDC ± 10%
	Power consumption 100mA
Electrical	System consumption PS/2 mini-din connector
	ESD CE level 4, 15 kV air discharge
	EMI-RFI Conforms to FCC rules for a Class B computing device
	Microsoft PC99 - 2001 Functionally compliant
	Resolution 800 DPI
	Tracking speed 10 in/s (25.4 cm/s) maximum
	Acceleration ±15%
	Switch actuation 65±20 gf
Mechanical	Switch life 3,000,000 operations (using Hasco modified tester)
	Switch type Low force micro-switches
	Tracking mechanism life 80 km
	Cable length 6 ft (1.8 m)
	Microsoft PC99 - 2001 Mechanically compliant
	Width 6 mm
	Diameter 22.5 ± 0.2 mm
Scroll wheel	Maximum rotation force 50 gf-cm
	Switch type Light force micro-switch

Technical Specifications – Keyboards and Pointing Devices

Switch life	1 million operations
Mechanical life	Minimum 200,000 revolutions

Regulatory Approvals UL/cUL, FCC, CE Mark, TUV/GS, VCCI, KCC, BSMI, C-Tick

HP USB Mouse

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

Technical Specifications – Power

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.8 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: 15% to 80% (non-condensing at ambient) Non-operating: 15% to 90% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 7500 ft (2286 m) Non-operating: 15,000 ft (4572 m)

*Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

Power Supply

Standard Efficiency

MT

300W active PFC
(230 VAC input only)

High Efficiency*
80 PLUS Bronze

300W active EStar 6

82/85/82% efficient at 20/50/100% load (115V)

82/85/82% efficient at 20/50/100% load (230V)

Operating Voltage Range

90 - 264 VAC(300W EStar 6)
180 – 264 VAC(300W active PFC)

Rated Voltage Range

100 - 240 VAC(300W EStar 6)
200 – 240 VAC(300W active PFC)

Rated Line Frequency

50/60 Hz

Operating Line Frequency Range

47 - 63 Hz

Rated Input Current

4A

Rated Input Current with Energy Efficient*

4A

Power Supply

Current Leakage
(NFPA 99)

<900uA / 230Vac (300W PSU)

Power Supply Fan

80mm Fan (300W PSU)

Power cord length

6.0 ft. (1.83 m)

External Power Adapter

Dimensions

N/A

Total Cord Length

N/A

Technical Specifications – Weights & Dimensions

Weights & Dimensions

(configured with 1 HDD & 1 ODD)

Chassis (W x H x D)	182.88 x 357 x 402 mm 7.2 x 14.05 x 15.82 in
System Volume	24.66 L
System Weight*	7.148 kg 15.75 lb
Max Supported Weight (desktop orientation)	N/A
Tower Stand (H x W x D)	N/A
Packaged (H x W x D)	535 x 289 x 500 mm 21.06 x 11.37 x 19.68 in
Shipping Weight*	Est. = ~10.7 kg (packaged) ~23.58 lb
Palletization Profile	4-units per layer 8-layer max. 32-units per pallet

Technical Specifications – Miscellaneous Features

Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
 - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
 - 3 - processor not installed
 - 5 -- memory error
 - 6 - video error
 - 7 - PCA failure (ROM detected failure prior to video)
 - 8 - invalid ROM, bootblock recovery mode
- HP PC Hardware Diagnostics UEFI:
 - This utility enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- 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

Towerable Orientation

Description

Product can be oriented as either a desktop or a tower

Drive Lock

Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.

DPS Access through F10 Setup during Boot

Drive Protection System

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

Technical Specifications – Miscellaneous Features

produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced

The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures

SMART Technology (Self-Monitoring, Analysis and Reporting Technology)

Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted

SMART I - Drive Failure Prediction

Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count

SMART II - Off-Line Data Collection

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

SMART III - Off-Line Read Scanning with Defect Reallocation

IOEDC: I/O Error Detection Circuitry

Detects errors in Read/Write buffers on HDD cache RAM

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

Interface in F10 setup provides confirmation of SMART IV support.

Technical Specifications – Environmental Data

Environmental Data

Eco-Label Certifications & Declarations

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

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

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/pdf/gse.pdf>):

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

Packaging Usage

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

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

End-of-life Management and Recycling

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

Technical Specifications – Environmental Data

a responsible manner.

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

Hewlett-Packard Corporate Environmental Information

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

Global Citizenship Report

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

Eco-label certifications

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

ISO 14001 certificates:

http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf

and

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

Summary of changes

Date of change:	Version History:	Change	Description of change:
August 19, 2014	V1 to V2	Creation	Created the file based on APJ
August 19, 2014	V2 to V3	Addition	Added the change log
July 7, 2015	V3 to V4	Addition	Added new footnote to Storage; Change the OS
December 5, 2016	V4 to V5	Updated	SuperMulti references deleted

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