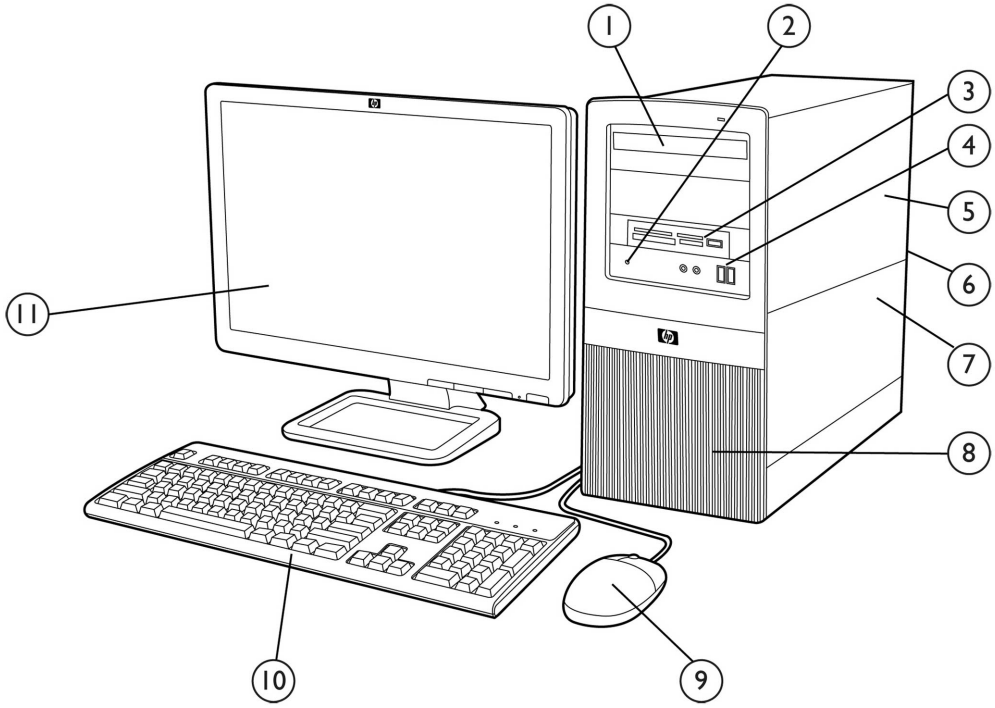
Overview

Microtower



1. (2) external 5.25" drive bays for optional optical drives
2. Reset/recovery button
3. (1) external 3.5" drive bay for optional media reader or Pocket Media drive
4. Front I/O includes: (2) USB 2.0 ports, dedicated headphone output, microphone jack
5. Standard efficiency Power Supply or optional energy efficient Power Supply
6. Rear I/O includes: (4) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DVI-D and VGA video interfaces, microphone jack, audio in/out jacks
7. (2) full-height PCI 2.3 slots, (1) PCIe x1 slot, (1) PCIe x16 slot
8. (2) internal 3.5" hard drive bays
9. PS/2 Scroll Mouse
10. HP Standard Keyboard
11. Monitor (sold separately)

Overview

At A Glance

- Support for Intel® Core™ 2 Duo and Core™ 2 Quad processors, Intel Pentium® processors, Intel Celeron® processors
- Genuine Windows 7 versions, Genuine Windows Vista versions, Genuine Windows XP Professional available through downgrade rights from Windows 7 Professional, SuSE Linux Enterprise Desktop 11, or FreeDOS
- Intel G41 Express Chipset
- Legacy serial port support
- Intel I/O Controller Hub 7 (ICH7)
- Intel Graphics Media Accelerator X4500 with DX10 support
- PCI Express I/O bus
- Serial ATA controller
- Realtek 8111DL Gigabit Ethernet Controller
- Choice of hard drives and optical drives
- DDR3 SDRAM system memory
- Optional energy efficient power supply for Microtower
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions and exclusions apply.

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

Processor and Speed One of the following	Intel Celeron Processors: Intel Celeron 440 Processor (2.0-GHz, 512-KB L2 cache, 800-MHz FSB) Intel Celeron 450 Processor (2.2-GHz, 512-KB L2 cache, 800-MHz FSB) Intel Celeron Dual-Core Processors: Intel Celeron E1500 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB) Intel Celeron E1600 Processor (2.4-GHz, 512K L2 cache, 800-MHz FSB) Intel Celeron E3200 Processor (2.4-GHz, 1-MB L2 cache, 800-MHz FSB) Intel Celeron E3300 Processor (2.5-GHz, 1-MB L2 cache, 800-MHz FSB) Intel Pentium Dual-Core Processors: Intel Pentium E5300 Processor (2.6-GHz, 2-MB L2 cache, 800-MHz FSB) Intel Pentium E5400 Processor (2.7-GHz, 2-MB L2 cache, 800-MHz FSB) Intel Pentium E6300 Processor (2.8-GHz, 2-MB L2 cache, 1066-MHz FSB) Intel Core 2 Duo Processors: Intel Core 2 Duo E7500 Processor (2.93-GHz, 3 MB L2 cache, 1066-MHz FSB) Intel Core 2 Duo E7600 Processor (3.06-GHz, 3 MB L2 cache, 1066-MHz FSB) Intel Core 2 Duo E8400 Processor (3.0-GHz, 6 MB L2 cache, 1333-MHz FSB) Intel Core 2 Duo E8500 Processor (3.16-GHz, 6-MB L2 cache, 1333-MHz FSB) Intel Core 2 Duo E8600 Processor (3.33-GHz, 6 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Processors: Intel Core 2 Quad Q8300 Processor (2.5-GHz, 4 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q8400 Processor (2.66-GHz, 4 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q9400 Processor (2.66-GHz, 6 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q9550 Processor (2.83-GHz, 12 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q9650 Processor (3.0-GHz, 12 MB L2 cache, 1333-MHz FSB) NOTE: Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

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

Operating Systems and Application Software (availability varies by region)

- Genuine Windows 7 Professional Edition (32-bit)[2]
- Genuine Windows 7 Professional Edition (64-bit)[2]
- Genuine Windows XP Professional available through downgrade rights from Windows 7 Professional [2,3]
- Genuine Windows 7 Home Premium Edition (32-bit or 64-bit)[2]
- Genuine Windows 7 Home Basic Edition (32-bit)[2]
- Genuine Windows Vista Business (32-bit) [1]
- Genuine Windows Vista Home Basic (32-bit) [1]
- Genuine Windows XP Home Basic (China only)
- SuSE Linux Enterprise Desktop 11
- Red Flag Linux (China only)
- FreeDOS

[1] Certain Windows Vista product features require advanced or additional hardware. See www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and www.microsoft.com/windowsvista/getready/capable.mspx for details. 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.

[2] System may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

[3] Windows 7 Professional disk may be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image.

2007 Microsoft Office Ready PC
Microsoft Office 2007 Basic
Microsoft Office 2007 Small Business
Microsoft Office 2007 Professional
HP Recovery Manager
Mozilla Firefox for HP Virtual Solutions
Hard Disk Partitioning
Roxio Easy Media Creator 10**
Core WinDVD 8**
Core WinDVD BD for Blu-Ray**
McAfee Total Protection Anti-Virus***
PDF Complete
HP Power Manager v2.0 (Edison)
Credential Manager
HP Total Care Advisor
USB Port Disable
Sun Java Runtime Environment
Welcome Center SMB Offers

** Supporting software available with certain optical drive configurations
*** 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

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

Hard Drives	160-GB 7200 rpm Serial ATA 3.0-Gb/s NCQ, SMART 250-GB 7200 rpm Serial ATA 3.0-Gb/s NCQ, SMART 320-GB 7200 rpm Serial ATA 3.0-Gb/s NCQ, SMART 500-GB 7200 rpm Serial ATA 3.0-Gb/s NCQ, SMART
System Memory	1-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (1 x 1GB) 2-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (2 x 1GB) 2-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (1 x 2GB) 3-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (1 x 1GB + 1 x 2GB) 4-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (2 x 2GB) NOTE: Memory runs at maximum system supported speed of 1066 MHz, or at 800 MHz when processor has 800-MHz FSB. 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.
Storage – One or more of the following (see Storage section below)	USB Pocket Media Drive (PMD) and Bay HP 3.5-inch Pocket Media Drive Bay HP 320GB 3.5-inch Pocket Media Drive with Bay Diskette Drive 1.44 MB Diskette Drive Media Reader HP 22-in-1 Media Card Reader Optical Drives (Serial ATA) SATA DVD-ROM Drive SATA SuperMulti LightScribe DVD Writer HP SATA Blu-ray Writer
Input Devices	Keyboard – One of the following HP PS/2 Standard Keyboard HP USB PS/2 Washable Keyboard HP USB Standard Keyboard HP USB Mini Keyboard HP USB Smartcard Keyboard Mouse – One of the following PS/2 2-Button Optical Scroll Mouse USB 2-Button Optical Scroll Mouse USB 2-Button Laser Mouse

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

Audio	Realtek ALC662 High Definition audio codec Internal PC speaker HP USB Thin Powered Speakers
Communication	Realtek 8111DL GbE Ethernet Controller Intel Gigabit CT Desktop NIC LSI PCIe x1 56K International SoftModem
Graphics	Intel Graphics Media Accelerator X4500 ATI Radeon HD 4350 (512MB) FH PCIe x16 Card ATI Radeon HD 4550 (256MB) DH PCIe x16 Graphics Card (available through January 2010) ATI Radeon HD 4550 (512MB) DH PCIe x16 Graphics Card (available after January 2010) ATI Radeon HD 4650 1GB Dual Head PCIe x16 Card NVIDIA GeForce G210 512MB ATX PCIe x16 NVIDIA GeForce GT230 1.5GB PCIe x16 Card NVIDIA GeForce 205 512MB ATX PCIe x16 NVIDIA GeForce 315 1GB ATX PCIex16 DMS-59 To Dual DVI Y-Cable Adapter
Miscellaneous	Hood Sensor Port Control Cover HP Chassis Security Kit HP Parallel Port Adapter HP Serial Port Full Height Adapter HP Serial/Parallel PCI Card HP 1394a FireWire 400 PCI Card

System Details

Base Unit

- Micro ATX Microtower chassis, including power supply and front bezel; five (5) drive bays and four expansion slots
- Active type heatsink
- 92 x 92 x 25 mm chassis fan for Microtower chassis
- System board with Intel G41 Express chipset, Intel I/O Controller Hub 7 (ICH7), Realtek RTL8111DL Ethernet controller, Intel GMA X4500 graphics, and Realtek audio, (1) PCI Express x1 slots, (1) PCI Express x16 slot, (2) PCI, (2) DDR3 DIMM memory slots, (4) Serial ATA data connectors, (6) USB Ports (see USB support below), (1)VGA, (1)DVI-D port, (1) serial port in the rear IO
- Power cord

Slots

PCI	One (1) PCI Express x1 slots on PCA One (1) PCI Express x16 slot on PCA (for graphic cards) Two (2) PCI slots on PCA
Memory Expansion	Two (2) DDR3 SDRAM DIMM slots (4 GB maximum memory support)

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.

Bays

Internal	Two (2) 3.5-inch
External	Two (2) 5.25-inch; One (1) 3.5-inch

USB Support

EHCI high-speed USB 2.0 controller

Two (2) front ports; Four (4) rear ports
Four (4) internal ports on system board:

- 2 for front ports
- 2 for media card reader

Interfaces (Legacy)

One (1) PS/2 keyboard port
One (1) PS/2 mouse port
One (1) analog VGA video port
One (1) DVI-D video port
One (1) serial port
One (1) line in; one (1) line out; one (1) microphone in
One (1) RJ45 network port

System Details

Weight & Dimensions	Chassis Dimensions (H x W x D)	15.14 x 7.27 x 16.36 in 385 x 185 x 416 mm
	Packaged Dimensions (D x L x W)	19.63 x 24.13 x 10.56 in 498.6 x 613 x 268.2 mm
	System Weight	16.66 lb (7.56 kg)
	Shipping Weight	24.63 lb (11.17 kg)
Technology and Features	Memory Type	PC3-10600 DDR3 SDRAM (1066/1333MHz) non-ECC Up to 4 GB system memory standard
	NOTE: Memory runs at maximum system supported speed of 1066 MHz, or at 800 MHz when processor has 800-MHz FSB. 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.	
	Hard Drive Interfaces Supported	Serial ATA, NCQ support
Chassis	Front Panel	Power button Power On LED HDD Activity LED Reset/recovery button (MT only) *
	Cooling Solutions Supported	Power Supply Fan (variable speed) Active heatsink (variable speed) Chassis fan (variable speed)
	Slots Supported	Four (4) full-height expansion slots
	Front I/O	Two (2) USB 2.0 ports, Headphone, Mic
	Rear I/O	Standard Micro ATX I/O connectors, including four(4) USB 2.0 ports, serial ports
	Drive Bays	Two (2) 5.25-inch (13.335 cm) half height external One (1) 3.5-inch (8.89 cm) half height external Two (2) 3.5-inch half height internal
	Internal Speaker	Optional for APJ
	Security	Padlock loop Kensington Lock Support Noble Universal Clamp Lock Cable Kit Port Control Cover supported
	Power Supply	250W PFC HV immunity (410V/s) with a 115v/230v line switch (varies by country/region) as Standard configuration , and 300W PFC HV immunity (410V/s) with a 115v/230v line switch and 300W 85% Efficiency power supply as option
	*Reset function will be set for China/Hong Kong/Korea; Recovery function will be set for all other regions.	

System Details

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 4 in (10.2 cm) 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	41° to 95° F (5° to 35° C)
	Non-operating	-22° to 149° F (-30° to 65° 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)

NOTE: Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 7500 ft (2286 m) above sea level, no direct sustained sunlight. Maximum rate of change is 7.5 deg C/Hr. The upper limit may be limited by the type and number of options installed.

System Board

Processor	Socket T; LGA775 industry standard Micro ATX form factor Support single Intel Core 2 Duo and Core 2 Quad, Pentium dual-core, or Celeron processors
Chipset	Intel G41 Express Intel I/O Controller Hub 7 (ICH7)
Front Side Bus Frequency	800/1066/1333 MHz
Memory	DDR3 SDRAM 2 x DIMM slots
Integrated Graphics	Intel Graphics Media Accelerator (GMA) X4500
Audio	Realtek ALC662 HD Audio compatible codec with two channel audio 3D audio compliant with AC'97 rev. 2.3
LOM	Realtek RTL8111DL
Storage	Four Serial ATA interfaces
Expansion Slots	1 x PCI Express x1 slots 1 x PCI Express x16 slot 2 X PCI
BIOS	SPI FLASH ROM
Industrial Standard	PCIe compliant USB 2.0
Rear I/O Ports	1 x PS/2 keyboard port 1 x PS/2 mouse port 4 x USB 2.0 ports

System Details

	1 x RJ-45 10/100/1000 port
	1 x serial port
	1 x DVI-D video port
	1 x DB 15-pin analog VGA port
	3 x audio ports
On Board I/O Interfaces	1 x ATX power connector
	1 x +12V power connector
	1 x Floppy connector
	1 x header (1 – 1x3) to support hood sensor
	1x COM2 header
	1x Parallel header
	1 x Front panel connector, Switch, LED (ON/Flash/OFF)
	2 x Fan headers for CPU, chassis, with voltage/fan speed control
	1 x header (1 – 2x5,) to support 2 USB 2.0 ports at front side
	1 x header (1 – 2x5) to support USB Card Media Reader
	1 x header (1 – 1x2) to support one touch reset
	1 x header (1 –- 1x2) to support one touch recovery
	1 x header to support 2 front (Headphone/Mic) audio ports
Board Size	Micro-ATX, PCB Size: 9.6 x 9.6 in (24.38 x 24.38 cm)
	4-layer PCB with green color
Additional Features	Bootable without keyboard, mouse or monitor
	Keyboard/mouse/USB wake up
	Support S3, S4 and S5
	ACPI status
	Hardware monitor capability
	CPU fan speed control
	One button reset/recovery*
	*Reset function will be set for China/Hong Kong/Korea; Recovery function will be set for the other regions.

Network Interface	Realtek 8111DL GbE Ethernet Controller Intel Gigabit CT Desktop NIC
Modem	LSI PCIe x1 56K International SoftModem

System Details

Power Supply

	Microtower		
Model	250W PFC+HV	300W PFC+HV	300W 85% Eff
Standard Efficiency	N/A	N/A	300W standard efficiency active PFC
Energy Efficient	N/A	N/A	300W 85% efficient active PFC
Operating Voltage Range	90 to 132VAC, or 180 to 264VAC	90 to 132VAC, or 180 to 264VAC	90 - 264 VAC
Rated Voltage Range	100 to 127VAC, or 200 to 240VAC	100 to 127VAC, or 200 to 240VAC	100 - 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Operating Line Frequency Range	47 - 63 Hz	47 - 63 Hz	47 - 63 Hz
Rated Input Current	8A/4A	8A/4A	8A/4A
115V/230V Line switch	Yes	Yes	N/A
Rated Input Current with Energy Efficient* Power Supply	N/A	N/A	8A/4A
Current Leakage (NFPA 99)	<3.5mA	<3.5mA	<275 μA
System Heat Dissipation	48.5 W or 165.482 BTU/hr.(For 115V/60Hz) 48.2 W or 164.4584 BTU/hr. (For 30V/50Hz)	50.4W or 171.9648 BTU/hr. (For115V/60Hz) 50.3W or 171.6236 BTU/hr.(For 230V/50Hz)	43.1W or 147.0572BTU/hr. (For 115V/60Hz) 43.2W or 147.3984 BTU/hr. (For 230V/50Hz)
System Heat Dissipation with Energy Efficient* Power Supply	N/A	N/A	43.1W or 147.0572BTU/hr. (For 115V/60Hz) 43.2W or 147.3984 BTU/hr. (For 230V/50Hz)
Power Supply Fan	80mm variable speed	80mm variable speed	80mm variable speed
FEMP Standby Power Compliant (<2W in S5 - Power Off)*	0.45W (For 115V/60Hz) 0.53W (For 230V/50Hz)	0.65W (For 115V/60Hz) 0.71W (For 230V/50Hz)	0.17W (For 115V/60Hz) 0.37W (For 230V/50Hz)
Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC)	<3W	<3W	<2.7W
High voltage immunity	up to 410V/s	up to 410V/s	N/A
China Telecom YD/T 993-2006 spec	Yes	Yes	N/A

System Details

System Environmental Specs

- Values are subject to change without notification and are for reference only.
- Performance of system, options, and ancillary equipment will vary depending on the system configuration.
- Levels presented do not account for non-HP/Compaq installed hardware.

Ambient Air Temperature	Operating	Operating 41° to 95°F (5 to 35°C) (Test 0 to 104°F (40°C))
	Storage	Storage: 90% RH @ 60°C for 12 hours (Non-condensing)
Humidity	Operating	10% to 90% relative humidity (Rh), 35°C non-condensing
	Storage	90% relative humidity (Rh), 60°C for 12 hours, non-condensing
Altitude	Operating	0 to 10,000 feet (0 to 3048 meters) - This value may be limited by the type and number of options installed.
	Non-Operating	0 to 30,000 feet (0 to 9,144 meters)
Shock	Listed are the levels of shock the product can withstand with No damage being incurred. The values represent peak input acceleration during an 2~3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.	
	Non-Operating	35G's (Half-sine Shock) 30G's (Trapezoidal Shock)
Vibration	Listed are the levels of vibration the product can withstand with No damage being incurred. The values represent a flat random vibration input acceleration profile across the given frequency range.	
	Operating	Random vibration at 5Hz@0.00025G2/Hz, 10Hz@0.01G2/Hz, 100Hz@0.01G2/Hz, 300Hz@0.00001G2/Hz 5Hz to 300Hz, (0.25G's nominal).
	Non-Operating	~2.09Grms (5-500Hz), Non-Operational
Acoustic Noise	Listed are the declared A-WEIGHTED SOUND POWER LEVELS (LWAd) and declared average desktop seated operator position A-WEIGHTED SOUND PRESSURE LEVELS (LpAm) when the product is operating in a 73.4°F (23°C) ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
	IDLE (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32 dBA
	FIXED DISK (Random write)	LWAd = 4.4 Bels, Desktop Average LpAm = 33 dBA
	DVD-ROM (Sequential Reads)	LWAd = 5.5 Bels, Deskside Average LpAm = 44 dBA

Service and Support

On-site Warranty[Note 1]: 1-1-1, 3-1-1, 3-3-3, 3-3-3 limited, 4-4-4, 5-5-5 limited warranty delivers on-site, next business-day[Note 2] service for parts and labor and includes free telephone support[Note 3] 24 x 7. Global coverage[Note 2] ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. One-year onsite and labor are not available in all countries.

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.

After-Market Options (availability may vary by country)

Communications	NICs	
	Intel Gigabit CT Desktop NIC	FH969AA
	Modems	
	LSI PCIe x1 56K International SoftModem	FH970AA
Hard Disk Drives	HP 500-GB SATA 3.0-Gb/s Hard Drive	KW347AA
	HP 320-GB SATA 3.0-Gb/s Hard Drive	FH963AA
	HP 250-GB SATA 3.0-Gb/s Hard Drive	PY278AA
	HP 160-GB SATA 3.0-Gb/s Hard Drive	PY277AA
Removable Storage Devices	HP 22-in-1 Media Card Reader	AR941AA
Input Devices	Keyboards	
	HP PS/2 JB Standard Keyboard	DT527A
	HP USB JB Standard Keyboard	DT528A
	HP USB Smartcard Keyboard (Carbonite/Silver)	ED707AA
	Mice	
	HP PS/2 2-Button Optical Scroll Mouse	EY703AA
	HP USB 2-Button Optical Scroll Mouse	DC172B
	HP USB 2-Button Laser Mouse	GW405AA
I/O Adapter	HP Serial/Parallel PCI Card	KD062AA
	HP Parallel Port Adapter	KD061AA
	HP 2nd Serial Port Adapter	PA716A
	HP FireWire / IEEE 1394 PCI Card	PA997A
	Belkin Serial to USB adapter	EM449AA
Memory	HP 1GB PC3-10600 (DDR3-1333) DIMM	AT023AA
	HP 2GB PC3-10600 (DDR3-1333) DIMM	AT024AA
Audio	HP Thin USB Powered Speakers	KK912AA

After-Market Options (availability may vary by country)

Graphics	ATI Radeon HD 4550 (256MB DH) PCIe x16 Graphics Card	AT042AA
	ATI Radeon HD 4550 (512MB) DH PCIe x16 Graphics Card	SG764AA
	ATI Radeon HD 4650 DP (1GB) PCIe x16 Graphics Card	VN566AA
	NVIDIA GeForce G210 HDMI (512MB) SH PCIe x16 Graphics Card	VN565AA
	NVIDIA GeForce GT230 1.5GB PCIe x16 Graphics Card	VH697AA
	Nvidia GeForce GT 315 PCIe x16 Card - China Only	VR763AA
	HP DMS59 DVI Dual-head Connector Cable	DL139A
	HP DVI to DVI Cable	DC198A
Optical Drives	HP 16X/48X SATA DVD-ROM Drive BLK	AR629AA
	HP 16X SATA SuperMulti LightScribe DVD Drive BLK	AR630AA
	HP 16X SATA Blu-ray Writer BLK	AR482AA
Security	HP Business PC Security Lock Kit	PV606AA
	HP/Kensington MicroSaver Security Cable Lock	PC766A
	HP Chassis (dc) Security Kit	AR639AA

Memory

DDR SYNCH DRAM NON-ECC MEMORY

The Intel G41 Express chipset supports non-ECC DDR3 memory up to PC3-10600 (1333 MHz). However, the chipset runs this memory at a maximum clock rate of 1066 MHz, or at 800 MHz when processor has 800-MHz FSB. Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations.

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.

HP recommends dual-channel symmetric configurations for maximum performance.

For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will default to the slowest DIMM.

STANDARD MEMORY

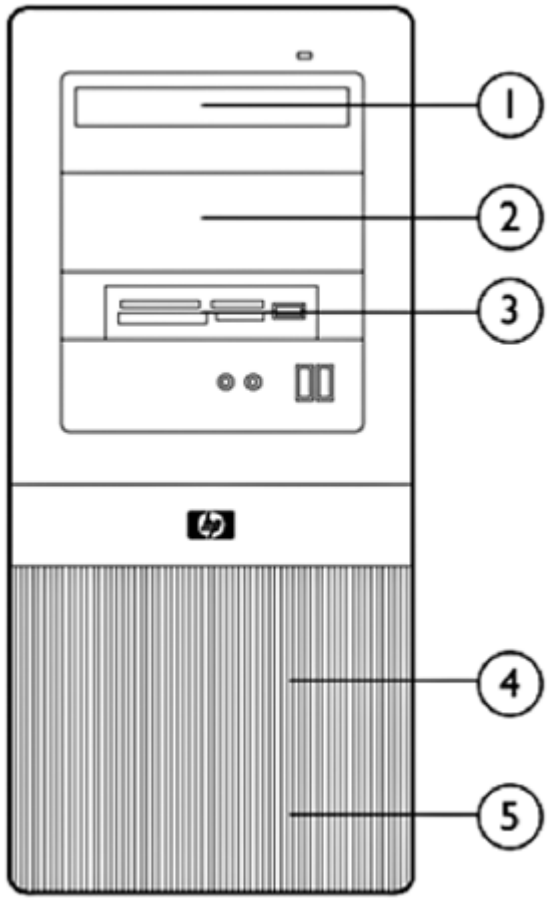
1-GB, 2-GB DDR3 SYNCH DRAM

OPTIONAL MEMORY UPGRADES

Supports up to 4-GB of DDR3 SYNCH DRAM. 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.

DIMM Size	Slot 1 (White)	Slot 2 (White)
1-GB	1-GB	
2-GB (dual-channel symmetric)	1-GB	1-GB
2-GB	2-GB	
3-GB	1-GB	2-GB
4-GB (dual-channel symmetric)	2-GB	2-GB



HP Pro 2000 Microtower Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Media Reader	1	3	Internal USB 2.0 port
Diskette Drive	1	3	FDD
USB Pocket Media Drive (PMD)	2	1, 2	Internal USB 2.0 port
DVD-ROM Drives	2	1, 2	SATA
SuperMulti LightScribe Drives	2	1, 2	SATA
Blu-Ray JB Writer	2	1, 2	SATA
3.5" Serial ATA Hard Drives	2	4, 5	SATA

Integrated Realtek ALC662-GR Audio	Type	Integrated
	HD Audio compatible codec	Yes
	Sampling (DAC and ADC)	Supports 44.1/48/96 KHz
	Audio Jacks	Mic-In
		Line-In
		Line-Out / Headphone Out
	Power Support	Digital: 3.3V
		Analog: 5V
	Other	Meets Mircrosoft Windows Vista (WLP 3.08) Premium requirements High-performance DACs with 98dB SNR (A-Weighting) ADCs with 90dB SNR (A-Weighting)
Integrated Realtek 8111DL-VB-GR GbE Ethernet Controller	Connector	RJ45
	Controller	Realtek 8111DL-VB-GR Gigabit Ethernet Controller
	Memory	Transmit/Receive on-chip buffer support
	Data rates supported	2.5GHz data rate with X1 link width.
	Compliance	IEEE 802.1P, 802.1Q, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI Express 1.1
	Data transfer mode	DMA
	Power requirement (LOM)	1000mbps (TxRx) max.568mW 1000mbps (TxRx) idle.498mW 100mbps (TxRx) max.274mW 1000mbps (TxRx) idle.224mW 10mbps (TxRx) max.330mW 10mbps (TxRx) idle.155mW D3 hot with Link (10M) 155 mW D3 hot without Link 76 mW D3 cold with Link (10M) 109 mW D3 cold without Link with WoL 30 mW D3 cold without Link with WoL 3 mW
	Network transfer rate	10/100/1000 Mbps over CAT.5
		10 Mbps over CAT.3
	Dimensions	7mm x 7mm
	Power Management	ACPI rev 2.0, PCI PM rev 1.1, ASPM L0s/L1
	Connector	RJ45

Technical Specifications

Intel Gigabit CT Desktop NIC	Connector	RJ-45
	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 capabilities	WOL, PXE, DMI, WFM 2.0

LSI PCIe x1 56K International SoftModem	Data Transmission	Technology speeds: 56,000 Kbps maximum downstream data, controllerless NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
	Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
	Power Management	PCI Bus Power Management Interface Specification (PCI-PM) Revision 1.2, Appendix A. D0, D3hot, and D3cold. Wake on Ring state when in D3cold. If the power management event (PME) feature is enabled in D3cold, a modem can wake the system via WAKE# (WAKEN) or beacon. Meets PCI Express 1.1 standard.
	Upgradeability	Driver upgradeable for future enhancements
	Video	ITU-T V.80 video ready interface

Other	TIA/EIA 602 standard AT command set
	Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface
	Optional ring wakeup signal
Operating Temperature	32° to 158° F (0° to 70° C)
Operating Humidity	20% to 90%, non-condensing
Power	Requires a 3.3-V auxiliary power rail on PCI express bus
	Uses only one PCI express load (i.e., one grant/request pair), one shared IRQ, one electrical load
Chipset	LSI SV92EX - Integrated PCI interface with 3.3-V tolerant buffers and CardBus support
Dimensions (L X H)	Complies with PCI express low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
Connection	Single RJ-11 connector
Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
Safety	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
Other	The SV92EX device is packaged in a 32-pin micro leadless chip carrier (MLCC). The SV92EX is fully compliant with the PCI Express revision 1.1 specification. WHQL approved; ASPM compliant.

HP Wireless 802.11 b/g/n PCIe Card	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13112_div/13112_div.html (Worldwide)
DMS-59 to Dual DVI Cable	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12845_div/12845_div.html (Worldwide)

Integrated Intel Graphics Media Accelerator X4500	3D/2D Controller	Microsoft DirectX® 10 based with support for Pixel Shader 3.0
	VGA Controller	Integrated
	DVI	Integrated
	Bus Type	PCI Express™ x16
	RAMDAC	Integrated, 350 MHz
	Graphics Engine Clock	667 MHz
	Memory	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. For Vista, use of PAVP heavy mode pre-allocates an additional 96MB. 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.

Windows XP Memory Usage:

Total System Memory (GB)	Total Graphics memory (MB)	Pre-Allocated (MB)	DVMT (MB)
0.5	128	32	96
	256	32	224
1	512	32	480
1.5	768	32	736
=>2.0	1024	32	992

Windows Vista Memory Usage:
Support for DVMT 5.0. The graphics driver will determine DVMT memory.

DVMT memory = Total GFX memory – Pre-allocated size and fixed memory = Pre-allocated memory.

Maximum Color Depth	32 bits/pixel
Maximum Vertical Refresh Rate	2048x1536@75Hz. Varies with mode and configuration. See table below.
Multi-display Support	Dual Independent monitor support facilitated via one VGA port and one DVI integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces.
Graphics/Video API Support	Microsoft DirectX® 10, OpenGL® 1.5 (OpenGL® 2.0 available in a driver update)

Resolutions Supported

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

Technical Specifications

	Maximum Refresh Rate (Hz)	
Resolution	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	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 GeForce 205 512MB PCIe x16 Card

Form Factor	ATX Full Height	
Display max resolution	Analog VGA: 2048x1536x32bpp@85Hz DVI: 1920 x 1200 x32bpp @60Hz	
Input/Output connectors	DVI-I+VGA	
Board configuration	Specification	Description
	Graphics Chip	NVIDIA D10M1-20 (GT218-200-A3)
	Core clock	589 MHz
	Memory clock	790 MHz
	Frame buffer	512 MB DDR3, 64-bit
Core power	30 W (Max board power)	

NVIDIA GeForce 205 (512MB) PCIe x16 Graphics Controller display resolutions and refresh rates

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

Analog Resolution	Maximum Refresh Rate
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1080	85 Hz
1920 x 1200	85 Hz
1920 x 1440	85 Hz
2048 x 1536	85 Hz
Digital Resolution	Maximum Refresh Rate
640 x 480	60 Hz
800 x 600	60 Hz
1024 x 768	60 Hz
1280 x 1024	60 Hz

1600 x 1200	60 Hz
1920 x 1200*	60 Hz
1920 x 1440**	60 Hz
2560 x 1600**	60 Hz

* Reduced blanking timings used when connected to a single-link DVI monitor
** Requires a dual-link DVI capable monitor

NVIDIA GeForce 315 1GB PCIe x16 Card

Form Factor	ATX Full Height	
Display max resolution	Analog VGA: 2048x1536x32bpp@85Hz DVI: 2560 x 1600 x32bpp @60Hz	
Input/Output connectors	DVI-I +VGA	
Board configuration	Specification	Description
	Graphics Chip	D10M2-20 (GT216-200-A2)
	Core clock	625 MHz
	Memory clock	790 MHz
	Frame buffer	1GB DDR3, 128-bit
Core power	52 W (Max board power)	

NVIDIA GeForce 315 (1GB) PCIe x16 Graphics Controller display resolutions and refresh rates

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

Analog Resolution	Maximum Refresh Rate
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1080	85 Hz
1920 x 1200	85 Hz
1920 x 1440	85 Hz
2048 x 1536	85 Hz
Digital Resolution	**Maximum Refresh Rate**
640 x 480	60 Hz
800 x 600	60 Hz
1024 x 768	60 Hz
1280 x 1024	60 Hz
1600 x 1200	60 Hz
1920 x 1200*	60 Hz
1920 x 1440**	60 Hz
2560 x 1600**	60 Hz

* Reduced blanking timings used when connected to a single-link DVI monitor
** Requires a dual-link DVI capable monitor

NVIDIA G210 (512MB)

Form Factor	ATX Full Height

PCIe x16 Card

Display max resolution	Analog VGA: 2048x1536x32bpp @ 75Hz &1920x1440x32bpp @ 75Hz DVI: 2560x1600x32bpp @ 75Hz HDMI: 1920x1200x32bpp @ 100Hz	
Input/Output connectors	Dual-Link DVI-I/VGA/HDMI	
Board configuration	Specification	Description
	Graphics Chip	NVIDIA D10M1
	Core clock	600 MHz
	Memory clock	500 MHz
	Frame buffer	512 MB DDR2, 192bit

Compliance standards

EMC Emissions:

- FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
- CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
- Canadian Standard ICES-003 is equivalent to CISPR22
- Japanese VCCI
- Taiwanese Standard BSMI
- Australian C-Tick
- Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

Core power: 21 W (Max board power)

NVIDIA G210 (512 MB) PCIe x16 Graphics Controller 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
- All standard VGA text/graphics modes are supported in addition to table below.
- All modes not highlighted are selectable Windows® desktop modes. Highlighted modes should not be selectable as Windows® desktop modes (they are for DirectX™)
- All modes up to and including 1600x1200 must support the video overlay at all refresh rates.

Technical Specifications

Analog Resolution	Depth(bpp)	CRT Maximum Refresh Rate (Hz)	VGA AND DVI-A (ANALOG)	DVI-I (DIGITAL)	HDMI
640 x 480	16, 32	60, 72, 75, 85, 90, 100, 120, 160	X	X	X
800 x 600	16, 32	48, 56, 60, 70, 72, 75, 85, 90, 100, 120, 160	X	X	X
848x480	16, 32	60, 88	X	X	X
1024 x 768	16, 32	46, 60, 70, 72, 75, 85, 90, 100, 120	X	X	X
1152x864	16, 32	43, 47, 60, 70, 75, 80, 85, 100	X	X	X
1280x720	16, 32	60, 70, 75, 80, 85, 90, 100	X	X	X
1280x768	16, 32	60, 70, 75, 80, 85, 90, 100	X	X	X
1280 x 1024	16, 32	43, 47, 60, 70, 74, 75, 85, 90, 100	X	X	X
1600 x 1200	16, 32	52, 58, 60, 66, 70, 72, 75, 76, 85	X	X	X
1768x1344	16, 32	60, 75	X	X	X
1800x1440	16, 32	60, 65, 75	X	X	X
1856x1392	16, 32	60, 75	X	X	X
1920 x 1080	16, 32	60, 70, 75, 80, 85, 90, 100	X	X	X
1920 x 1200	16, 32	60, 72, 75, 76 80, 85, 90, 100	X	X	X
1920 x 1440	16, 32	60, 75	X	X	NA
2048 x 1536	16, 32	60, 66, 70, 75	X	X	NA
2560 x 1600	16, 32	60, 75	NA	X	NA

NVIDIA GeForce GT230 1.5GB PCIe x16 Graphics Card

Form Factor	ATX Full Height
Display max resolution	Analog VGA: 2560x1600x32bpp @ 60Hz &1920x1440x32bpp @ 60Hz DVI: 2560x1600x32bpp @ 60Hz HDMI: 2560x1600x32bpp @ 60Hz
Input/Output connectors	Dual-Link DVI-I/VGA/HDMI

Board configuration

Specification	Description
Graphics Chip	NVIDIA D10P1
Core clock	500 MHz
Memory clock	500 MHz
Frame buffer	1.5 GB DDR2, 192bit

Compliance standards

EMC Emissions:

- FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
- CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
- Canadian Standard ICES-003 is equivalent to CISPR22
- Japanese VCCI
- Taiwanese Standard BSMI
- Australian C-Tick

- Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

Core power 65 W (Max board power)

NVIDIA GT230 (1.5 GB) PCIe x16 Graphics Controller 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
- All standard VGA text/graphics modes are supported in addition to table below.
- All modes not highlighted are selectable Windows® desktop modes. Highlighted modes should not be selectable as Windows® desktop modes (they are for DirectX™)
- All modes up to and including 1600x1200 must support the video overlay at all refresh rates.

Analog Resolution	Depth(bpp)	CRT Maximum Refresh Rate (Hz) - VGA AND DVI-A (ANALOG)	CRT Maximum Refresh Rate (Hz) - DVI-I (DIGITAL)	CRT Maximum Refresh Rate (Hz) - HDMI
800 x 600	8, 16, 32	72, 75	59, 60, 72, 75	NA
1024 x 768	8, 16, 32	70, 75	59, 60, 70, 75	NA
1280x720	8, 16, 32	50, 59, 60	50, 59, 60, 75	50, 59, 60
1280 x 1024	8, 16, 32	60, 70, 75	59, 60, 75	NA
1400x 900	8, 16, 32	NA	59, 60	NA
1600 x 1200	8, 16, 32	60	60	NA
1920 x 1080	8, 16, 32	59, 60	59, 59, 60	50, 59, 60
1920 x 1200	8, 16, 32	59, 60	59, 60	59, 60
1920 x 1440	8, 16, 32	60	60	60
2048 x 1536	8, 16, 32	60	60	60
2560 x 1600	8, 16, 32	60	60	60

ATI Radeon HD 4350 HDMI (512MB) SH PCIe x16 Graphics Card

Input/Output connectors: Dual-link DVI-I/VGA/HDMI

Display max resolution:
Analog VGA: 1920x1200x32bpp @ 60Hz
DVI: 1920x1200x32bpp @ 60Hz
HDMI: 1920x1200x32bpp @ 60Hz

Display support: Integrated 400 MHz RAMDAC

Bus type: PCI Express (x16 lanes)

Board configuration

Specification	Description
Graphics Chip	RV710D2
Core clock	600 MHz
Memory clock	500 MHz
Frame buffer	512 MB DDR2, 64 bit wide

Languages supported: 24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish

Core power: 23 W

Compliance standards

EMC Emissions:

a. FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b. CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c. Canadian Standard ICES-003 is equivalent to CISPR22
d. Japanese VCCI
e. Taiwanese Standard BSMI
f. Australian C-Tick
g. Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

ATI HD4350 (512 MB) PCIe x16 Graphics Controller 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
- All standard VGA text/graphics modes are supported in addition to table below.
- All modes not highlighted are selectable Windows® desktop modes. Highlighted modes should not be selectable as Windows® desktop modes (they are for DirectX™)

All modes up to and including 1600x1200 must support the video overlay at all refresh rates.

Analog Resolution	Depth(bpp)	CRT Maximum Refresh Rate (Hz) - VGA AND DVI-A (ANALOG)	CRT Maximum Refresh Rate (Hz) - DVI-I (DIGITAL)	CRT Maximum Refresh Rate (Hz) - HDMI
800 x 600	16, 32	60, 75	60, 75	60, 75
1024 x 768	16, 32	60, 75	60, 75	60, 75
1152x648	16, 32	NA	NA	59, 60
1152x864	16, 32	NA	60, 75	59, 60
1280x720	16, 32	NA	60	50, 59, 60
1280x768	16, 32	75	60, 75	60, 75
1280x960	16, 32	60	60	60
1280 x 1024	16, 32	60, 75	60, 75	60, 75
1440x900	16, 32	60	60	60
1600 x 1200	16, 32	60	60	60
1680x1050	16, 32	60	60	60
1920 x 1080	16, 32	NA	59, 60	50, 59, 60
1920 x 1200	16, 32	59, 60	59, 60	59, 60

ATI Radeon HD 4550 (256MB DH) PCIe x16 Graphics Card	Input/Output connectors	DMS-59 S-video connector
	Board display options	Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A. 4-pin mini-DIN S-video connector for TV output
	Display max resolution	1900 x 1200 digital, 2048 x 1536 analog

Technical Specifications

Display support	Integrated 400 MHz RAMDAC
Bus type	PCI Express (x16 lanes)
Maximum vertical refresh rate	85 Hz

Board configuration

Specification	Description
Graphics Chip	RV710
Core clock	600 MHz
Memory clock	800 MHz
Frame buffer	256 MB DDR2, 64 bit wide

Languages supported: 24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish

Operating systems support: Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*.
* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.
Linux x86 and x86_64 distributions using XFree86 or X.Org**.
** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information

Core power: 21 W

Option kit contents:

- ATI Radeon HD 4550 DH PCIe x16 Graphics Card with full height bracket attached;
- DMS 59 to dual VGA Y cable;
- Software CD with graphics drivers;
- Low profile bracket to convert the card for using in a low profile chassis;
- Warranty documentation;

Compliance standards: EMC Emissions:

a. FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b. CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c. Canadian Standard ICES-003 is equivalent to CISPR22
d. Japanese VCCI
e. Taiwanese Standard BSMI
f. Australian C-Tick
g. Korean (MIC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

ATI Radeon HD 4550 DH PCIe x16 Graphics Card display resolutions and refresh rates

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

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

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

ATI Radeon HD 4650 (1GB DH) PCIe Graphics Card	Bus type	PCI Express (x16 lanes)
	Maximum vertical refresh rate	85 Hz
	Display support	Dual 400 MHz integrated RAMDACs
	Display max resolution	2560 x 1600 digital, 2048 x 1536 analog
	Board display options	Supports two displays through any combination of two of the three output ports.
	Board configuration	Specification: Description Graphics Chip: RV730Pro Core clock: 600MHz Memory clock: 500 MHz Frame buffer: 1 GB DDR2, 128 bit wide
	Maximum power	55 W
	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
	Operating systems support	Windows Vista Home Basic 32*, FreeDOS * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements. Linux x86 and x86_64 distributions using XFree86 or X.Org**

	** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information.
Core power	55 W
Compliance standards	EMC Emissions: a) CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment EMC Immunity: CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

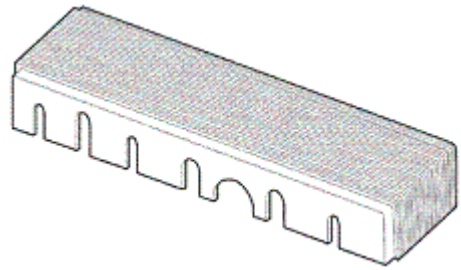
HP PS/2 or USB Standard Keyboard	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11880_div/11880_div.html (Worldwide)
HP USB PS2 Washable Keyboard	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13395_div/13395_div.html (Worldwide)
HP USB Mini Keyboard	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13237_div/13237_div.html (Worldwide)
HP USB Smart Card Keyboard	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12346_div/12346_div.html (Worldwide)
HP USB 2-Button Laser Mouse	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12912_div/12912_div.html (Worldwide)
HP PS/2 2-Button Optical Scroll Mouse	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12490_div/12490_div.html (Worldwide)
HP USB Optical Scroll Mouse	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11356_div/11356_div.html (Worldwide)

Technical Specifications

Serial ATA 3.0-Gb/s Hard Drives (7200 rpm)	160 GB 250 GB 320 GB 500 GB	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12229_div/12229_div.html (Worldwide)
SATA DVD-ROM Drive		NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12548_div/12548_div.html (Worldwide)
HP SATA SuperMulti LightScribe Drive		NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12739_div/12739_div.html (Worldwide)
HP 16X SATA Blu-ray Writer		NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13321_div/13321_div.html (Worldwide)

Port control cover

Prevent access to ports at the back of your HP Compaq Business Desktop with a rear port controller cover.



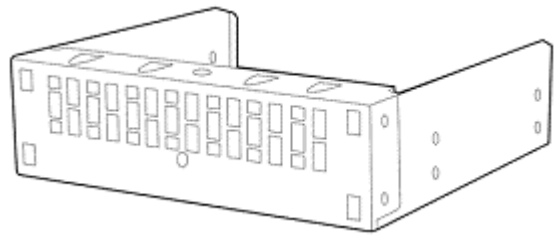
Port control cover

Key Benefits

- Prevent access to rear ports
- Enhances security and convenience

HP Chassis Security Kit

Prevent access to or removal of internal components like memory, hard drive, and power supply, particularly designed for the education market.



Chassis Security Kit

Key Benefits

- Protect your investment and help keep the system up and running by:
- Safeguarding the memory and hard drive with a metal bay filler
- Securing the power supply with two screws
- Preventing cable disconnection
- Locking down the front bezel so that internal components cannot be removed

HP 2nd Serial Port Adapter HP Parallel Port Adapter HP Serial/Parallel PCI Card	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12396_div/12396_div.html (Worldwide)		
HP 22-in-1 Media Card Reader	USB interface	USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board	
	Advance protocol support	• Supports hardware ECC (Error Correction Code) function • Supports hardware CRC (Cyclic Redundancy Check) function • Supports MS 4-bit parallel transfer mode • Supports MS-PRO 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50 MHz SD 4-bit card (version 1.1) • Support high-speed 52 MHz MMC 8-bit card (version 4.x)	
	Supported media types	• Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II), MicroDrive (MD) • Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), xD-Picture Card (xD) • Supports Secure Digital Card (SD), Secure Digital ROM Card (SD ROM), miniSD, MultiMediaCard (MMC), Secure MultiMediaCard (Secure MMC), ROM Type MultiMediaCard (MMC ROM), Reduced Size MultiMediaCard (RS MMC), MultiMediaCard 4.0 (MMC Plus), Reduced Size MultiMediaCard 4.0 (MMC Mobile) • Support Memory Stick (MS), Memory Stick ROM (MS ROM), MagicGate Memory Stick (MG), Memory Stick Select, Memory Stick Duo (MS Duo), Memory Stick PRO (MS-PRO), Memory Stick PRO Duo (MS PRO Duo)	
	Mechanical	**Length** (3.5″)	124.7 cm
		Width (3.5″)	101.6 cm
		Height (3.5″)	25.4 cm
		Length (5.25″)	171.6 cm
		Width (5.25″)	148.9 cm
		Height (5.25″)	42.7 cm
	Environmental	**Operational environmental extremes**	Test Parameters/Conditions – Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours

	Storage environmental extremes	Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T	

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:

- IT ECO declaration

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	36.972 W	36.610 W	NA
Sleep (Energy Star low power mode)	2.0204 W	1.8217 W	NA
Off	1.0163 W	0.8287 W	NA

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	126 BTU/hr	125 BTU/hr	NA
Sleep	7 BTU/hr	6 BTU/hr	NA
Off	3 BTU/hr	3 BTU/hr	NA

* 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	3.6	23
Fixed Disk (random writes)	3.6	24

Batteries

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

Batteries used in the product do not contain:

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

Battery size: CR2032 (coin cell)
Battery type: Lithium Metal

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).
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% post consumer recycled plastic (by wt.)
- This product is 85% recyclable when properly disposed of at end of life.

Packaging Materials

- External:
  - Corrugated 4250 g
  - Corrugated Carton 3855 g
- Internal:
  - EPE - Expanded Polyethylene 690 g
- The corrugated packaging material is made from 30% recycled content.
- The EPE - Expanded Polyethylene material is made from 0% recycled content.

RoHS Compliance

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

Material Usage

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

- 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)

Technical Specifications

Packaging	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications 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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