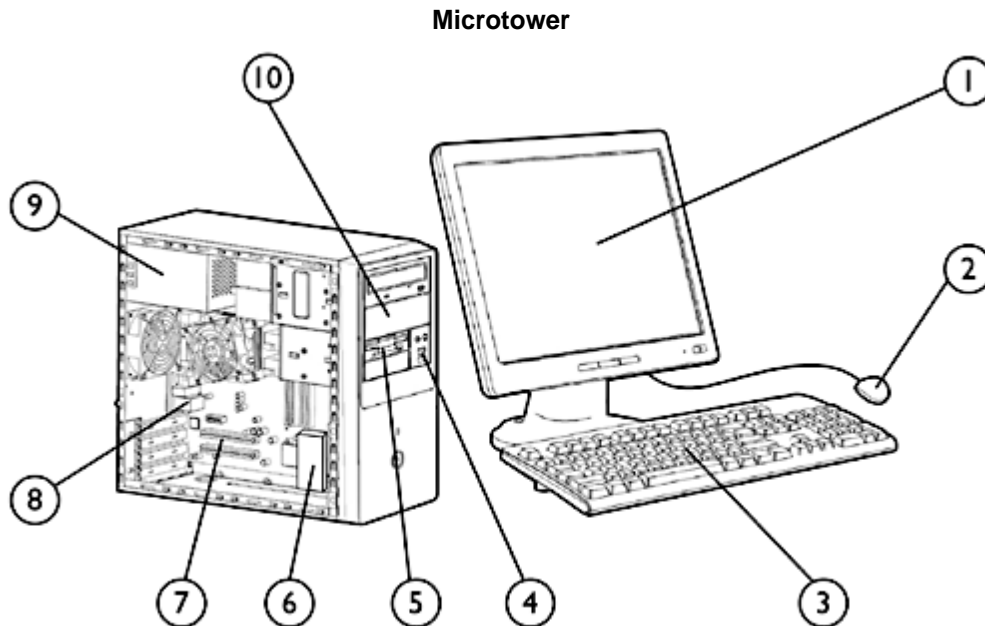


Overview

**HP recommends Windows
Vista™ Business**



- | | |
|--|--|
| <ul style="list-style-type: none">1. Monitor (sold separately)2. 2-Button Scroll Mouse3. HP Standard Keyboard
4. Front I/O - 2 USB 2.0 ports & MIC, Headset5. 2 internal 3.5" drive bays | <ul style="list-style-type: none">6. 2 external 3.5" drive bays for optional diskette drive7. 2 full height PCI 2.2 slots, 1 PCI-Ex1 slot8. 4 USB 2.0 ports, 1 serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, 1 audio in, 1 audio out, 1 MIC9. 300-watt max power supply10. 2 external 5.25" drive bays for optional optical drives |
|--|--|

At A Glance

- Intel® Pentium 4 processors, Intel Celeron D processors
- Choice of operating systems:
 - Geniune Windows XP Home
 - Geniune Windows XP Professional
 - FreeDOS
- Intel 915GV Express chipset
- Intel Graphics Media Accelerator 900
- PCI Express I/O bus
- Integrated SATA/150 controller
- Integrated Ultra ATA/100 controller
- Integrated Realtek 10/100/1000 Network Connection
- Choice of hard drives and optical drives
- Single or dual channel DDR SDRAM system memory
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions & exclusions apply.

Available Technology and Features

Processor and Speed

One of the following

Intel Celeron D Processors:

Intel Celeron D 331 Processor
(2.66-GHz, 256-KB L2 cache, 533-MHz FSB)

Intel Celeron D 336 Processor
(2.80-GHz, 256-KB L2 cache, 533-MHz FSB)

Intel Celeron D 341 Processor
(2.93-GHz, 256-KB L2 cache, 533-MHz FSB)

Intel Celeron D 346 Processor
(3.06-GHz, 256-KB L2 cache, 533-MHz FSB)

Intel Celeron D 351 Processor
(3.20-GHz, 256-KB L2 cache, 533-MHz FSB)

Intel Pentium 4 Processors with Hyper-Threading Technology:

Intel Pentium 4 506 Processor
(2.66-GHz, 1-MB L2 cache, 533-MHz FSB)

Intel Pentium 4 511 Processor
(2.8-GHz, 1-MB L2 cache, 533-MHz FSB)

Intel Pentium 4 516 Processor
(2.93-GHz, 1-MB L2 cache, 533-MHz FSB)

Intel Pentium 4 519K Processor
(3.06-GHz, 1-MB L2 cache, 533-MHz FSB)

Intel Pentium 4 521 Processor
(2.80-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Pentium 4 531 Processor
(3.00-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Pentium 4 541 Processor
(3.20-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Pentium 4 551 Processor
(3.40-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Pentium 4 630 Processor
(3.0-GHz, 2-MB L2 cache, 800-MHz FSB)

Intel Pentium 4 640 Processor
(3.20-GHz, 2-MB L2 cache, 800-MHz FSB)

Intel Pentium 4 650 Processor
(3.40-GHz, 2-MB L2 cache, 800-MHz FSB)

Operating Systems and Application Software

Geniune Windows XP Home SP2

Geniune Windows XP Professional SP2

Free DOS

Microsoft Office 2003 Basic (availability varies by region)

Microsoft Office 2003 Small Business (availability varies by region)

Microsoft Office 2003 Professional (availability varies by region)

Microsoft Works 7.0 (availability varies by region)

Altiris Local Recovery (availability varies by region)

Norton AntiVirus 2005 (availability varies by region)

Available Technology and Features

Hard Drives

40-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)
80-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
160-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
250-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)

NOTE: The Serial ATA interfaces in the HP Compaq d290 Microtower support data transfer rates up to 1.5 Gb/s.

System Memory – Single Channel Configurations

128-MB DDR Synch DRAM PC3200 (400-MHz) Non-ECC (1 x 128-MB)
256-MB DDR Synch DRAM PC3200 (400-MHz) Non-ECC (1 x 256-MB)
512-MB DDR Synch DRAM PC3200 (400-MHz) Non-ECC (1 x 512-MB)
1-GB DDR Synch DRAM PC3200 (400-MHz) Non-ECC (1 x 1-GB)

System Memory - Dual Channel Configurations

512-MB DDR Synch DRAM PC3200 (400-MHz) Non-ECC (2 x 256-MB)
1-GB DDR Synch DRAM PC3200 (400-MHz) Non-ECC (2 x 512-MB)
2-GB DDR Synch DRAM PC3200 (400-MHz) Non-ECC (2 x 1-GB)

NOTE: For best performance, memory speeds and sizes should not be mixed. See memory section for more information.

Storage –

One or more of the following (see Storage section below)

Diskette Drive

1.44-MB Diskette Drive

Optical Drives

52X CD-ROM drive (available in APJ only)
48X/32X/48X CD-RW drive
16X/48X DVD-ROM drive
48X/32X Combo CD-RW/DVD-ROM Drive
16X DVD+/-RW

Keyboard –

One of the following

HP PS/2 Standard Keyboard
HP USB Standard Keyboard

Mouse –

One of the following

PS/2 2-Button Scroll Mouse
USB 2-Button Optical Scroll Mouse
USB 2-Button Scroll Mouse

Audio

6-channel AC' 97 audio (Realtek ALC 655)
3D audio compliant with AC'97

Communication

Integrated Realtek 10/100/1000 Network Connection (8110S)
Agere 56K PCI Modem

Graphics

On board Intel Graphics Media Accelerator 900



System Details

Base Unit	<ul style="list-style-type: none"> • Micro ATX microtower chassis, including power supply and front bezel • Six (6) drive bays and three expansion slots • Microsoft operating system CD • System board with Intel 915GV Express chipset, integrated Realtek 10/100/1000 Network Connection, integrated graphics and audio, 2 PCI slots, 1 PCI Express x1 slot, 2 DDR DIMM memory slots • (1) Parallel ATA data cable; 3-headed; supports two IDE drives • (1) Serial ATA data cable • Chassis fan (92 mm x 92 mm x 25 mm) • Product documentation on CD • HP system restore CD • Power cord
------------------	--

Slots	PCI	Two (2) PCI 2.2 slots on PCA One (1) PCI Express x1 slot on PCA
	Memory Expansion	Two (2) DIMM slots (2 GB maximum memory support)

Bays	Internal	Two (2) 3.50" internal
	External	Two (2) 5.25" external Two (2) 3.50" external

USB Support	High-speed USB 2.0 controller Two (2) front ports; Four (4) rear ports
--------------------	---

Interfaces (Legacy)	One (1) parallel port One (1) serial port One (1) PS/2 keyboard port One (1) PS/2 mouse port One (1) analog VGA video port One (1) line in; one (1) line out; one (1) mic in One (1) RJ45 network port Front Audio One (1) Speaker One (1) MIC
----------------------------	---

Weight & Dimensions	Chassis Dimensions (H x W x D)	14.49 x 6.89 x 15.75 in (36.80 x 17.50 x 40.00 cm)
	Packaged Dimensions (L x W x H)	23.2 x 19.6 x 10.9 in (58.9 x 49.9 x 27.8 cm)
	System Weight	~ 25.35 lb (11.5 kg) (depending on configuration)
	Shipping Weight	~ 31.97 lb (14.5 kg) (depending on configuration)

System Details

Supported Technology & Features	Memory Type	<ul style="list-style-type: none"> • PC3200 DDR SDRAM (400-MHz) non-ECC • Single or dual channel configurations • 2 GB maximum system memory
	Hard Drive Interfaces Supported	<ul style="list-style-type: none"> • Serial ATA 1.5-Gb/s and 3.0-Gb/s hard drives are supported • 915GV chipset limits throughput to 1.5 Gb/s

Intel Pentium 4 Processor with HT Technology	Coprocessor	Integrated
	CPU Socket Type/Number	Socket T LGA775 socket
	CPU Package	LGA775
	Front Side Bus Speed	533/800-MHz
	Cache Memory	1-MB L2 Advanced Transfer Cache (500 Series) 2-MB L2 Advanced Transfer Cache (600 Series)

Intel Celeron D Processor	Coprocessor	Integrated
	CPU Socket Type/Number	Socket T LGA775 socket
	CPU Package	LGA 775
	Front Side Bus Speed	533-MHz
	Cache Memory	256-KB L2 Advanced Transfer Cache

Chassis	Front Panel	<ul style="list-style-type: none"> • Power button • Power On LED • HDD Activity LED
	Cooling Solutions Supported	<ul style="list-style-type: none"> • Power Supply Fan (with speed control) • Active heat sink (variable speed) • Chassis fan
	Slots Supported	Three (3) full-height expansion slots
	Front I/O	Two (2) USB 2.0 ports Two (2) Front Audio ports (1 Headphone, 1 MIC)
	Rear I/O	Standard Micro ATX I/O connectors, including four (4) USB 2.0 ports
	Drive Bays	<ul style="list-style-type: none"> • Two (2) 5-1/4" external • Two (2) 3-1/2" external • Two (2) 3-1/2" internal
	Power Supply	<ul style="list-style-type: none"> • 300-watt ATX Power Supply – non-PFC with a 115v/230v line switch (varies by country/region)

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 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range Operating Temperature: 50° to 95° F (10° to 35° C)
Non-operating Temperature: -22° to 140° F (-30° to 60° C)

Relative Humidity Operating Humidity: 10% to 90% (non-condensing at ambient)
Non-operating Humidity: 5% to 95% (non-condensing at ambient)

Maximum Altitude Operating: 8000 ft (2500 m)
(unpressurized) Non-operating: 30,000 ft (9000 m)

NOTE: 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.

System Board

Socket LGA775 industry standard Micro ATX form factor

- | | |
|--------------------------|---|
| Processor | <ul style="list-style-type: none">• Socket T; LGA775• Support single Intel Pentium 4 or Celeron D |
| PWM | <ul style="list-style-type: none">• ON 3 phase power solution• Meets Intel Mainstream FMB spec |
| Chipset | <ul style="list-style-type: none">• Intel 915GV Express• Intel ICH6 |
| Super I/O | <ul style="list-style-type: none">• ITE IT8712 |
| Front Side Bus Frequency | <ul style="list-style-type: none">• 533/800-MHz |
| Memory | <ul style="list-style-type: none">• PC3200 DDR SDRAM• 2 x DIMM slots• Support for single or dual-channel configurations |
| Clock Generator | <ul style="list-style-type: none">• Cypress CY28411 |
| Integrated Graphics | <ul style="list-style-type: none">• Intel Graphics Media Accelerator (GMA) 900 |
| Audio | <ul style="list-style-type: none">• Realtek ALC655 six channel audio 3D audio compliant with AC'97 |
| LAN | <ul style="list-style-type: none">• Integrated Realtek 10/100/1000 (8110S) network controller |
| IDE | <ul style="list-style-type: none">• Support all PIO modes• 1 x IDE ports support up to 2 devices• Support Ultra ATA 33/66/100 |
| SATA | <ul style="list-style-type: none">• Two Serial ATA interfaces support data transfer rates up to 1.5 Gb/s |
| Expansion Slots | <ul style="list-style-type: none">• 2 x PCI 2.2 slots• 1 x PCI Express x1 slot |
| BIOS | <ul style="list-style-type: none">• 4Mbit flash EEPROM |

System Details

Manageability	<ul style="list-style-type: none">• WfM 2.0, SMBus
Industrial Standard	<ul style="list-style-type: none">• PCI 2.2 compliant• USB 2.0
Rear Side I/O Ports	<ul style="list-style-type: none">• 1 x PS/2 keyboard port• 1 x PS/2 mouse port• 4 x USB 2.0 ports• 1 x RJ-45 10/100/1000 port• 1 x serial port• 1 x parallel port• 1 x DB 15 pin analog VGA port• 3 x audio ports
On Board I/O Interfaces	<ul style="list-style-type: none">• 1 x ATX power connector• 1 x +12V power connector• 1 x Floppy connector• 1 x Front panel connector, Switch, LED (ON/Flash/OFF)• 2 x Fan headers for CPU, chassis, with voltage/fan speed control• 1 x ATAPI headers-CD IN• 1 x header to support 2 USB 2.0 ports at front side
Board Size	<ul style="list-style-type: none">• Micro-ATX
Additional Features	<ul style="list-style-type: none">• Keyboard/mouse/USB wake up• Support S1, S3, S4 and S5• ACPI status• Hardware monitor capability• CPU fan speed control• Wake on LAN

Network Interface

	Integrated Realtek 8110S Network Connection
Hardware Highlights	<ul style="list-style-type: none">• Realtek 8110S Platform LAN Connect device• 10/100/1000 mbps• IEEE 802.3 10BASE-T compliant physical layer interface• IEEE 802.3u Auto-Negotiation and 100BASE-TX support• 10BASE-T auto-polarity correction• 1:1 transmit transformer ratio support• Low power (300 mW) typical in active transmit mode• Reduced power(less than 50 mW) in "unplugged mode"• Automatic detection of "unplugged mode"
Features	<ul style="list-style-type: none">• ACPI support• Magic Packet filtering for Wake on LAN support• Automatic detection of "unplugged mode"• Low power (less than 300 mW in active transmit mode)• Platform LAN connect interface support• Low power 3.3 V device

System Details

Power Supply

- ATX Power Supply - non-PFC with a 115v/230v line switch
- 100 to 125 VAC, or 200 to 250 VAC input voltage range
- 50–60 Hz rated line frequency
- 300 watt maximum power
- 80-mm power supply fan with speed control
- Over Voltage Protection
- Over Current Protection
- Short Circuit Protection
- FCC ,UL approved

Power Conservation 'Energy Saver'

- Energy Star compliant
- APM 1.2 support, ACPI 2.0 support
- Screen blanking
- Hard drive 'Idle' mode
- System Idle mode
- Blue Angel compliant (<5w in S5 – power off)
- Processor/Cache memory power-down (S3)

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	50° to 104°F (10° to 40°C) at sea level with an altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 8000 ft (2500 m), no direct sustained sunlight. Maximum rate of change is 77°F/Hr (25°C/Hr). The upper limit may be limited by the type and number of options installed.
	Storage	-22° to 140°F (-30° to 60°C) – Maximum rate of change: 410°F/Hr (210°C/Hr).
Humidity	Operating	10% to 90% relative humidity (Rh), 86°F (30°C) maximum wet bulb temperature, non-condensing
	Storage	10% to 95% relative humidity (Rh), 101.66°F (38.7°C) maximum wet bulb temperature, non-condensing
Altitude	Operating	0 to 8,000 feet (0 to 2438.4 meters) – This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1,000 ft/min (304.8 m/min).
	Non-Operating	0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min).

System Details

Shock	Listed are the levels of shock the product can withstand with NO damage being incurred. The values represent peak input acceleration during a 2~3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse. Non-Operating 40G's (Half-sine Shock) 40G'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@0.00025G ² /Hz, 10Hz@0.01G ² /Hz, 100Hz@0.01G ² /Hz, 300Hz@0.00001G ² /Hz, 5Hz to 300Hz, (0.25G's nominal). Non-Operating Random vibration at 0.008G ² /Hz, 10Hz to 500Hz, (2 Grms nominal).
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. IDLE (Fixed disk drive spinning) Desktop Average LpAm = 35 dBA Operating (Random write) Desktop Average LpAm = 41dBA

Service and Support

On-site Warranty [Note 1](#) One-year (1-1-1) limited warranty delivers one year of on-site, next business day or second business-day [Note 2](#) service for parts and labor and includes free telephone support [Note 3](#) 24 x 7. Additional configurable warranty options (sold separately) include: 90 days parts (90/0/0), three years parts and one year labor (3/1/1), or 3 years next business day, three years parts and three years labor (3/3/3).

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

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

Communication	Modems	
	Agere PCI Hi-Speed 56K International SoftModem	DC131C
Hard Disk Drives	250-GB SATA 3.0-Gb/s Hard Drive	PY278AA
	160-GB SATA 3.0-Gb/s Hard Drive	PY277AA
	80-GB SATA 3.0-Gb/s Hard Drive	PY276AA
Removable Storage Devices	Diskette Drive	
	1.44-MB Internal Diskette Drive for d290	
	1.44-MB USB Diskette Drive – External	DC141B
	USB Drive Key	
	512-MB HP Drive Key II (USB 2.0)	ED516AA
	256-MB HP Drive Key II (USB 2.0)	PH657R
Input Devices	Keyboards	
	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	Mice	
	HP PS/2 2-Button Scroll Mouse	DD440B
	HP USB 2-Button Scroll Mouse	DD441B
	HP USB 2-Button Optical Scroll Mouse	DC172B
Memory	1-GB PC3200 (DDR-400) DIMM	DE468A
	512-MB PC3200 (DDR-400) DIMM	DE467A
	256-MB PC3200 (DDR-400) DIMM	DE466A
Optical Drives	52X Max CD-ROM Drive (available in Asia Pacific and Japan only)	AG041AA
	48X/32X/48X CD-RW Drive	DL975B
	48X/32X Combo Drive CD-RW / DVD-ROM Drive	DL976B
	16X/48X DVD-ROM Drive	PR596A
	16X DVD+/-RW	PR595A
Miscellaneous Accessories	HP FireWire / IEEE 1394 PCI Card	PA997A
	USB to Serial Adaptor	EM449AA

After-Market Options

Monitors

CRTs

HP s5502 15" (13.8" vis) CRT Monitor	PQ560AA#XXX
HP s7540 17" (16.0" vis) CRT Monitor	PF997AA#XXX
HP v7650 17" (16.0" vis) Flat-face CRT Monitor	PF996AA#XXX

TFTs

HP L1506 15" TFT Flat Panel Monitor – Analog only	PX848AA#XXX
HP L1706 17" TFT Flat Panel Monitor – Analog only	PX849AA#XXX
HP L1740 17" TFT Flat Panel Display – Analog/Digital	PL766AA#XXX
HP L1755 17" TFT Flat Panel Display – Analog/Digital	PL777AA#XXX
HP L1906 19" TFT Flat Panel Display – Analog only	PX850AA#XXX
HP L1940T 19" TFT Flat Panel Display – Analog/Digital	EM869AA#XXX
HP L1955 19" TFT Flat Panel Display – Analog/Digital	PD974AA#XXX
HP L2065 20" TFT Flat Panel Display – Analog/Digital	EF227A4#XXX
HP LP2465 24" TFT Widescreen Flat Panel Display – Analog/Digital	EF224A4#XXX

GSA Monitors

HP L717g 17" GSA Flat Panel Monitor	EE191AA#XXX
HP L919g 19" GSA Flat Panel Monitor	EE192AA#XXX

Options

HP Flat Panel Speaker Bar	EE418AA
HP CRT Monitor Multimedia Base	PM552AA

Memory

915GV Express chipset

DDR2 SYNCH DRAM NON-ECC MEMORY

The Intel 915GV Express chipset supports non-ECC DDR PC3200 (400-MHz) memory. 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.

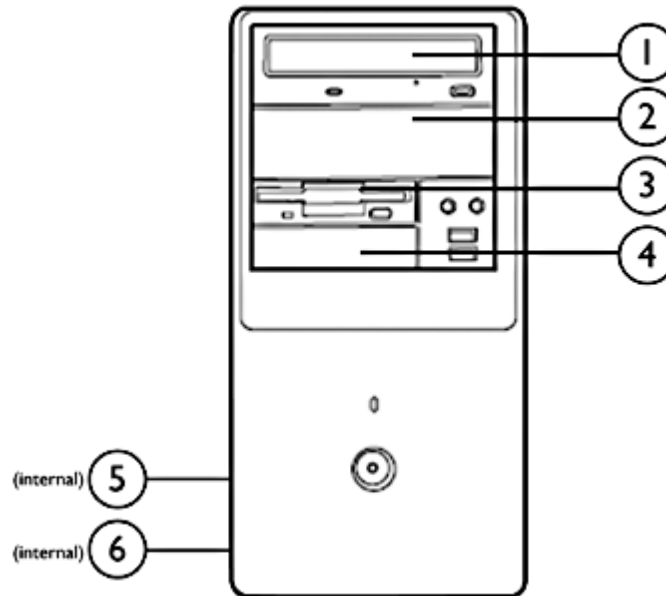
HP recommends dual-channel symmetric configurations for maximum performance. For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will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

MAXIMUM MEMORY

Supports up to 2-GB of DDR SYNCH DRAM. Not all memory configurations possible are represented below.

Memory Capacity	Channel	Slots	
		DIMM 1	DIMM 2
128-MB	Single	128-MB	
256-MB	Single	256-MB	
512-MB	Single	512-MB	
	Dual	256-MB	256-MB
1-GB	Single	1-GB	
	Dual	512-MB	512-MB
2-GB	Dual	1-GB	1-GB

Storage



HP Compaq d290 Microtower Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Diskette Drives	1	1, 2	ICH6
CD-ROM Drives	2	1, 2	ICH6
DVD-ROM Drives	2	1, 2	ICH6
CD-RW/Combo Drives	2	1, 2	ICH6
DVD+/-RW Drives	2	1, 2	ICH6
3.5" Serial ATA Hard Drives	2	3,4	ICH6

Technical Specifications - Audio

**Integrated Realtek
ALC655 Audio**

Type	Integrated
AC '97 Stereo Codec	Yes
Sampling	Supports 48 KHz
Audio Jacks	Mic-In Line-In Line-Out
Power Support	Digital: 3.3V Analog: 5V
Other	Meets performance requirements for audio on PC99/2001 systems High quality differential CD input

Technical Specifications - Communications

Agere 56K PCI Modem	Data Transmission	56,000 Kbps maximum downstream data 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.42bis, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/300 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	ACPI; PPMI 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
	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 bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
	Chipset	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
	Dimensions (L X H)	Complies with PCI 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.
	Health	Bare PCB material compliant to 94V-0 or better (marked as such)
	Other	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant

Technical Specifications - Communications

Kit Contents

DC132D : Agere Systems PCI International Softmodem with full-height bracket attached, additional low-profile bracket, RJ11 modem cable, driver and documentation CD.

NOTE: RJ11 modem adapter is not included.

DC131C #xxx: RJ11 modem adapter kit for use with DC132D

#ACP: Austria, #ABW: Belgium (Dutch/Flemish), #AKN: Bosnia, Herzegovna, Croatia, Slovenia, Yugoslavia (Slovenian), #AKB: Czech Republic (Czech) & Slovakia, #ABF: France, #ABD: Germany, #AB7: Greece, #AKC: Hungary, #ABT: Israel, #ABZ: Italy, #ABH: Netherlands, #UUW: Nordic Region, #ACB: Russia, #ACQ: South Africa, #ACD: Switzerland, #AB8: Turkey, #ABU: UK, #ABG: Australia, New Zealand, #ACJ: India.

Realtek 8110S Integrated Gigabit Ethernet Controller

Connector	RJ-45
Controller	Realtek 8110S PCI LAN Controller
Data rates supported	10/100/1000 Mbps
Compliance	IEEE 802.3, 802.1Q, 802.3ab and 802.3u compliant, 802.3x flow control
Bus architecture	PCI 2.2
WOL Support	Single channel, PCI-E
Data transfer mode	Bus-master DMA
Power requirement	+3.3 Volt signaling , 5V PCI I/O tolerant
Boot ROM support	Yes
Network transfer mode	Full-duplex Half-duplex
Other features	PXE support Auto Negotiation Cross over Detection and auto correction ACPI support Transmit/receipt FIFO – 8K /64K support

Technical Specifications - Graphics

Integrated Graphics Media Accelerator 900	3D/2D Controller	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.
	VGA Controller	Integrated
	Bus Type	PCI Express™
	RAMDAC	Integrated, 400 MHz
	Memory	Graphics memory is shared with system memory. Graphics memory usage can vary from 8-128 MB depending on the amount of system memory installed and system load. 8 MB is pre-allocated for graphics use at system boot time. Additional memory is allocated for graphics using Intel's Dynamic Video Memory Technology (DVMT) to balance the optimum amount of memory between graphics and other system use. Memory < 256 MB: 8 MB pre-allocated (for DOS) + 24 MB DVMT: max frame buffer of 32 MB 256 MB <= Memory < 512 MB: 8 MB pre-allocated + 56 MB DVMT: max frame buffer of 64 MB 512 MB <= Memory: 8 MB pre-allocated + 120 MB DVMT: max frame buffer of 128 MB
	Controller Clock Speed	333 MHz
	Overlay Planes	Single overlay support with 5x3 filtering
	Maximum Color Depth	32 bits/pixel
	Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 75 Hz at 2048x1536. Varies with mode and configuration. See table below.
	Multi-display Support	Support for one CRT via the motherboard's VGA connector. Support for an additional DVI-D display via the optional DVI ADD2 card. Dual independent displays and dual synchronous (Twin or Clone mode) displays are supported.
	Graphics/Video API Support	Microsoft DirectX9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported*	Resolution	Maximum Refresh Rate (Hz)	
		Analog Monitor (HP 7500)	Digital Monitor
		640 x 480	85
800 x 600	85	70	
1024 x 768	85	70	
1152 x 864	85	70	
1280 x 768	60	70	
1280 x 960	85	70	
1280 x 1024	85	70	
1600 x 900	60	70	
1600 x 1200	85	60	
1920 x 1080	60	–	
1920 x 1200	60	–	
1920 x 1440	75	–	
2048 x 1536	75	–	

* Modes listed are supported with a single active display. The supported mode list for multiple active displays is a subset of this list. Not all modes will support video playback and some supported modes may use software MC (motion compensation) rather than hardware MC. Not all modes will support 3D acceleration depending on the system configuration (e.g., resolution selected, size of frame buffer, number of installed memory modules, etc.).

NOTE: Other resolutions and refresh rates may be selectable but are not recommended.

Technical Specifications - Input/Output Devices

HP PS/2 or USB Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	Operating voltage	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		ESD	CE level 4, 15-kV air discharge
		EMI – RFI	Conforms to FCC rules for a Class B computing device
		MicrosoftPC 99 – 2001	Functionally compliant
	Mechanical	Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 - 2001	Mechanically compliant
	Environmental	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)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

Technical Specifications - Input/Output Devices

HP 2-Button Scroll Mouse (PS/2 or USB)	Scroll Wheel	8 mm		
	Maximum Rotation Speed	30 mm/s		
	Switch Type	Light force micro-switch		
	Switch Life	1 million operations		
	Mechanical Life	Minimum 200,000 revolutions		
	Environmental	Operating Temperature	50° to 122° F (10° to 50° C)	
		Non-operating Temperature	-22° to 140° F (-30° to 60° C)	
		Operating Humidity	10% to 90% (non condensing at ambient)	
		Non-operating Humidity	20% to 80% (non condensing at ambient)	
		Operating Shock	40 g, 6 surfaces	
		Non-operating Shock	80 g, 6 surfaces	
		Operating Vibration	2 g peak acceleration	
		Non-operating Vibration	4 g peak acceleration	
		Electrical	Operating Voltage	+ 5VDC ± 10%
			Power Consumption	15mA
	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			
PC98	Functionally compliant			
Mechanical	Resolution	400 ± 20% DPI		
	Tracking Speed	10 in/s maximum		
	Acceleration	100 in/s		
	Switch Actuation	85 g nominal peak force		
	Switch Life	1,000,000 operations (using Hasco modified tester)		
Regulatory Approvals	Cable Length	2 m		
	PC98-99	Mechanically compliant		
		UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick		

Technical Specifications - Hard Drives

Serial ATA Hard Drives 40 GB (7200 rpm)

Capacity	40,020,664,320 bytes	
Height	1 in (2.6 cm)	
Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
Interface	Serial ATA	
Synchronous Transfer Rate (Maximum)	1.5 Gb/s	
Buffer	2 MB	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
	Average	8.5 ms
	Full-Stroke	18.0 ms
Rotational Speed	7,200 rpm	
Logical Blocks	78,165,360	
Operating Temperature	32° to 140° F (0° to 60° C)	

80 GB*

Capacity	80,026,361,856 bytes	
Height	1 in (2.6 cm)	
Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
Interface	Serial ATA	
Synchronous Transfer Rate (Maximum)	1.5 Gb/s	
Buffer	8 MB	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
	Average	8.5 ms
	Full-Stroke	18.0 ms
Rotational Speed	7,200 rpm	
Logical Blocks	156,301,488	
Operating Temperature	32° to 140° F (0° to 60° C)	

Technical Specifications - Hard Drives

160 GB*	Capacity	160,041,885,696 bytes	
	Height	1 in (2.6 cm)	
	Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA	
	Synchronous Transfer Rate (Maximum)	1.5 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
		Average	8.5 ms
		Full-Stroke	18 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	32° to 140° F (0° to 60° C)	
	250 GB*	Capacity	250,059,350,016 bytes
Height		1 in (2.6 cm)	
Width		Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
Interface		Serial ATA	
Synchronous Transfer Rate (Maximum)		3.0 Gb/s	
Buffer		8 MB	
Seek Time (typical reads, includes controller overhead, including settling)		Single Track	0.8 ms
		Average	<9.0 ms
		Full-Stroke	<17 ms
Rotational Speed		7,200 rpm	
Logical Blocks		488,397,168	
Operating Temperature		41° to 131°F (5° to 55°C)	

***NOTE:** Although this drive is rated for a 3.0-Gb/s transfer rate, the Serial ATA interfaces in the HP Compaq d290 Microtower support data transfer rates up to 1.5 Gb/s.

Technical Specifications - Optical Storage

52X CD-ROM Drive	Interface	ATAPI	
	Data Transfer Rate	CDR read – 16X ~ 52X (2400 ~ 7800 KB/s) CDRW read – 12X ~ 24X (1800 ~ 3600 KB/s) Digital audio – 12X ~ 24X (1800 ~ 3600 KB/s)	
	Access Time (ms)	Random: <125 ms Full-stroke seek: <210 ms	
	Data Buffer	2 MB	
	Interface Type	E-IDE / ATPI	
	Disk Capacity (CD)	180 MB, 540 MB, 650 MB, and 700 MB	
	Start up Time (Single)	<7 seconds	
	Start up Time (Multi Session)	< 30 seconds	
	Stop up Time	< 4 seconds	
	MTBF	150000 POH @ 25% Duty cycle	
	Disk Diameter	12 cm, 8 cm	
	Disk Thickness	1.2 mm	
	CD Media supported	CDROM, CD DA, CDR, CDRW	
	Block Size	CD -DA (2352 and 2368) Mode 1 (2048 and 2352) , Mode 2 form1 (2048,2328,2336,2340,2352) ,Mode 2 form 2 (2328,2336,2340,2352)	
	Operating Conditions	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
	Dimensions (H x W x D, maximum)	1.6 x 5.7 x 7.3 in (4.1 x 14.6 x 18.5 cm)	

48X/32X/48X CD-RW Drive	Orientation	Either horizontal or vertical	
	Disc Loading Mechanism	Half-height, tray load	
	Interface Type	ATAPI IDE	
	Dimensions – External (W x H x D)	7.99 x 5.88 x 1.71 in (20.3 x 14.93 x 4.34 cm)	
	Weight	2.6 lb (1.2 kg)	
	Disc Diameter	12 cm, 8 cm	
	Disc Thickness	1.2 mm	
	Track Pitch	1.6 µm	
	Disc Center Hole Diameter	15 mm	
	Reference Scanning Velocity	1.2 m/s	
	Recording/Playing Time	80 minutes with CD-R media	

Technical Specifications - Optical Storage

Read only Disc Parameters	Formats and Modes Supported	CD-ROM-Mode 1; CD-ROM XA-Mode 2 (forms 1 and 2); CD digital audio; CD Extra; CD-I-Mode 2 (forms 1 and 2) and CD-I-Ready; Photo CD (single and multi-session); video CD
	Capacity	185 MB (Mode 2, 8cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)
	Block Size	Mode 1-2,048 and 2,352 bytes; mode 2, form 1-2,048; 2,328; 2,336; 2,340 and 2,352 bytes; mode 2, form 2-2,328; 2,336; 2,340 and 2,352 bytes; CD-DA-2,352 and 2,368 bytes
Writeable Disc Parameters	Disc Type	CD-R and CD-RW
	Write Methods	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
	Format and Modes Supported	CD-ROM (mode 1); CD-ROM XA (mode 2, forms 1 and 2); CD digital audio, CD-I (mode 2, forms 1 and 2); video CD
	Capacity	185 MB (Mode 2, 8cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)
	Block Size	Mode 1-2,048 bytes; mode 2, form 1-2,048 and 2,352 bytes; mode 2, form 2-2,352 bytes; CD-DA ---2,352 bytes
Access Times (typical)	Random	< 120 ms
	Full Stroke	< 200 ms
Data Transfer Rates	CD-RW Write	4800 KB/s (up to 32X)
	CD-ROM, CD-R Read	7200 KB/s (up to 48X)
	CD-RW Read	7200 KB/s (up to 32X)
	CD-R Write	7200 KB/s (up to 48X)
Data Transfer Modes	ATA PIO mode 4 (16.7MB/s); ATA multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA mode 0 (16.7 MB/s); ATA UltraDMA mode 1 (24 MB/s); ATA UltraDMA mode 2 (33 MB/s) - default.	
Cache Buffer	2 MB (minimum)	
Start-up Time (single)	< 7 seconds typical	
Start-up Time (multi-session)	< 30 seconds typical	
Stop Time	< 4 seconds	

Technical Specifications - Optical Storage

Power	Source	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC 5%-100 mV ripple p-p 12 VDC 5%-200 mV ripple p-p
	DC Current	5 VCD < 1A (typical) < 1600 mA (maximum) 12 VCD < 600 mA (typical) < 1.4A (maximum) Total Drive Power (Standby mode) < 2.5 watt
Audio Output Level		0.7 Vrms
Configuration Jumper Block		Master, slave and cable select modes
Data Interface Connector		50-pin IDE interface
Environmental (all conditions, non-condensing)	Temperature (operating)	41° to 122° F (5° to 50° C)
	Relative Humidity (operating)	10% to 90%
	Maximum Wet Bulb Temperature (operating)	84° F (29° C)
Certifications, Requirements		ACA AS/NZS 3548, ANSI C63.4-1992, CB Test Certificate for IEC 950, CE Mark, CFR 47 part 15, CNS 13438, CSA C22.2 No. 60950, DHHS/FDA – 1040, EN60825, EN55022:1998, EN55024, EN60950:2000, ICES-003 class B, IEC 61000 4-2 – 4-11, Nordic EN60950, TUV or VDE EN60950, UL 60950, C.I.S.P.R. Publication 22 Class B, BSMI, Microsoft P2001, Microsoft Logo for Windows 98, 2000 and XP

16X/48X DVD-ROM Drive	Height	5.25-in, half-height
	Interface Type	ATAPI
	Dimensions – External, Excluding Bezel (W x H)	5.88 x 1.71 in (149.5 x 43.5 mm)
	Disc Diameter	12 cm, 8 cm
	Disc Thickness	1.2 mm
	Track Pitch	1.6 µm (CD), 0.74 µm (DVD)
	Disc Center Hole Diameter	15 mm
	Disc Formats	DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border; DVD+RW; DVD+R, DVD+R DL ; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW

Technical Specifications - Optical Storage

Disc Capacity	DVD-ROM	4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R), 8.5 GB (DVD+R DL)
	CD-ROM	540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm)
Block Size (bytes)	DVD-ROM - 2048; CD-ROM Mode 0 - 2352; CD-ROM Mode 1 - 2352, 2340, 2336, 2048; CD-ROM Mode 2 - 2352, 2340, 2336, 2048	
Access Times (typical reads, including settling)	DVD-ROM Single Layer	120 ms (typical)
	CD-ROM Mode 1	90 ms (typical)
	Full Stroke DVD	240 ms (seek) (typical)
	Full Stroke CD	160 ms (seek) (typical)
Maximum Data Transfer Rates	CD-ROM Read	7200 KB/s (up to 48X)
	DVD-ROM Read	21,600 KB/s (16X) Max
Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s)	
Power	Source	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC \pm 5% – 100 mV ripple p-p 12 VDC \pm 5% – 200 mV ripple p-p
	DC Current	5 VDC – <800 mA typical, < 1000 mA maximum 12 VDC – < 870 mA typical
Audio Output Level	0.7 Vrms (typical)	
Configuration Jumper Block	Master, slave, and cable select modes	
Data Interface Connector	40-pin, shrouded and keyed, flat ribbon	
Environmental (all conditions non-condensing)	Temperature (operating)	41° to 122° F (5° to 50° C)
	Relative Humidity (operating)	10% to 85%
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)
Certifications, Approvals	MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, SEMKO, NEMKO, DEMKO, FIMKO, EN 60825-1, UL 60950, and CSA C22.2 60950-2000.	

48X Combo CD-RW/DVD-ROM

Height	5.25-inch, half-height, tray-load
Orientation	Either horizontal or vertical
Interface Type	ATAPI/EIDE
Dimensions (W x H x D)	5.77 x 1.71 x 7.36 in (14.66 x 4.34 x 18.69 cm) (external, excluding bezel)
Disc diameter	12 cm, 8 cm
Disc thickness	0.05 in (1.2 mm)

Technical Specifications - Optical Storage

Track pitch	1.6 µm (CD), 0.74 µm (DVD)	
Disc center hole diameter	0.6 in (15 mm)	
Reference scanning velocity	1.2 m/s (CD); 3.49 m/s (DVD SL); 3.84 m/s (DVD DL)	
Read only disc parameters	Formats and modes supported	CD-ROM-Mode 1; CD-ROM XA-Mode 2; CD-Bridge; CD digital audio; CD Extra; Photo CD (single and multi-session); video CD; DVD (single- and double-layer); DVD-R; DVD-RW; DVD-RW Multi-Border; DVD+R; DVD+R Multi-Session , and DVD+RW
	Capacity	180 MB (8 cm); 540 MB (12 cm); 650 MB (12 cm); 700 MB (12 cm); 4.7 GB (DVD-5); 8.54 GB (DVD-9); 9.4 GB (DVD-10)
	Block size	Mode 1-2,048 and 2,352 bytes; mode 2, form 1-2,048; 2,328; 2,336; 2,340 and 2,352 bytes; mode 2, form 2-2,328; 2,336; 2,340 and 2,352 bytes; CD-DA-2,352 bytes; DVD-2,048 bytes
Writeable Disc Parameters	Disc type	CD-R and CD-RW
	Write methods	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
	Format and modes supported	CD-ROM; CD-ROM XA; CD digital audio, video CD; CD-Bridge
	Capacity	180 MB (8 cm); 540 MB (12 cm); 650 MB (12 cm); 700 MB (12 cm)
	Block size	CD-DA-2,352 bytes; mode 0- 2,336 and 2,352 bytes; mode 1-2,048 and 2,352 bytes; mode 2-2,336 and 2,352; mode 2, form 1-2,048 and 2,352 bytes; mode 2, form 2-2,324 and 2,352 bytes
Access Times (typical reads, including settling)	Random DVD	< 140 ms (typical)
	Random CD	< 125 ms, (typical)
	Full Stroke DVD	< 250 ms (seek)
	Full Stroke CD	< 210 ms (seek)
Data Transfer Rates	CD-R write	7200 KB/s (up to 48X)
	CD-RW write	4800 KB/s (up to 32X)
	CD-ROM, CD-R, CD-RW read	7200 KB/s (up to 48X)
	DVD ROM read	21,632 KB/s (16X) Max
Data Transfer Modes	ATA PIO mode 4); ATA Multi-word DMA mode 2; ATA UltraDMA mode 0; ATA UltraDMA mode 1, mode 2; ATA UltraDMA Mode 3 (default)	
	Cache buffer	2 MB (minimum)
	Startup time (single)	< 7 seconds (typical)
	Startup time (multi-session)	< 30 seconds (typical)
	Stop time	< 4 seconds

Technical Specifications - Optical Storage

Power	Source	Four-pin, DC power receptacle
	DC power requirement	5 VDC \pm 5%-100 mV ripple p-p 12 VDC \pm 5%-200 mV ripple p-p
	DC current	5 VDC (< 1000 mA typical, < 1600 mA maximum) 12 VDC (< 600 mA typical, < 1400 mA maximum)
	Total drive power (standby mode)	< 2.5 Watt
Audio Output Level		0.7 Vrms (typical)
Configuration Jumper Block		Cable select (default), master and slave modes
Data Interface Connector		40-pin, shrouded and keyed, flat ribbon
Operating Conditions (all conditions non-condensing)	Temperature (operating)	41° to 122° F (5° to 50° C)
	Relative humidity (operating)	10% to 90%
	Maximum wet bulb temperature (operating)	86° F (30° C)
Certifications, Requirements		MPC-3 compliant, multi-read requirements, ACA AS/NZS 3548, ANSI C63.4-1992, ATAPI Spec SFF-8020, ATA Spec X3T9.2, CB Bulletin No. 92A, CSA C22.2 No. 950-1995, C.I.S.P.R. Pub 22, EMKO-TSE 207/94, TUV or VDE EN60 950, EN60825-1, Microsoft PC2001 certification, Microsoft Logo for Windows XP, 2000

16X DVD+/-RW LightScribe Drive (Double Layer/Dual Format)

		5.25-inch, half-height, tray-load
Orientation		Either horizontal or vertical
Interface type		ATAPI/EIDE
Disc recording capacity		8.5 GB DL or 4.7 GB standard
Dimensions (W x H x D)		5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)
Weight (max)		2.6 lb (1.2 kg)
Write speed	DVD+R	Up to 16X
	DVD+RW	Up to 4X
	DVD+R DL	Up to 2.4X
	DVD-R	Up to 8X
	DVD-RW	Up to 4X
	CD-R	Up to 40X
	CD-RW	Up to 24X
Read speed	DVD+R/-R/+RW/-RW/+R DL	Up to 8X
	DVD-ROM	Up to 16X
	CD-ROM, CD-R	Up to 40X
	CD-RW	Up to 32X

Technical Specifications - Optical Storage

Access time (typical reads, including settling)	Random	DVD: < 130 ms (typical), CD: < 120 ms (typical)
	Full Stroke	DVD: < 240 ms (seek), CD: < 200 ms (seek)
	Startup Time	Single-session: < 15 seconds (typical), Multi-session: < 30 seconds (typical)
	Stop Time	< 4 seconds
	Cache Buffer	2 MB (minimum)
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)
	Power	Source
DC Power Requirement		5 VDC \pm 5%-100 mV ripple p-p 12 VDC \pm 5%-200 mV ripple p-p
DC Current		5 VDC (< 1000 mA typical, 1600 mA maximum) 12 VDC (< 600 mA typical, 1400 mA maximum)
Total Drive Power (standby mode)		< 2.5 Watt
Audio output		Line-Out
	Signal-to-Noise Ratio	74 dB
	Channel Separation	65 dB
Environmental conditions (operating - non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative humidity	10% to 90%
	Maximum wet bulb temperature	86° F (30° C)
Regulatory approvals	MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec T13.1153D, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft PC2001 certification, Microsoft Logo for Windows XP and 2000.	

Technical Specifications - Removable Storage

1.44-MB Diskette Drive	Size	3.5 in (8.89 cm)
	LED Indicators (front panel)	Green
	Read/Write Capacity per Diskette (high/low)	1.44 MB/720 KB
	Drive Height	One-third
	Drive Rotation	300 rpm
	Transfer Rate (high/low)	500/250 KB/s
	Bytes/Sector	512
	Sectors/Track (high/low)	18/9
	Tracks/Side (high/low)	80/80
	Access Times	Track-to-Track (high/low) 3/6 ms Average (high/low) 94/173 ms Settling Time 15 ms Latency Average 100 ms
	Cylinders (high/low)	80/80
	Read/Write Heads	Two

Technical Specifications - Environmental Data

Environmental Data	Eco-Label Certifications & declarations	<p>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:</p> <ul style="list-style-type: none">• US Energy Star
	Longevity and Upgrading	<p>This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 15 months after the end of production. Upgradeability features contained in the product include:</p> <ul style="list-style-type: none">• 6 USB ports• 2 external 5.25" drive bays• 2 external 3.5" drive bays• 2 internal 3.5" drive bays• 2 empty standard PCI slots• 1 empty standard PCI-EX1 slot• 4 memory slots• 1 Serial port• 1 Parallel port
	Material Usage	<p>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):</p> <ul style="list-style-type: none">• 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 - Environmental Data

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/recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment: [link to new HP white paper now in progress]

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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