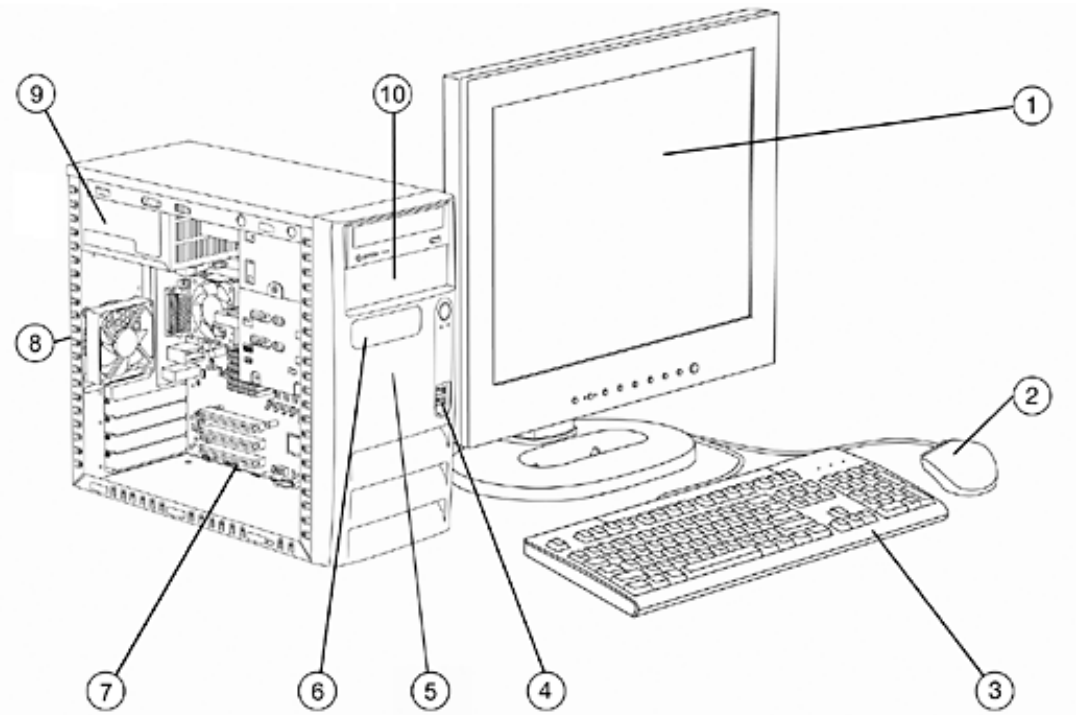
*Overview*

**HP recommends Microsoft® Windows® XP Professional**

**Microtower**

35.5 x 18.0 x 39.6 centimeters / 14.0 x 7.1 x 15.6 inches




1. Monitor (sold separately)
2. 2-Button Scroll Mouse
3. HP 2004 Standard Keyboard
4. 2 USB 2.0
5. 2 internal 3.5" bays
6. 3.5" external bay for optional diskette drive or other 3.5" device
7. 3 full-height PCI slots
8. 4 USB 2.0, 1 serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, audio in/out
9. 250-watt max power supply
10. 2-5.25" external bays for optional optical drives

*Overview*

## At A Glance

- Intel® Pentium® 4 and Celeron® processors
- Choice of operating systems:
  Genuine Microsoft Windows XP Home
  Genuine Microsoft Windows XP Professional
  Mandrake Linux 9.2 (delivered on CDs with system, not pre-installed)
- Intel Extreme Graphics 2
- Integrated Intel PRO/100 Network Connection
- SMART III Ultra ATA Hard Drives
- Choice of optical drives
- DDR SDRAM system memory
- Single or dual channel memory configurations
- Integrated audio, including an internal PC speaker
- Energy Star compliant with energy-saving features
- Protected by HP Services, including a 1-1-1 or 3-1-1 standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

## What's New

- Intel 865GV chipset
- Choice of operating systems:
  Microsoft Windows XP Home
  Microsoft Windows XP Professional
  Mandrake Linux 9.2 (delivered on CDs with system, not pre-installed)
- Integrated Intel PRO/100 Network Connection
- PC3200 (400MHz) DDR SDRAM
- Single or Dual Channel memory configurations
- Intel Extreme Graphics 2

*Available Technology and Features*

**Processors**

**Intel Celeron D Processors:**
Intel Celeron D 320 Processor (2.40-GHz, 256K L2 cache, 533-MHz FSB)
Intel Celeron D 325 Processor (2.53-GHz, 256K L2 cache, 533-MHz FSB)
Intel Celeron D 330 Processor (2.66-GHz, 256K L2 cache, 533-MHz FSB)
Intel Celeron D 335 Processor (2.80-GHz, 256K L2 cache, 533-MHz FSB)
Intel Celeron D 340 Processor (2.93-GHz, 256K L2 cache, 533-MHz FSB)
Intel Celeron D 345 Processor (3.06-GHz, 256K L2 cache, 533-MHz FSB)

**Intel Pentium 4 Processors:**
2.80A-GHz, 1-MB L2 cache, 533-MHz FSB

**Intel Pentium 4 Processors supporting Hyper-Threading Technology:**
2.80E-GHz, 1-MB L2 cache, 800-MHz FSB
3.0E-GHz, 1-MB L2 cache, 800-MHz FSB
3.20E-GHz, 1-MB L2 cache, 800-MHz FSB
3.40E-GHz, 1-MB L2 cache, 800-MHz FSB

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**Operating Systems and Application Software**

Genuine Microsoft Windows XP Home SP2
Genuine Microsoft Windows XP Professional SP2
Mandrake Linux 9.2 (delivered on CDs with system, not pre-installed)

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 2003 (availability varies by region)
Norton Antivirus 2005 with 60 day Live Update Subscription (availability varies by region)

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**Hard Drives**

40GB 5400rpm SMART III Ultra ATA/100
40GB 7200rpm SMART III Ultra ATA/100
80GB 7200rpm SMART III Ultra ATA/100
160GB 7200rpm SMART III Ultra ATA/100

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**System Memory - Single Channel Configurations**

256MB DDR SDRAM PC2700 (333-MHz) non ECC
512MB DDR SDRAM PC2700 (333-MHz) non ECC
256MB DDR SDRAM PC3200 (400-MHz) non ECC
512MB DDR SDRAM PC3200 (400-MHz) non ECC

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*Available Technology and Features*

| | |
|---|---|
| **System Memory - Dual Channel Configurations** | 256MB (2 x 128) DDR SDRAM PC2700 (333-MHz) non ECC<br>512MB (2 x 256) DDR SDRAM PC2700 (333-MHz) non ECC<br>1024MB (2 x 512) DDR SDRAM PC2700 (333-MHz) non ECC<br>256MB (2 x 128) DDR SDRAM PC3200 (400-MHz) non ECC<br>512MB (2 x 256) DDR SDRAM PC3200 (400-MHz) non ECC<br>1024MB (2 x 512) DDR SDRAM PC3200 (400-MHz) non ECC |
| **Removable Storage** | 1.44MB diskette drive<br>256MB USB HP Drive Key II (USB 2.0) |
| **Optical Storage** | CD-ROM drive<br>CD-RW drive<br>DVD-ROM drive<br>Combo drive (CD-RW & DVD-ROM)<br>DVD+/-RW drive |
| **Keyboard** | HP PS/2 2004 Standard Keyboard<br>HP USB 2004 Standard Keyboard |
| **Mouse** | HP PS/2 scroll mouse<br>HP USB optical scroll mouse |
| **Audio** | ADI AD1888 2 channel audio<br>3D audio compliant with AC'97 rev. 2.3<br>Includes internal PC speaker |
| **Communication** | Integrated Intel PRO/100 Network Connection<br>Intel PRO/1000 MT Desktop Adapter (FH PCI NIC)<br>PCI High Speed 56K Win Modem |
| **Graphics** | Intel Extreme Graphics 2 (integrated with the 865GV chipset) |

*System Details*

**Base Unit**

- uATX microtower chassis, including power supply and front bezel; featuring five (5) drive bays and three PCI expansion slots
- Microsoft or Linux operating system CD
- active type heatsink
- 80 x 80 x 25mm chassis fan
- Motherboard with Intel 865GV chipset, Intel PRO/100 integrated network interface, integrated graphics and audio, 3 ea. PCI slots, 4 ea. DDR DIMM slots
- (2) ATA data cables – (3) headed; each cable supports two drives
- product documentation on CD
- HP system restore CD
- power cord

| | | |
|---|---|---|
| **Slots** | PCI 2.3 | Three (3) full-height slots on PCA |
| | Memory Expansion | Four (4) DIMM slots (4.0GB maximum memory support) |
| **Bays** | Internal | Two (2) 3.50" half-height |
| | External | Two (2) 5.25" half-height |
| | | One (1) 3.50" half-height |
| **USB Support** | EHCI high-speed USB 2.0 controller | |
| | Two (2) front ports; Six (6) 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 | |
| **Weight & Dimensions** | Chassis Dimensions | 13.98 x 7.09 x 16.14 in (355 x 180 x 410 mm) (H x W x D) |
| | Packaged Dimensions - Americas | 21.57 x 19.92 x 11.34 in (548 x 506 x 288 mm) (L x W x H) |
| | Packaged Dimensions - Asia | 21.73 x 19.29 x 11.61 in (552 x 490 x 295 mm) (L x W x H) |
| | System Net Weight (not including packaging) | 23.15 lb (10.5 kg) |
| | System Gross Weight (including packaging) | 30.86 lb (14 kg) |

*System Details*

| | | |
|---|---|---|
| **Supported Technology & Features** | Memory Type | • PC2700 DDR SDRAM (333MHz) non-ECC<br>• PC3200 DDR SDRAM (400MHz) non-ECC<br>• Single or dual channel configurations<br>• 4.0GB maximum system memory |
| | Serial Presence Detect Support | Yes |
| | Hard Drive Interfaces Supported | SMART III Ultra ATA/100 |
| | Hard Drive Controller (PCI) Supported | SMART III Ultra ATA/100 |
| **Intel Pentium 4 CPU** | Coprocessor | Integrated |
| | CPU Socket Type/Number | Socket N 478 pin |
| | CPU Package | mPGA 478 |
| | Front Side Bus Speed | 400/533/800MHz |
| | Cache Memory | 512KB/1MB L2 Advanced Transfer Cache |
| **Intel Pentium 4 CPU with HT Technology** | Coprocessor | Integrated |
| | CPU Socket Type/Number | Socket N 478 pin |
| | CPU Package | mPGA 478 |
| | Front Side Bus Speed | 533/800MHz |
| | Cache Memory | 512KB/1MB L2 Advanced Transfer Cache |
| **Intel Celeron D CPU** | Coprocessor | Integrated |
| | CPU Socket Type/Number | Socket N 478 pin |
| | CPU Package | mPGA 478 |
| | Front Side Bus Speed | 533MHz |
| | Cache Memory | 256KB L2 Advanced Transfer Cache |

*System Details*

**Chassis**

| | |
|---|---|
| Front Panel | • Power button<br>• Power On LED<br>• HDD Activity LED |
| Cooling Solutions Supported | • Power Supply Fan (variable speed)<br>• Aluminum active heatsink (variable speed)<br>• Chassis fan (variable speed) |
| Slots Supported | Three (3) full-height, half-length PCI slots |
| Front I/O | Two (2) USB 2.0 ports |
| Rear I/O | Standard uATX I/O connectors, including six (6) USB 2.0 ports |
| Drive Bays | • Two (2) 5-1/4" external<br>• One (1) 3-1/2" external<br>• Two (2) 3-1/2" internal |
| Internal Speaker | yes |
| Power Supply | 250 watt ATX Power Supply – PFC/non-PCF with a 115v/230v line switch (varies by country/region) |

**Unit Environment and Operating Conditions**

General Unit Operating Guidelines

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

| | |
|---|---|
| Temperature Range | Operating: 50° to 95° F (10° to 35° C)* |
| | Non-operating: -22° to 140° F( -30° to 60° C) |
| Relative Humidity | Operating: 10% to 90% (non-condensing at ambient) |
| | Non-operating: 5% to 95% (non-condensing at ambient) |
| Maximum Altitude (unpressurized) | Operating: 10,000 ft (3048 m) |
| | Non-operating: 30,000 ft (9144 m) |

***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.

**Motherboard**

**Socket mPGA478B industry standard uATX form factor**

| | |
|---|---|
| Processor | • Socket 478B; mPGA 478-pin<br>• Support single Intel Pentium 4/Celeron 800/533/400MHz FSB processors |
| PWM | • ON 3 phase power solution<br>• Meet Intel FMB 1.5 spec |
| Chipset | • Intel 865GV<br>• Intel ICH5 |

*System Details*

| | |
|---|---|
| Super I/O | • SMSC LPC47M192 |
| Front Side Bus Frequency | • 400/533/800 MHz |
| Memory | • 4 x DIMM sockets<br>• Support single and dual channel PC3200/PC2700/PC2100 DDR SDRAM<br>• 1st/3rd DIMM sockets in black; 2nd/4th DIMM sockets in blue |
| Clock Generator | • Cypress CY28404/ics ics952617 |
| Integrated Graphics | • Intel Extreme Graphics 2 (integrated on the 865GV chipset) |
| Audio | • ADI AD1888 2 channel audio<br>• 3D audio compliant with AC'97 rev. 2.3 |
| LAN | • Intel 82562EZ 10/100 LAN |
| IDE | • Support all PIO modes<br>• 2 x IDE ports support up to 4 devices<br>• Support Ultra ATA 33/66/100 (IDE1 black, IDE2 white) |
| Expansion Slots | • 3 x PCI slots |
| BIOS | • 4Mbit flash EEPROM<br>• AMI BIOS, PnP, ACPI, SMBIOS 2.3, Boot Block, DMI |
| Manageability | • WfM 2.0, DMI 2.0, SMBus |
| Industrial Standard | • PCI 2.3 compliant<br>• USB 2.0 |
| Rear Side I/O Ports | • 1 x PS/2 keyboard port<br>• 1 x PS/2 mouse port<br>• 4 x USB 2.0 ports<br>• 1 x RJ-45 10/100 port<br>• 1 x serial port<br>• 1 x parallel port<br>• 1 x DB 15 pin analog VGA port<br>• 3 x audio ports |
| On Board I/O Interfaces | • 1 x ATX power connector<br>• 1 x +12V power connector<br>• 1 x Floppy connector<br>• 1 x Front panel connector, Switch, LED (ON/Flash/OFF)<br>• 2 x Fan headers for CPU, chassis, with voltage/fan speed control<br>• 1 x ATAPI headers-CD IN/AUX IN<br>• 1 x header to support 2 USB 2.0 ports at front side<br>• 1 x MONO-OUT header with amplifier |
| Board Size | • uATX form factor 245mm x 245mm<br>• 4-layer PCB with green color |
| Additional Features | • Bootable without keyboard, mouse or monitor<br>• Keyboard/mouse/USB wake up<br>• Support S1, S3, S4 and S5<br>• ACPI status<br>• Hardware monitor capability<br>• CPU fan speed control |

*System Details*

**Integrated Intel PRO/100 Network Connection**

| | | |
|---|---|---|
| **Network Interface** | **Hardware Highlights** | • 82562EZ Platform LAN Connect device<br>• IEEE 802.3 10BASE-T compliant physical layer interface<br>• IEEE 802.3u Auto-Negotiation and 100BASE-TX support<br>• Digital adaptive equalization control<br>• Link status interrupt capability<br>• XOR Tree mode support for board testing<br>• 3-port LED support (speed, link and activity)<br>• 10BASE-T auto-polarity correction<br>• Diagnostic loopback mode<br>• 1:1 transmit transformer ratio support<br>• Low power (300 mW) typical in active transmit mode<br>• Reduced power(less than 50 mW) in "unplugged mode"<br>• Automatic detection of "unplugged mode"<br>• 3.3V device<br>• Platform LAN connect interface support |
| | **Features** | • 3-port LED support (speed, link, and activity)<br>• WfM Baseline and NetPC Specification compliant<br>• ACPI support<br>• Magic Packet filtering for Wake on LAN support<br>• ARP and flexible frame support<br>• Automatic detection of "unplugged mode"<br>• Low power (less than 300 mW in active transmit mode)<br>• Platform LAN connect interface support<br>• Low power 3.3 V device |

**Power Supply**

- ATX Power Supply – PFC/non-PFC with a 115v/230v line switch
- Passive Power Factor Correction (PFC) – with line switch set to 230V – No PFC in 115V line switch position
- 90 to 132VAC, or 180 to 264VAC operating voltage range
- 100 to 127 VAC, or 200 to 240VAC rated voltage range
- 50-60 Hz rated line frequency
- 47-63 Hz operating line frequency range
- 250 watt maximum rated power
- 80-mm power supply fan – variable speed for optimum acoustics

**Power Conservation 'Energy Saver'**

- Energy Star compliant
- APM 1.2 support
- Screen blanking
- Hard drive 'Idle' mode
- System Idle mode
- Blue Angel compliant (<5w in S5 – power off)
- ~2 watt power consumption in ES mode – suspend to RAM (S3) (instantly available PC)
- 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** | **Operating** | 50° to 95°F (10° to 35°C) at sea level with an |

*System Details*

| | | |
|---|---|---|
| **Temperature** | | altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 10,000 ft (3000 m), no direct sustained sunlight. Maximum rate of change is 10°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: 20°C/Hr. |
| **Humidity** | **Operating** | 10% to 90% relative humidity (Rh), 30°C maximum wet bulb temperature, non-condensing |
| | **Storage** | 5% to 95% relative humidity (Rh), 38.7°C maximum wet bulb temperature, non-condensing |
| **Altitude** | **Operating** | 0 to 10,000 feet (0 to 3048 m) – This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1500 ft/min. |
| | **Non-Operating** | 0 to 30,000 feet – Maximum allowable altitude change rate is 1500 ft/min. |
| **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** | 80G's (Half-sine Shock)<br>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@0.0001$G^2$/Hz, 10Hz@0.0005G2/Hz, 100Hz@0.0005$G^2$/Hz, 300Hz@0.00001$G^2$/Hz<br>5Hz to 300Hz, (0.25G's nominal). |
| | **Non-Operating** | Random vibration at 0.008$G^2$/Hz,<br>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 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,<br>Desktop Average LpAm = 32 dBA |
| | **FIXED DISK** (Random write) | LWAd = 5.0 Bels,<br>Desktop Average LpAm = 40 dBA |
| | **CD-ROM** (Sequential Reads) | LWAd = 5.4 Bels,<br>Deskside Average LpAm = 44 dBA |

*System Details*

**Service and Support**

On-site Warranty[Note 1]: This 1-1-1 or 3-1-1 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.

**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*

| | | |
|---|---|---|
| **Communications** | Agere PCI High Speed 56K Worldwide Controllerless WinModem<br>**NOTE:** Does not support Philippines, India, Malaysia, Russia, Slovakia, Morocco. | DC131B#xxx |
| | RJ11 Modem Adapter Kit (for use with DC131B) | DC131C |
| | Intel Pro/1000 MT Desktop Adapter 10/100/1000 Network Adapter | DC193A |
| | HP Wireless A+G PCI Adapter (North America only) | EA118AA |
| | HP Wireless A+G PCI Adapter (WW except North America) | PZ928AA |
| | HP BT450 USB Bluetooth Wireless Printer and PC Adapter | IPQ639A |
| **Hard Disk Drives** | ***SMART III Ultra ATA/100 Hard Drive*** | |
| | 40-GB 7200 rpm SMART III Ultra ATA/100 Hard Drive with DPS | DC180A |
| | 80-GB 7200 rpm SMART III Ultra ATA/100 Hard Drive with DPS | DC181A |
| **Removable Storage Devices** | ***Diskette Drive*** | |
| | 1.44 MB Diskette Drive (external) | DC141B |
| | ***USB Drive Key*** | |
| | 256-MB HP Drive Key II (USB 2.0) | PH657A |
| **Input Devices** | ***Keyboards*** | |
| | HP 04 Standard Keyboard – PS/2 | DT527A#xxx |
| | ***Mice*** | |
| | HP PS/2 2-Button Scroll Mouse | DD440B |
| | HP USB 2-Button Optical Scroll Mouse | DC172B |
| **Memory** | ***PC2700 (333MHz) DDR SDRAM non-ECC*** | |
| | 128-MB DDR SDRAM PC2700 (333-MHz) non-ECC | DC338A |
| | 256-MB DDR SDRAM PC2700 (333-MHz) non-ECC | DC339A |
| | 512-MB DDR SDRAM PC2700 (333-MHz) non-ECC | DC340A |
| | ***PC3200 (400MHz) DDR SDRAM non-ECC*** | |
| | 128-MB DDR SDRAM PC3200 (400-MHz) non-ECC | DE465A |
| | 256-MB DDR SDRAM PC3200 (400-MHz) non-ECC | DE466A |
| | 512-MB DDR SDRAM PC3200 (400-MHz) non-ECC | DE467A |
| **Audio** | HP Satellite Speakers | ZD929AA#xxx |

*After-Market Options*

| | | |
|---|---|---|
| **Optical Drives** | 48X Max CD-ROM Drive | DC143B |
| | 48X/32X/48X CD-RW Drive | DL975B |
| | 48X/32X Combo Drive CD-RW & DVD-ROM | DL976B |
| | 16X/40X DVD-ROM Drive | DC151B |
| | 16X DVD+/-RW Drive (Dual Format, Double Layer, LightScribe) | PR595A |
| **Monitors** | **Essential Series** | |
| | HP s9500 CRT Monitor (19") | P9010A#ABA |
| | HP L1506 15-inch LCD Monitor | PX848AA#ABA |
| | HP L1706 17-inch LCD Monitor | PX849AA#ABA |

*Memory*

**865GV chipset**

**DDR SYNCH DRAM NON-ECC MEMORY**

It is not necessary to add memory in pairs. 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. The HP Compaq dx2000 supports non-ECC 333MHz (PC2700) and 400MHz (PC3200) DDR memory.

For best performance, add in pairs, add in different channel in matching slots (color coded), and do not mix speeds.

**MAXIMUM MEMORY**

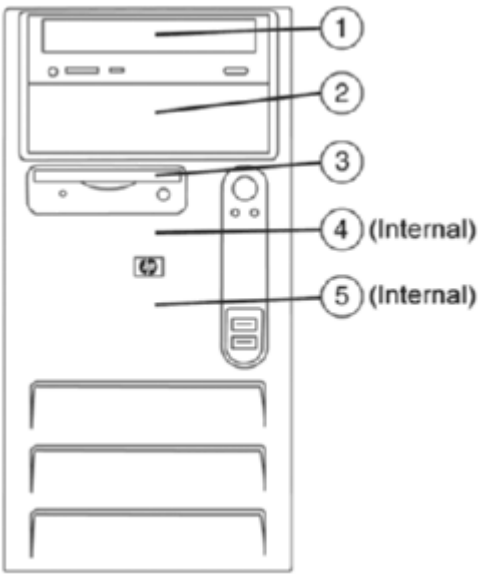
Supports up to 4-GB of DDR SYNCH DRAM.

**POSSIBLE MEMORY CONFIGURATIONS**

NOT ALL MEMORY CONFIGURATIONS POSSIBLE ARE REPRESENTED BELOW

| DIMM Size | Slot | | | |
|---|---|---|---|---|
| | Channel A | | Channel B | |
| | 1 | 2 | 3 | 4 |
| 128-MB | 128-MB | | | |
| 256-MB | 128-MB * | | 128-MB * | |
| 512-MB | 512-MB | | | |
| 512-MB | 256-MB * | | 256-MB * | |
| 1-GB | 512-MB * | | 512-MB * | |
| 2-GB | 512-MB * | 512-MB * | 512-MB * | 512-MB * |
| *** HP recommends dual channel configurations for maximum performance** | | | | |

*Storage*




## HP Compaq Business Desktop dx2000

| | Maximum Quantity Supported | Position Supported | Controller |
|---|---|---|---|
| **Drive Support** | | | |
| Diskette Drives | 1 | 3 | ICH5 |
| CD-ROM Drives | 2 | 1, 2 | IDE ATAPI |
| DVD-ROM Drives | 2 | 1, 2 | IDE ATAPI |
| CD-RW/Combo Drives | 2 | 1, 2 | IDE ATAPI |
| DVD+/-RW Drives | 2 | 1, 2 | IDE ATAPI |
| Ultra ATA/100 Hard Drives | 2 | 4, 5 | Ultra ATA/100 |

*Technical Specifications - Audio*

| | | | |
|---|---|---|---|
| **Integrated ADI AD1888 Audio** | **Type** | Integrated | |
| | **AC '97 Stereo Codec** | Yes | |
| | **OPL3 FM Synthesis Support** | Yes | |
| | **Sound Blaster Compatibility** | Yes | |
| | **Audio Jacks** | Mic-In (20-K ohm Input Impedance)<br>Line-In (12-K ohm Input Impedance)<br>Line-Out * (less than 800 ohms Output Impedance, expects at least a 10-K ohm load)<br>Headphone-Out (2.5 Ohms Output Impedance, expects at least a 32 ohm load) | |
| | **NOTE:** *Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally. | | |
| | **Sampling** | 7KHz-48KHz | |
| | **Compression** | ADPCM, ESPCM | |
| | **Wavetable Syntheses** (software) | Yes | |
| | **3D Positional Sound** | No | |
| | **Analog Audio** | **Number of Channels on Line-Out** (mono/stereo) | Stereo (Left & Right channels) |
| | | **Internal Audio Speaker Power Rating** | 3W |
| | | **Internal Tuned Port Speaker** | Yes |
| | | **External Speaker Jack** (Line-Out) | Yes |

| | | |
|---|---|---|
| **PCI High Speed 56K Worldwide Controllerless WinModem** | **Data Transmission** | High speed 56K modem technology speeds: 56,000 Kbps maximum downstream data, controllerless<br>**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 high speed 56K modem, ITU-T, V.34bis, V.22bis, V.22bis, V.21, V.23, 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** | Group3 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2, Class 1 |
| | **Error Correction and Data Compression** | V.44 (software upgradeable), 4.2bis, V.42 and MNP2-5 |
| | **Power Management** | APM and ACPI states D0, D1, D2, and D3; meets PCI 2.2 requirements and PC'99 requirements |
| | **Upgradeability** | Software driver upgradeable for high speed 56K modem and future enhancements |
| | **Video** | ITU-T V.80 video ready interface |
| | **Other** | TIA/EIA 602 standard AT command set<br>ntegrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface<br>Optional ring wakeup signal |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) |
| | **Operating Humidity** | 20% to 90%, non-condensing |
| | **Operating System Support** | Microsoft® Windows® 95 and 98, Microsoft Windows 98 SE, Microsoft Windows 2000, Microsoft Windows Me, Microsoft Windows NT® 4.0, and Microsoft Windows XP |
| | **OS Driver Support** | Microsoft Windows 95 and98, Microsoft Windows 98 SE , Microsoft Windows 2000, Microsoft Windows Me, Microsoft Windows NT 4.0, Microsoft Windows XP |
| | **Power** | Requires a 3.3-V auxiliary power rail on PCI bus<br>Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load |
| | **Chipset** | Agere Systems 1648C (Mars 3.2) - 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** | Dual, parallel RJ-11 support with auxiliary Tip/Ring connector |
| | **Other Features** | Digital line protection, call progress monitoring via on-board piezo device, transformer-based DAA design, support for high profile and low profile brackets, PnP ID supports via external EEPROM |
| | **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 |

*Technical Specifications - Communications*

| | | |
|---|---|---|
| | **Telecom** | FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals<br>Not available in India, Russia, Slovakia, Slovenia, Belarus, Brunei, Croatia, Ecuador, Latvia, Lithuania, Morocco, Peru, Phillipines, Sri Lanka, Ukraine, Malaysia (use DC132B or DC132C instead) |
| | **Health** | Bare PCB material compliant to 94V-0 or better (marked as such), Microsoft Windows Me health compliant |
| | **Other** | PC'99 compliant, PCI version 2.2, WHQL approved; support for ACPI revision 1.1<br>DC131C #xxx: RJ11 modem adapter kit for use with DC131B, DC132B and DC132C<br>#ACP: Austria, #ABW: Belgium, #AKB: Czech Republic, #ABU: UK & former colonies, #ABD: Germany, #ABF: France, #AB7: Greece, #AKC: Hungary, #ABT; Israel, #ABZ: Italy, #ABH: Netherlands, #UUW: Nordic countries, #UUZ: Switzerland, #AB8: Turkey, #ABG: Australia, #ACJ: India |
| **Intel Pro 1000 MT NIC** | **Connector** | RJ-45 |
| | **Controller** | Intel 82540EM Gigabit Controller |
| | **Memory** | Integrated 96Kb frame buffer memory |
| | **Data rates supported** | 10/100/1000 Mbps |
| | **Compliance** | IEEE 802.1A, 802.1P, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | **Bus architecture** | PCI 2.2 |
| | **Data path width** | 32-bit, 33/66 MHz bus 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** | 1.48 watts @ +3.3V AUX supply with 5V tolerance |
| | **Boot ROM support** | Yes |
| | **Network transfer rate** | 10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps<br>100BASE-TX (half-duplex) 100 Mbps<br>100BASE-TX (full-duplex) 200 Mbps<br>1000BASE-T, 1000 Mbps |
| | **Environmental** | **Operating temperature** 32° to 131°F (0° to 55° C)<br>**Operating humidity** 85% at 131° F (55° C) |
| | **Dimensions** | 6.4 x 4.8 x 0.8 inches (16.3 x 12.1 x 1.9 cm) |
| | **Operating system driver support** | Microsoft Windows NT 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP, Linux 2.2, Linux 2.4 |
| | **Management capabilities** | ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Intel PROset II utility |

| | | |
|---|---|---|
| **Integrated Intel Extreme Graphics 2** | **3D/2D Controller** | Support is fully compliant with Microsoft standard API such as Direct Draw, GDI/GDI+ and Direct Show |
| | **VGA Controller** | Integrated |
| | **Bus Type** | none |
| | **RAMDAC** | Integrated 350-MHz DAC |
| | **Memory** | Graphics memory is shared with system memory. Graphics memory usage can vary from 8 – 64MB depending on the amount of system memory installed and system load. 16MB 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. With a 128MB system, graphics memory usage will be 8MB – 32MB depending on system load. With 256MB or more, graphics memory usage will be 8MB – 64MB depending on system load. |
| | **Controller Clock Speed** | 266 MHz |
| | **Overlay Planes** | Single Overlay support with 5x3 filtering |
| | **Max Color Depth** | 32-bits/pixel |
| | **Maximum Vertical Refresh Rate** | 85Hz at up to 1920 x 1440, 75Hz at 2048 x 1536. Varies with mode and configuration. See table below |
| | **Multi-display Support** | Support for one CRT via the motherboard's VGA connector. |
| | **Graphics API Support** | Complete Microsoft DirectX® support, including DirectX 8.1; complete OpenGL® 1.3 support. Compatible with DirectX 9. |

**Resolutions Supported** (At various color depths & memory configurations) (**NOTE:** Refresh rates higher than 85Hz may be obtainable in some modes and configurations but are not recommended.)

| **Resolution** | **Maximum Refresh Rate** (Hz) **DR266 Single Channel** (8/16/32 bits/pixel) | **Maximum Refresh Rate** (Hz) **DDR 266 Dual/DDR 333 Single Channel** (8/16/32 bits/pixel) | **Maximum Refresh Rate** (Hz) **DDR 333 Dual Channel** (8/16/32 bits/pixel) |
|---|---|---|---|
| 640 x 480 | 85/85/85 | 85/85/85 | 85/85/85 |
| 800 x 600 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1024 x 768 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1152 x 864 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1280 x 720 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1280 x768 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1280 x 960 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1280 x 1024 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1400 x 1050 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1600 x 900 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1600 x 1200 | 85/85/85 | 85/85/85 | 85/85/85 |
| 1856 x 1392 | 75/75/60 | 75/75/60 | 75/75/60 |
| 1920 x 1080 | 85/85/75 | 85/85/85 | 85/85/85 |
| 1920 x 1200 | 75/75/60 | 75/75/75 | 75/75/75 |
| 1920 x 1440 | 85/85/60 | 85/85/60 | 85/85/60 |
| 2048 x 1536 | 75/75/NA | 75/75/NA | 75/75/60 |

*Technical Specifications - Input/Output Devices*

| | | | |
|---|---|---|---|
| **HP 2004 Standard Keyboard** (PS/2 or USB) | **Physical characteristics** | **Keys** | 104, 105, 106, 107, 109 layout (depending upon country) |
| | | **Dimensions** (L x W x H) | 18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm) |
| | | **Weight** | 2 lb (0.9 kg) minimum |
| | **Electrical** | **Operating voltage** | + 5VDC ± 5% |
| | | **Power consumption** | 50-mA maximum (with three LEDs ON) |
| | | **System interface** | PS/2 mini-din connector<br>or<br>USB Type A plug connector |
| | | **ESD** | CE level 4, 15-kV air discharge |
| | | **EMI - RFI** | Conforms to FCC rules for a Class B computing device |
| | | **Microsoft PC 99 - 2001** | Functionally compliant |
| | **Mechanical** | **Languages** | 38 available |
| | | **Keycaps** | Low-profile design |
| | | **Switch actuation** | 55-g nominal peak force with tactile feedback |
| | | **Switch life** | 20 million keystrokes (using Hasco modified tester) |
| | | **Switch type** | Contamination-resistant switch membrane |
| | | **Key-leveling mechanisms** | For all double-wide and greater-length keys |
| | | **Cable length** | 6 ft (1.8 m) |
| | | **Microsoft PC 99 - 2001** | Mechanically compliant |
| | | **Acoustics** | 43-dBA maximum sound pressure level |
| | **Environmental** | **Operating temperature** | 50° to 122° F (10° to 50° C) |
| | | **Non-operating temperature** | -22° to 140° F (-30° to 60° C) |
| | | **Operating humidity** | 10% to 90% (non-condensing at ambient) |
| | | **Non-operating humidity** | 20% to 80% (non-condensing at ambient) |
| | | **Operating shock** | 40 g, six surfaces |
| | | **Non-operating shock** | 80 g, six surfaces |
| | | **Operating vibration** | 2-g peak acceleration |
| | | **Non-operating vibration** | 4-g peak acceleration |
| | | **Drop** (out of box) | 26 in (66 cm) on carpet, six-drop sequence |
| | | **Drop** (in box) | 42 in (107 cm) on concrete, 16-drop sequence |
| | **Operating system support** | Windows 2000 and Windows XP | |
| | **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<br>or<br>USB Type-A plug connector |
| | | **ESD** | CE level 4, 15 kV air discharge |
| | | **EMI-RFI** | Conforms to FCC rules for a Class B computing device |
| | | **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) |
| | | **Cable Length** | 2 m |
| | | **PC98-99** | Mechanically compliant |
| | **Regulatory Approvals** | UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick | |

*Technical Specifications - Hard Drives*

| | | | | |
|---|---|---|---|---|
| **5400 rpm SMART III Ultra ATA/100 Hard Drives** | **40-GB** | **Capacity** | 40 GB | |
| | | **Dimensions** (H x W) | 1.0 x 3.5 in (2.5 x 8.9 cm) | |
| | | **Interface** | Ultra ATA/100 | |
| | | **Transfer Rate Synchronous** (Maximum) | 100 MB/s | |
| | | **Seek Time** (typical reads, including settling) | Single Track | 1.2 ms |
| | | | Average | 8 ms |
| | | | Full-Stroke | 18 ms |
| | | **Rotational Speed** | 5400 rpm | |
| | | **Logical Blocks** | 78,165,360 | |
| | | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **7200 rpm SMART III Ultra ATA/100 Hard Drives** | **40-GB** | **Capacity** | 40 GB | |
| | | **Dimensions** (H x W) | 1.0 x 3.5 in (2.5 x 8.9 cm) | |
| | | **Interface** | Ultra ATA/100 | |
| | | **Transfer Rate Synchronous** (Maximum) | 100 MB/s | |
| | | **Seek Time** (typical reads, including settling) | Single Track | 0.8 ms |
| | | | Average | 9 ms |
| | | | Full-Stroke | 17 ms |
| | | **Rotational Speed** | 7200 rpm | |
| | | **Logical Blocks** | 78,140,160 | |
| | | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| | **80-GB** | **Capacity** | 80 GB | |
| | | **Dimensions** (H x W) | 1.0 x 3.5 in (2.5 x 8.9 cm) | |
| | | **Interface** | Ultra ATA/100 | |
| | | **Transfer Rate Synchronous** (Maximum) | 100 MB/s | |
| | | **Seek Time** (typical reads, including settling) | Single Track | 0.8 ms |
| | | | Average | 9.0 ms |
| | | | Full-Stroke | 17.0 ms |
| | | **Rotational Speed** | 7200 rpm | |
| | | **Logical Blocks** | 156,301,488 | |
| | | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| | **160-GB** | **Capacity** | 160 GB | |
| | | **Dimensions** (H x W) | 1.0 x 3.5 in (2.5 x 8.9 cm) | |
| | | **Interface** | Ultra ATA/100 | |

*Technical Specifications - Hard Drives*

| | | |
|---|---|---|
| **Transfer Rate Synchronous** (Maximum) | 100 MB/s | |
| **Seek Time** (typical reads, including settling) | Single Track | 0.8 ms |
| | Average | 9.0 ms |
| | Full-Stroke | 17.0 ms |
| **Rotational Speed** | 7200 rpm | |
| **Logical Blocks** | 78,140,160 | |
| **Operating Temperature** | 41° to 131° F (5° to 55° C) | |

*Technical Specifications - Optical Storage*

| | | |
|---|---|---|
| **48X Max CD-ROM Drive** | **Interface** | ATAPI IDE |
| | **Data Buffer** | 16.6 Mbps |
| | **Data Transfer Rate** | Sustained – 1200 Kbps minimum (audio)<br>Variable (CD) – 3,000 to 7,200 Kbps |
| | **Disk Rotation Technology** | CAV (Constant Angular Velocity) |
| | **Access Time** (ms) | Random: <100 ms<br>Full-stroke seek: <150 ms |
| | **Average Access Time** | < 80 ms |
| | **Cache Buffer** (standard/maximum) | 128 KB |
| | **Disk Formats Read** | Multi-session Photo CD, multi-read CD-ROM, CD text, audio CD, CD-I, CD-RW, CD-R, CD-Extra, CD-ROM XA |
| | **Disk Formats Written** | None |
| | **Disk Capacity** (CD) | 650 MB |
| | **Block Size** | Mode 1 – 2,048, 2,352 bytes<br>Mode 2 – 1, 2,088, 2,328, 2,336, 2,340, 2,353 bytes<br>Mode 2 – 2, 2,328, 2,336, 2,340, 2,352 bytes<br>CD-DA – 2,352, 2,368 bytes |
| | **Diameter** | 12 cm; 8 cm |
| | **Thickness** | 1.2 mm |
| | **Track Pitch** | 1.6 µm |
| | **Audio Output Level** | Line-out – 0.7 V @ 47 Kohm<br>Headphone – 0.6 V @ 32 ohm |
| | **Startup Time** | <7 seconds (typical); < 30 seconds with multi-session |
| | **Operating Conditions** | **Temperature** 41° to 120° F (5° to 50° C)<br>**Relative Humidity** 10% to 90% |
| | **Dimensions** (H x W x D, maximum) | 1.7 x 5.9 x 8.0 in (4.3 x 15.0 x 20.3 cm) |
| | **Weight** | 2.6 lb (1200 g) |
| | **MPEG Playback Graphics Solution Support** | None |

| | | |
|---|---|---|
| **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 (203 x 149.5 x 43.5 mm) |
| | **Weight** | 2.6 lb (1.2 kg) |
| | **Disc Diameter** | 12 cm, 8 cm |
| | **Disc Thickness** | 1.2 mm |
| | **Track Pitch** | 1.6 m µm |

*Technical Specifications - Optical Storage*

| | | |
|---|---|---|
| **Disc Center Hole Diameter** | 15 mm | |
| **Reference Scanning Velocity** | 1.2 m/s | |
| **Recording/Playing Time** | 80 minutes with CD-R media | |
| **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 |
| **Maximum Data Transfer Rates** | **CD-RW Write** | 4800 KB/s (32X) Max |
| | **CD-ROM, CD-R read** | 7200 KB/s (48X) Max |
| | **CD-RW read** | 7200 KB/s (32X) Max |
| | **CD-R write** | 7200 KB/s (48X) Max |
| **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 | |
| **Power** | **Source** | Four-pin, DC power receptacle |
| | **DC power requirement** | 5 VDC ± 5%—100 mV ripple p-p<br>12 VDC ± 5%—200 mV ripple p-p |

| | | | |
|---|---|---|---|
| | **DC current** | 5 VCD | < 1A (typical)<br>< 1600 mA (maximum) |
| | | 12 VCD | < 600 mA (typical)<br>< 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) | Operating 41° to 122° F (5° to 50° C) | |
| | **Relative Humidity** (operating) | 10% to 90% | |
| | **Maximum Wet Bulb** Temperature (operating) | 84° F (29° C) | |

| | | | |
|---|---|---|---|
| **16X/40X DVD-ROM** | **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 ; 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 | |
| | **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), 4.7 GB (DVD+R) |
| | | **CD-ROM** | 40 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) |

*Technical Specifications - Optical Storage*

| | | |
|---|---|---|
| **Maximum Data Transfer Rates** | **CD-ROM Read** | 6000 KB/s (40X) Max |
| | **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 ± 5% – 100 mV ripple p-p |
| | | 12 VDC ± 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 90% |
| | **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. | |
| **Operating Systems Supported** | Microsoft Windows 2000, Windows XP Professional, Windows XP Home | |
| **Kit Contents** | 16X/40X DVD-ROM Drive, Roxio CinePlayer software, and installation guide. | |

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| | | |
|---|---|---|
| **48X/32X/48X/16X Combo CD-RW/DVD-ROM** | 5.25-inch, half-height, tray | |
| | **Color** | Carbonite |
| | **Orientation** | Either horizontal or vertical |
| | **Interface Type** | ATAPI |
| | **Dimensions** (W x H x D) | 5.77 x 1.71 x 7.36 in (146.5 x 43.5 x 187 mm) (external, excluding bezel) |
| | **Disc Diameter** | 12 cm, 8 cm |
| | **Disc Thickness** | 0.05 in (1.2 mm) |
| | **Track Pitch** | 1.6 um (CD), 0.74 um (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 (forms 1 and 2); CD-Bridge; 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; 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 (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (Mode 2, 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 (mode 1); CD-ROM XA (mode 2, forms 1 and 2); CD digital audio, CD-I (mode 2, forms 1 and 2); video CD; CD-Bridge; Video CD |
| | **Capacity** | 180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (mode 2, 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) |
| **Maximum Data Transfer Rates** | **CD-R write** | 7200 KB/s (48X) Max |
| | **CD-RW write** | 1500 KB/s (10X) Max |
| | **CD-ROM, CD-R, CD-RW read** | 7200 KB/s (48X) Max |
| | **DVD ROM read** | 21,632 KB/s (16X ) Max |
| | **DVD RW** | |
| **Data Transfer Modes** | ATA PIO mode 4 (16.7 MB/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), mode 2 (33 MB/s); ATA UltraDMA Mode 3 44 Mbytes/s (default) | |
| | **Cache Buffer** | 2 MB (minimum) |
| | **Startup Time** (single) | < 7 seconds (typical) |
| | **Startup Time** (multi-session) | < 30 seconds (typical) |
| | **Stop Time** | < 4 seconds |
| **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 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** | 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 90% |
| | | **Maximum Wet Bulb Temperature** (operating) | 86° F (30° C) |
| | **Certifications, Approvals** | 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, and NT4 | |
| | **Operating Systems Supported** | Microsoft Windows 2000, Windows XP Professional, Windows XP Home | |
| **16X DVD+/-RW Drive** | **Height** | 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 |
| | **Reads** | DVD+R/-R/+RW/-RW | Up to 16X |
| | | DVD-ROM | Up to 16X |
| | | CD-R/RW | Up to 40X |
| | **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) |

*Technical Specifications - Optical Storage*

| | | |
|---|---|---|
| | **Startup Time** | Single-session: < 7 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** | 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 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** | 0.7 VRMS |
| | **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) |
| **System configuration** | Intel Pentium III Processor or later with 128 MB of memory (required); 256 MB recommended 2-D or 3-D graphics cards on primary disk drive for operating system and application software; second disk drive for audio and video data | |
| **Operating systems support** | Microsoft Windows 2000 and Windows XP | |
| **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. | |
| **Option kit contents** | 16X DVD+/-RW drive, Roxio DigitalMedia Plus, Dantz Retrospect Express Backup Software, installation guide, and DVD+R media. | |

*Technical Specifications - Removable Storage*

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|---|---|---|---|
| **1.44-MB Diskette Drive** | **Dimensions** (HxWxD) | 0.7 x 4.0 x 5.5 in (17.8 x 101.6 x 139.7 mm) | |
| | **Weight** | 0.56 lb (255 g) | |
| | **Disk Used** | High density (2HD) | |
| | **Maximum Data Transfer Rate** | 500-Kbps internal FDD | |
| | **Cable Length** | 12.9 in (33 cm) | |
| | **Disk Rotational Speed** | 300 rpm | |
| | **Required Power** | Supplied from a USB port | |
| | **Operating Position** | Horizontal only | |
| | **Recording Method** | MFM (modified frequency modulation) | |
| | **Signal Interface** | USB Specification version 1.1 | |
| | **Ambient Temperature** | **Operating Storage** | 39° to 125° F (4° to 51.7° C) |
| | | | -8° to 140° F (-22° to 60° C) |
| | **Temperature Gradient** | **Operating Storage** | 36° F (20° C) or less per hour (no condensation) |
| | | | 54° F (30° C) or less per hour (no condensation) |
| | **Relative Humidity** | **Operating** | 20 to 80% (no condensation)-maximum wet bulb temperature of 85° F (29.4° C) |
| | | **Storage** | 5 to 90% (no condensation)-maximum wet bulb temperature of 104° F (40° C) |
| | | **Suspend** | Initiates when continuously idle for 3.0 ms or more on the bus line |
| | | **Resume** | Initiates when signal other than idle state is detected on the bus line |
| | **Safety Standards** | UL and CSA | |

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|---|---|---|---|
| **HP Drive Key II** | **Dimensions** (HxWxD) | 0.32 x 0.63 x 2.67 in (0.8 x 1.6 x 6.8 cm) | |
| | **Storage Capacity** | 256 MB | |
| | **Weight** | 0.05 lb (0.02 kg) | |
| | **Transfer Rates** | Read | Capable of 6.0 MB/s sustained read speed in USB 2.0 system |
| | | Write | Capable of 6.0 MB/s sustained write speed in USB 2.0 system |
| | **Operating Temperature** | 41° to 122° F (5° to 50° C) | |
| | **Non-operating Temperature** | -22° to 140° F (-30° to 60° C) | |
| | **Operating System Support** | Microsoft Windows 2000, Windows XP Professional, Windows XP Home. No driver is required for this device. Native support is provided by the operating system. | |
| | **Option Kit Contents** | HP Drive Key II, documentation | |

*Technical Specifications - Removable Storage*

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