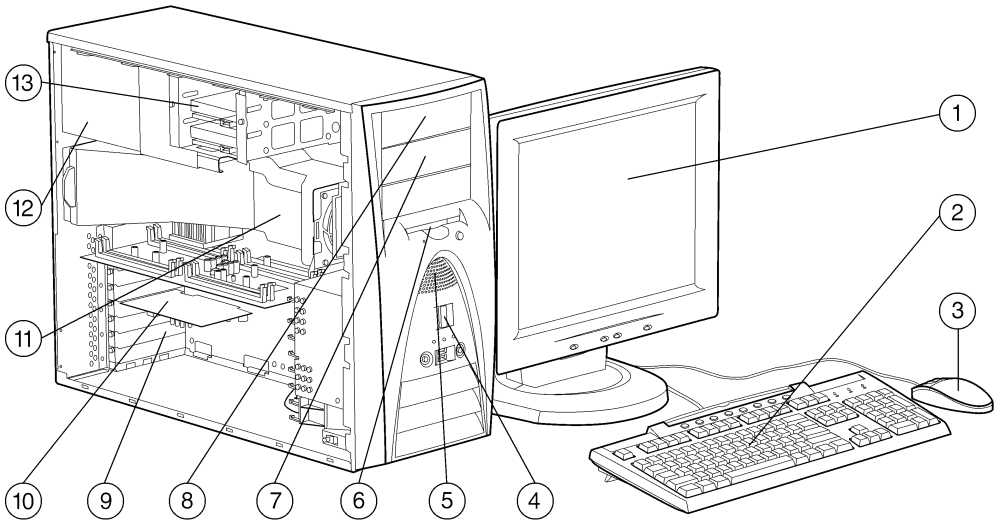
Overview

At A Glance

- Minitower form factor for increased expandability
- Supports up to two Intel® Xeon® processors, up to 2.8-GHz (depending on the model)
- Intel 860 chipset with 400-MHz front side bus, dual memory channels, dual-peer PCI buses, and 64-bit/66-MHz PCI
- 512-KB L2 cache integrated on processor
- ECC RDRAM expandable to 4-GB
- High-performance Ultra160 SCSI 10,000 rpm or 15,000 rpm hard drives or Ultra ATA/100 7200 rpm hard drives
- Integrated dual channel Ultra160 SCSI and Ultra ATA/100 controllers
- Up to 360GB of high-performance internal storage
- Choice of Wildcat III 6110, ATI Fire GL 8800, NVIDIA® Quadro2 EX, NVIDIA Quadro4 200 NVS, NVIDIA Quadro4 400 NVS, NVIDIA Quadro4 550 XGL, NVIDIA Quadro4 750 XGL, NVIDIA Quadro4 900 XGL, Matrox® Millennium® G450 dual, Matrox Millennium G550 or Matrox Millennium G200 Quad MMS graphics controllers
- Multiple display support
- Integrated Intel PRO/100+ Management Adapter
- Seven total slots (two 64-bit/66-MHz PCI, four 32-bit/33-MHz PCI, one AGP Pro 4X)
- Seven bays (four internal and three external)
- CD-ROM, DVD-ROM, DVD+RW, CD-RW drive, or combo drive (depending on model)
- SoundBlaster 128 Audio with support for digital output
- Windows® XP® Professional, or Windows 2000® Professional and Compaq support software pre-installed
- Protected by Compaq Services, including a three-year, limited warranty — certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details. Three-year onsite and labor not available in all countries.



1. Compaq Monitor (optional)
2. Compaq Keyboard
3. 3-Button Mouse
4. On-Off Button
5. Speaker
6. 1.44-MB Diskette Drive
7. 5.25-inch Drive Bays (available)
8. Optical Drive
9. Expansion Slots
10. Graphics Board
11. Processor
12. 500-Watt Power Supply
13. Internal Drive Bays

Standard Features – Custom Configuration Models

Processor	Intel Xeon processor 2.0 GHz, 512-KB cache Intel Xeon processor 2.2 GHz, 512-KB cache Intel Xeon processor 2.4 GHz, 512-KB cache Intel Xeon processor 2.6 GHz, 512-KB cache Intel Xeon processor 2.8 GHz, 512-KB cache	
Cache Memory	512-KB integrated, full-speed Level 2 cache per processor	
Upgradability	Upgradable to dual processor	
Memory	Maximum	4 GB of 800-MHz ECC RDRAM
Network Controller	Integrated Intel PRO/100+ Management Adapter 3COM 3C920C	
Expansion Slots	I/O (Total)	7, up to 6 available
	64-bit/66-MHz PCI	2, 2 available
	32-bit/33-MHz PCI	4, up to 4 available depending on model
	AGP Pro/AGP 4X	1, up to 1 available depending on model
Expansion Bays	(Total/Available)	7/4
	Internal	3/2
	External	4/2
Storage	Diskette Drives	1.44 MB
	Removable Media	CD-ROM, CD-RW, DVD-ROM , Combo CD-RW and DVD-ROM, or DVD+RW drive
	Hard Drives	73-GB, 36-GB, 18-GB Ultra160 SCSI (10,000 rpm) 36-GB,18-GB Ultra160 SCSI (15,000 rpm) 120-GB, 80-GB, 60-GB, 40-GB or 20-GB Ultra ATA (7200 rpm)
	Tape Drives	TR5 10/20GB 250-MB ATAPI ZIP Ecrix 33/66 GB VXA-1 Tape Drive (SCSI or IDE)
Interfaces	Parallel	1
	USB	2 (in front)
	USB	2 (in back)
	Serial	2
	Ultra 160 SCSI	3 (two 68-pin internal, one 68-pin external)
	Ultra ATA/100	2
	Keyboard (PS/2)	1
	Pointing Device (PS/2 mouse)	1
	Video	1
	Microphone Jack	1 (in front)
	Headphone Jack (analog/SPDIF digital)	1 (in front)
	Line-In	1 (in back)
	Line-Out (analog/SPDIF digital)	1 (in back)
	RJ-45 Network Connector	1

Standard Features – Custom Configuration Models

Graphics *One of the following:*	Matrox Millennium G450 (AGP) Matrox G200 Quad MMS (PCI) Matrox Millennium G550 (AGP) NVIDIA Quadro2 EX (AGP) NVIDIA Quadro4 200 NVS (AGP) NVIDIA Quadro4 400 NVS (PCI) NVIDIA Quadro4 550 XGL (AGP) NVIDIA Quadro4 750 XGL (AGP) NVIDIA Quadro4 900 XGL (AGP) ATI Fire GL 8800 (AGP) 3Dlabs Wildcat III 6110 (AGP)
Audio	Integrated SoundBlaster 128 Audio
Software	Windows XP Professional Microsoft Windows 2000 Microsoft Service Pack 2 for Windows 2000 Professional Compaq Restore CD Compaq Management Agents Compaq PC Diagnostics via the Web ROM-based Setup Diagnostics for Windows 2000 and Windows XP Professional Microsoft Internet Explorer System Software Manager via the Web Altiris eXpress (Limited time license)
Intelligent Manageability	Asset Control Alert on LAN (AoL) hardware ready Wake on LAN (WoL) Fault Management Lite Console Security Management Pre-Failure Warranty (processors, hard drives and memory) **Remote Management** Remote Wakeup via Magic Packet Support Remote ROM Flash Remote Security Remote Shut Down **Bios Features** Advanced Configuration and Power Interface (ACPI) 1.0b Advanced Power Management (APM) 1.2 Desktop Management Interface (DMI) 2.1 System Management (SM) Bios 2.3
Security	Diskette write and boot control Flash ROM lock Keyboard password Network server mode Parallel interface control Power-on password Serial interface control Setup password Cable lock provision
Power Supply	500-Watt, with Power Factor Correction (PFC)
Diagnostic LEDs	LEDs in front and on the keyboard are used to flash diagnostic codes in the event of trouble. During normal operation, front panel LEDs indicate power, drive usage, and network link/activity. At the rear of the W8000, LEDs indicate network link, activity, and connection speed. If opening the system is required, color-coded LEDs on the system board help to quickly identify the problem.
Service and Support	Protected by Compaq Services including a three-year, limited warranty with three-year parts coverage, three-year, on-site service, and three-year labor; 7 x 24 hardware technical phone support and on-line support through the Internet; Pre-Failure Warranty coverage of hard drives, memory, and processors. **Note:** Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details. Three-year, onsite and labor not available in all countries.

Options

Processor	Intel Xeon processor 1.8 GHz, 512-KB cache w/VRM	277602-B21
	Intel Xeon processor 2.0 GHz, 512-KB cache w/VRM	277603-B21
	Intel Xeon processor 2.2 GHz, 512-KB cache w/VRM	267804-B21
	Intel Xeon processor 2.4 GHz, 512-KB cache w/VRM	284034-B21
	Intel Xeon processor 2.6 GHz, 512-KB cache w/VRM	310564-B21
	Intel Xeon processor 2.8 GHz, 512-KB cache w/VRM	284036-B21
	Note: When adding an additional processor, both processors must have the same speed and cache size.	
Memory (RDRAM)	512-MB Memory Module Upgrade Kit (800-MHz ECC)	103996-B21
	256-MB Memory Module Upgrade Kit (800-MHz ECC)	157341-B21
	128-MB Memory Module Upgrade Kit (800-MHz ECC)	157338-B21
	Note: Memory must be installed in equal size pairs. Option kits contain one memory module. Only 800-MHz speed is qualified.	
Monitors	TFT8030 Flat Panel Monitor (18-inch, Carbon/Silver)	234362-001
	TFT7020 Flat Panel Monitor (17-inch, Carbon/Silver, baseless)	253218-001
	TFT7020 Flat Panel Monitor (17-inch, Carbon/Silver, built in speakers)	253217-001
	TFT5030 Flat Panel Monitor (15-inch, Carbon/Silver)	228134-001
	TFT5030 Flat Panel Monitor (15-inch, Carbon/Silver, baseless)	250198-001
	TFT5017 Flat Panel Monitor (15-inch, built in speakers)	279414-001
	TFT5017 Flat Panel Monitor (15-inch, Carbon/Silver)	263874-001
	P1220 CRT Monitor (22-inch, Carbon/Silver)	244374-001
	P920 CRT Monitor (19-inch, Carbon/Silver)	244375-001
	P720 CRT Monitor (17-inch, Carbon/Silver)	244373-001
	V7550 CRT Monitor (17-inch, Carbon/Silver)	261611-003
	S9500 CRT Monitor (19-inch, Carbon/Silver)	261615-003
	S7500 CRT Monitor (17-inch, Carbon/Silver)	261606-001
	S5500 CRT Monitor (15-inch Carbon/Silver)	261602-001
	Note: AssetControl monitor. AssetControl features are accessible with Compaq Workstations featuring Intelligent Manageability.	
Graphics	Matrox G200 Quad Multi-monitor Series with cables for analog output (32MB) (PCI)	159513-B21
	Matrox G200 Quad Multi-monitor Series with cables for DVI output (32MB) (PCI)	179597-B21
	Matrox G200 Quad MMS DVI Upgrade Cable Kit (for option kit 159513-B21)	170840-B21
	Matrox Millennium G550 with analog and DVI cable (AGP)	250227-B21
	Matrox Millennium G450 DualHead (32MB) (AGP)	202389-B21
	NVIDIA Quadro4 900 XGL (AGP)	284279-B21
	NVIDIA Quadro4 750 XGL (AGP)	270731-B21
	NVIDIA Quadro4 550 XGL (AGP)	290648-B21
	NVIDIA Quadro4 400 NVS (PCI)	273305-B21
	DVI pigtail cable upgrade kit, quantity 2 (used with Quadro4 400 NVS)	284282-B21
	NVIDIA Quadro4 200 NVS (AGP)	273304-B21
	DVI pigtail cable upgrade kit (used with Quadro4 200 NVS)	284281-B21
	NVIDIA Quadro2 EX (32MB) (AGP)	250066-B21
	ATI Fire GL 8800 (AGP)	271686-B21
	3Dlabs Wildcat III 6110 (64MB) (AGP)	271685-B21
Diskette Drives	250-MB ZIP Drive	294416-B22
	250-MB ZIP Media 3-Pack	217896-B21

Options

Tape Drives	TR5 10/20-GB	294243-B22
	TR5 10/20-GB Media (3-Pack)	125782-B21
	33/66 GB VXA-1 SCSI Tape Drive	237108-B22
	33/66 GB VXA-1 IDE Tape Drive	237109-B22
	33/66 GB VXA-1 Media (2-Pack)	237111-B21
	VXA-1 Cleaning Cartridge	237110-B21
Hard Drives	***Ultra3 (Ultra160) SCSI Drives***	
	73-GB Ultra160 SCSI 10,000 rpm (1″)	250023-B21
	36-GB Ultra160 SCSI 10,000 rpm	191189-B21
	36-GB Ultra 160 SCSI 15,000 rpm	250022-B21
	18-GB Ultra160 SCSI 15,000 rpm	191188-B21
	18-GB Ultra160 SCSI 10,000 rpm	159764-B21
	Ultra ATA Drives	
	120-GB Ultra ATA 7200 rpm Quiet Seek and Quiet Idle	250021-B21
	80-GB Ultra ATA 7200 rpm Quiet Seek and Quiet Idle	250020-B21
	40-GB Ultra ATA 7200 rpm Quiet Seek and Quiet Idle	201066-B21
	20-GB Ultra ATA 7200 rpm Quiet Seek	251974-B21
Storage Controllers	Adaptec 29160N Ultra 160 (U3) Single Channel SCSI Controller	157810-B21
	Adaptec 2100S Ultra 160 (U3) Single Channel RAID Controller	192842-B21
	StorageWorks™ Enclosure 4314R by Compaq	190209-001
	StorageWorks Smart Array Controller 5304/128	158939-B21
	StorageWorks Smart Array Controller 5302/64	124992-B21
	StorageWorks Smart Array Controller 5302/32	166207-B21

Options

Biometrics	USB Biometric ID Device	240238-B21
Multimedia	48X CD-ROM	187217-B22
	16X/40X DVD-ROM Read	280625-B22
	16X Combo CD-RW/DVD-ROM	273504-B22
	40X/12X/40X CD-RW	268985-B22
	1394 PCI DV and Adobe Software Kit	229966-001
	Labtec Spin-22 Carbon Speakers	246637-001
	4.7-GB DVD-RW Drive	272851-B22
	4.7-GB DVD+RW Drive (2.4X/2.4X/8X DVD-RW and 12X10X32X CD-RW)	306816-B22
Communications	Compaq NC6136 Fiber Gbit NIC	203539-B21
	Compaq NC7131 Gigabit Server Adapter PCI (64/44 10/100/1000-T)	158575-B21
	Lucent V.90 56K PCI Win Modem	239137-001
	Broadcom NetXtreme Based 10/100/1000 Management Gb Adapter	266997-B21
Uninterruptible Power Systems	Compaq Tower UPS Model T2000 (low voltage)	242688-005
	Compaq Tower UPS Model T1500 (low voltage)	242688-003
	Compaq Tower UPS Model T1000 (low voltage)	242688-001
	Compaq Tower UPS Model T700 (low voltage)	295372-B21
Other	PS/2 2-Button Scroll Mouse (Carbon)	170299-B22
	PS/2 3-Button Mouse (carbon)	269192-B23
	USB 2-Button Scroll Mouse	195255-B25
	USB 2-Button Optical Scroll Mouse	265985-B21
	Compaq USB Easy Access Smartcard Keyboard	267147-008
	PS/2 Easy Access Keyboard 8-Button (Carbon)	202109-008
	PS/2 Easy Access Keyboard	267145-008
	Logitech Cordless Desktop (Keyboard and Mouse)	251385-008
	Spaceball 4000 3D Motion Controller (Carbon)	112138-B22
	1394 Firewire PCI Card	277824-B21
	Rack Mount Conversion Kit without rails	338544-B24
	Rack Mount Conversion Kit with rails	338544-B23
	Kensington Security Lock	294316-B21
	High-speed USB 2.0 PCI Card	287636-B21
Support Software CD	Annual Subscription	183426-xxx
	Single CD-ROM (current month)	272505-001

Memory

Compaq Evo Workstation W8000

STANDARD MEMORY

256-MB of 800-MHz ECC RDRAM is standard. Memory must be installed in like pairs. (Only 800-MHz memory speed is supported.)

STANDARD MEMORY PLUS OPTIONAL MEMORY

Support for up to 3328 MB of 800-MHz ECC RDRAM is available with the installation of optional Memory Kits. Memory must be installed in like pairs.

STANDARD MEMORY REPLACED WITH OPTIONAL MEMORY

Support for up to 4 GB of 800-MHz ECC RDRAM is available with the removal of the two standard 128-MB RDRAM modules and the installation of optional 800-MHz ECC RDRAM Kits. Memory must be installed in like pairs

Note: This chart does not represent all possible memory configurations. Memory must be installed in like pairs. Option kits contain one memory module.

Memory		Memory Channel A-Top		Memory Channel B-Top		Memory Channel A-Bottom		Memory Channel B-Bottom	
RIMM Slot		XMM4	XMM2	XMM3	XMM1	XMM6	XMM8	XMM5	XMM7
Standard	256 MB	128 MB	CRIMM	128 MB	CRIMM	Empty	Empty	Empty	Empty
Optional	512 MB	128 MB	128 MB	128 MB	128 MB	Empty	Empty	Empty	Empty
Optional	1024 MB	256 MB	256 MB	256 MB	256 MB	Empty	Empty	Empty	Empty
Optional	2048 MB	512 MB	512 MB	512 MB	512 MB	Empty	Empty	Empty	Empty
Maximum	4096 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB

Following are memory options available from Compaq:

- 512-MB Memory Kit (RDRAM RIMM, 800MHz) 103996-B21
- 256-MB Memory Kit (RDRAM RIMM, 800 MHz) 157341-B21
- 128-MB Memory Kit (RDRAM RIMM, 800 MHz) 157338-B21

Memory

Compaq Evo Workstation W8000

STANDARD MEMORY

512-MB of 800-MHz ECC RDRAM is standard. Memory must be installed in like pairs. (Only 800-MHz memory speed is supported.)

STANDARD MEMORY PLUS OPTIONAL MEMORY

Support for up to 3584 MB of 800-MHz ECC RDRAM is available with the installation of optional ECC RDRAM Kits. Memory must be installed in like pairs.

STANDARD MEMORY REPLACED WITH OPTIONAL MEMORY

Support for up to 4 GB of 800-MHz ECC RDRAM is available with the removal of the standard 128-MB RDRAM modules and the installation of optional 800-MHz ECC RDRAM Kits. Memory must be installed in like pairs

Note: This chart does not represent all possible memory configurations. Memory must be installed in like pairs. Option kits contain one memory module.

Memory		Memory Channel A-Top		Memory Channel B-Top		Memory Channel A-Bottom		Memory Channel B-Bottom	
RIMM Slot		XMM4	XMM2	XMM3	XMM1	XMM6	XMM8	XMM5	XMM7
Standard	512 MB	256 MB	CRIMM	256 MB	CRIMM	Empty	Empty	Empty	Empty
Optional	1024 MB	256 MB	256 MB	256 MB	256 MB	Empty	Empty	Empty	Empty
Optional	2048 MB	512 MB	512 MB	512 MB	512 MB	Empty	Empty	Empty	Empty
Maximum	4096 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB

Following are memory options available from Compaq:

- 512-MB Memory Kit (RDRAM RIMM, 800MHz) 103996-B21
- 256-MB Memory Kit (RDRAM RIMM, 800 MHz) 157341-B21
- 128-MB Memory Kit (RDRAM RIMM, 800 MHz) 157338-B21

Memory

Compaq Evo Workstation W8000

STANDARD MEMORY

1 GB of 800-MHz ECC RDRAM is standard. Memory must be installed in like pairs. (Only 800-MHz memory speed is supported.)

STANDARD MEMORY PLUS OPTIONAL MEMORY

Support for up to 4 GB of 800-MHz ECC RDRAM. Memory must be installed in like pairs.

STANDARD MEMORY REPLACED WITH OPTIONAL MEMORY

Support for up to 4 GB of 800-MHz ECC RDRAM is available with the removal of the standard 128-MB RDRAM modules and the installation of optional 800-MHz ECC RDRAM Kits. Memory must be installed in like pairs

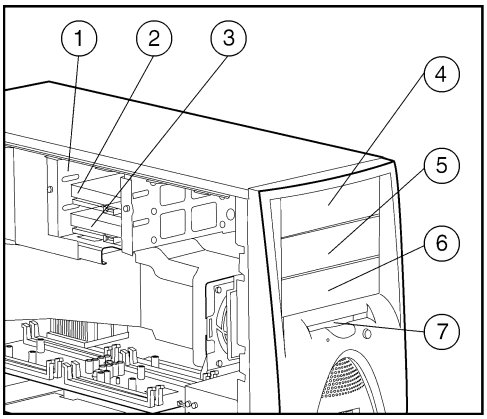
Note: This chart does not represent all possible memory configurations. Memory must be installed in like pairs. Option kits contain one memory module.

Memory		Memory Channel A-Top		Memory Channel B-Top		Memory Channel A-Bottom		Memory Channel B-Bottom	
RIMM Slot		XMM4	XMM2	XMM3	XMM1	XMM6	XMM8	XMM5	XMM7
Standard	1024 MB	512 MB	CRIMM	512 MB	CRIMM	Empty	Empty	Empty	Empty
Optional	2048 MB	512 MB	512 MB	512 MB	512 MB	Empty	Empty	Empty	Empty
Maximum	4096 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB

Following are memory options available from Compaq:

- 512-MB Memory Kit (RDRAM RIMM, 800MHz 103996-B21
- 256-MB Memory Kit (RDRAM RIMM, 800 MHz) 157341-B21
- 128-MB Memory Kit (RDRAM RIMM, 800 MHz) 157338-B21

Storage



DRIVE SUPPORT

	Quantity Supported	Position Supported	Controller
Removable Media			
1.44-MB Diskette Drive	Up to 1	7	Integrated
CD-ROM Drive	Up to 1	4, 5, 6	Integrated EIDE
ATAPI ZIP Drive	Up to 1	4, 5, 6	Integrated EIDE
DVD-ROM Drive	Up to 1	4, 5, 6	Integrated EIDE
DVD+RW	Up to 1	4, 5, 6	Integrated EIDE
Combo CD-RW/DVD-ROM	Up to 1	4, 5, 6	Integrated EIDE
CD-RW Drive	Up to 1	4, 5, 6	Integrated EIDE
Tape Drive	Up to 1	4, 5, 6	Integrated EIDE
Hard Drives			
Ultra 160 SCSI Drives			
1-inch 73-GB 10,000 rpm 36.4-GB 10,000 rpm 36.4-GB 15,000 rpm 18.2-GB 15,000 rpm 18.2-GB 10,000 rpm	Up to 5	1, 2, 3, 5, 6	Integrated Dual channel Ultra160 SCSI Controller
Ultra ATA Drives			
1-inch 20-GB 7200 rpm 40-GB 7200 rpm 80-GB 7200 rpm 120-GB 7200 rpm	Up to 4	1, 2, 3, 5, 6	Integrated EIDE
Maximum Storage Capacity			
Internal	360 GB (assumes two removable media drives installed)		

Technical Specifications

System Unit	**Tower Dimensions** (H x W x D)	Tower	17.75 x 8.05 x 23.75 in/45.1 x 20.5 x 60.3 cm
		Rack Mountable (5U)	8.68 x 17.75 x 23.75 in/22.1 x 45.1 x 60.3 cm
	Weight (standard configuration)	54.75 lbs/24.89 kg	
	Power Supply	Operating Voltage Range	100 VAC to 240 VAC
		Rated Voltage Range	100 VAC to 120 VAC; 200 VAC to 240 VAC
		Rated Line Frequency	50 Hz to 60 Hz
		Rated Input Current	8A @ 115 VAC; 4A @ 230 VAC
		Maximum Rated Power	500-Watt output; 770-Watt input
		Physical Dimensions	6.5 x 5 x 6.9 in/16.51 x 12.7 x 17.54 cm
		Weight	7 lbs/3.18 kg
	Temperature (Values are subject to change)	Operating	50° to 95°F/10° to 35°C
		Non-operating	–22° to 140°F/–30° to 60°C
	Humidity (non-condensing) (Values are subject to change)	Operating	20% to 80%
		Non-operating	10% to 95%
	Maximum Altitude (nonpressurized)	Operating	10,000 ft/3,048 m
		Non-operating	30,000 ft/9,144 m

Compaq Easy Access Keyboard	**Dimensions** (H x W x D)	18.3 x 6.3 x 1.4 in/465 x 160 x 36 mm	
	Weight	Approximately 2 lbs/0.9 kg	
	Electrical	Operating Voltage	+5VDC ± 5%
		Power Consumption	50 mA maximum (with 3 LEDs on)
		System Interface	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	Languages	30+ 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 membrane
		Key Leveling Mechanism	For all double wide and greater length keys
		Cable Length	6 ft/1.8 m
		PC98-99	Mechanically compliant
		Acoustics	50 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, 6 surfaces
		Non-operating Shock	80 g, 6 surfaces
		Operating Vibration	2 g peak acceleration
		Non-operating Vibration	4 g peak acceleration

1.44-MB Diskette Drive	**Diskette Size**	3.5 in	
	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	

Compaq 3-Button Mouse	**Dimensions/Weight**	Height	1.42 in/3.6 cm
		Length	4.17 in/10.7 cm
		Width	2.87 in/7.4 cm
		Weight	5.20 oz/150 g
	Environmental	Operating Temperature	32° to 104° F/0°C to 40° C
		Non-operating Temperature	–4° to 140° F/–20° to 60°C
		Operating Humidity	10% to 90% (non condensing at ambient)
	Mechanical	Resolution	400 ± 20% DPI
		Tracking Speed	10 in/s Maximum
		Switch Life	1,000,000 operations (using Hasco modified tester)
		Switch Type	Micro-switches
		Tracking Mechanism Life	155 miles/250 km at average speed of 10 in/s
		Cable Length	6 ft/1.8 m
		PC98-99	Mechanically compliant
	Regulatory Approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick

Ultra160 SCSI Hard Drives

73 GB	**Capacity**	72,000 MB	
201735-B21	**Height**	1.6 in/40.64 mm	
	Width	3.5 in/88.9 mm	
	Interface	Ultra160 SCSI	
	Synchronous Transfer Rate (Maximum)	160 MB/s	
	Seek Time (typical reads, including settling)	Single Track	0.6 ms
		Average	5.2 ms
		Full-Stroke	12 ms
		Rotational Speed	10,000 rpm
	Logical Blocks	142,264,000	
	Operating Temperature	50° to 95°F/10° to 35°C	
36 GB	**Capacity**	36,419.2 MB	
232916-B22	**Height**	1.0 in/25.4 mm	
	Width	4.0 in/101.6 mm	
	Interface	Ultra160 SCSI	
	Synchronous Transfer Rate (Maximum)	160 MB/s	
	Seek Time (typical reads, including settling)	Single Track	0.4 ms
		Average	3.8 ms
		Full-Stroke	7 ms
		Rotational Speed	15,000 rpm
	Logical Blocks	71,132,000	
	Operating Temperature	50° to 95°F/10° to 35°C	
36 GB	**Capacity**	36,400 MB	
250022-B21	**Height**	1.0 in/25.4 mm	
	Width	3.5 in/88.9 mm	
	Interface	Ultra160 SCSI	
	Synchronous Transfer Rate (Maximum)	160 MB/s	
	Seek Time (typical reads, including settling)	Single Track	0.6 ms
		Average	4.7 ms
		Full-Stroke	12 ms
		Rotational Speed	10,000 rpm
	Logical Blocks	71,132,000	
	Operating Temperature	50° to 95°F/10° to 35°C	
18 GB	**Capacity**	18,209 MB	
191188-B21	**Height**	1 in/25.4 mm	
	Width	3.5 in/88.9 mm	
	Interface	Ultra160 SCSI	
	Synchronous Transfer Rate (Maximum)	160 MB/s	
	Seek Time (typical reads, including settling)	Single Track	0.8 ms
		Average	4.1 ms
		Full-Stroke	7.7 ms
		Rotational Speed	15,000 rpm
	Logical Blocks	35,566,000	
	Operating Temperature	50° to 95°F/10° to 35°C	

Ultra160 SCSI Hard Drives *(continued)*	**18 GB** *159764-B21*	**Capacity**	18,209 MB	
		Height	1 in/25.4 mm	
		Width	3.5 in/88.9 mm	
		Interface	Ultra160 SCSI	
		Synchronous Transfer Rate (Maximum)	160 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.6 ms
			Average	4.7 ms
			Full-Stroke	12 ms
			Rotational Speed	10,000 rpm
		Logical Blocks	35,566,000	
		Operating Temperature	50° to 95°F/10° to 35°C	
Ultra ATA Hard Drives	**120 GB** *250021-B21*	**Capacity**	120,000 MB	
		Height	1 in/25.4 mm	
		Width	3.5 in/88.9 mm	
		Interface	Ultra ATA/100	
		Synchronous Transfer Rate (Maximum)	100 MB/s	
		Seek Time (typical reads, including settling)	Single Track	1.2 ms (2.7 ms quiet seek)
			Average	8 ms (10.1 ms quiet seek)
			Full-Stroke	18.0 ms (21.1 ms quiet seek)
			Rotational Speed	7200 rpm
		Logical Blocks	234,441,648	
		Operating Temperature	41° to 131°F/5° to 55°C	
	80 GB *250020-B21*	**Capacity**	80,000 MB	
		Height	1 in/25.4 mm	
		Width	3.5 in/88.9 mm	
		Interface	Ultra ATA/100	
		Synchronous Transfer Rate (Maximum)	100 MB/s	
		Seek Time (typical reads, including settling)	Single Track	1.2 ms (2.7 ms quiet seek)
			Average	8 ms (10.1 ms quiet seek)
			Full-Stroke	18.0 ms (21.1 ms quiet seek)
			Rotational Speed	7200 rpm
		Logical Blocks	157,278,240	
		Operating Temperature	41° to 131°F/5° to 55°C	

Ultra ATA Hard Drives *(continued)*	**40 GB**	**Capacity**	40,000 MB	
	201066-B21	**Height**	1 in/25.4 mm	
		Width	3.5 in/88.9 mm	
		Interface	Ultra ATA	
		Synchronous Transfer Rate (Maximum)	66.6 MB/s	
		Seek Time (typical reads, including settling)	Single Track	1.2 ms (2.7 ms quiet seek)
			Average	8 ms (10.1 ms quiet seek)
			Full-Stroke	18.0 ms (21.1 ms quiet seek)
			Rotational Speed	7200 rpm
		Logical Blocks	78,165,360	
		Operating Temperature	41° to 131°F/5° to 55°C	
	20 GB	**Capacity**	20,000 MB	
	251974-B21	**Height**	1 in/25.4 mm	
		Width	3.5 in/88.9 mm	
		Interface	Ultra ATA	
		Synchronous Transfer Rate (Maximum)	66.6 MB/s	
		Seek Time (typical reads, including settling)	Single Track	1.2 ms (2.7 ms quiet seek)
			Average	8 ms (10.1 ms quiet seek)
			Full-Stroke	18.0 ms (21.1 ms quiet seek)
			Rotational Speed	7200 rpm
		Logical Blocks	39,102,336	
		Operating Temperature	41° to 131°F/5° to 55°C	

16X/40X DVD-ROM Read	**Height**	5.25-inch, half-height	
	Interface type	ATAPI	
	Dimensions– External, Excluding Bezel (W x H)	5.88 x 1.71 (149.5 x 43.5 mm)	
	Disc diameter	5 in, 3 in (12 cm, 8 cm)	
	Disc thickness	0.05 inch (1.2 mm)	
	Track pitch	1.6 µm (CD), 0.74 µm (DVD)	
	Disc center hole diameter	0.6 inch (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/RW multi-border; DVD+RW; 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)
		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
		CD-ROM Mode 1	< 90 ms
		Full stroke DVD	< 240 ms (seek)
		Full stroke CD	< 160 ms (seek)
	Data transfer rates	2600 – 6000 KB/s (40X CAV CD-ROM mode)	
		8100 – 21,600 KB/s (16X CAV DVD-ROM mode)	
	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 85%
		Maximum wet bulb temperature (operating)	86° F (30° C)

16X/40X DVD-ROM Read *(continued)*	**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, CSA C22.2 60950-2000,	
	Operating systems supported	Microsoft Windows 98, Microsoft Windows NT 4.0, Microsoft Windows 2000, Windows XP Professional	
4.7-GB DVD+RW Drive	**Interface**	Atapi IDE	
	Media formats written	CD-R, CD-RW, DVD+RW, DVD+R	
	Media capacity	4.7 GB DVD disc / 700 MB CD disc	
	Write methods	Disc-at-once, track-at-once, incremental fixed and variable packet	
	Recording/playing time	3 hours DVD (3.3 Mbps) / 80 minutes CD	
	Data transfer rates	**Write**	DVD+R write — 3247 KB/s (2.4X) DVD+RW write — 3247 KB/s (2.4X) CD-R write — 300 KB/s (2X) CD-R write — 600 KB/s (4X) CD-R write — 1200 KB/s (8X) CD-R write — 1,800 KB/s (12X) CD-RW write — 300 KB/s (2X) CD-RW write — 600 KB/s (4X) CD-RW write —1500 KB/s (10X)
		Read	Digital audio extraction (minimum) —1,200 KB/s (8X) CD-ROM, CD-R, CD-RW read — up to 4,800 KB/s (32X) DVD-ROM, DVD+R, DVD+RW read — up to 10,800 KB/s (8X)
	Data transfer modes	ATA PIO mode 4—16.7 Mbps ATA multi-word DMA mode 2—16.7 Mbps ATA UltraDMA mode 0—16.7 Mbps ATA UltraDMA mode 1—24 Mbps mode 2—33 Mbps (default)	
	Media formats read	CD-R/CD-ROM, CD-RW, CD-Digital Audio (Red Book) and CD Extra, CD-ROM (Mode 1 - Yellow Book), CD-ROM XA and CD-I (Mode 2/Form 1 - Green Book), CD-ROM XA and CD-I (Mode 2/Form 2 - Green Book), CD-Bridge and Photo-CD (single and multi-session), CD-Video, DVD-ROM, DVD+RW, DVD+R	
	Access times	**Random**	< 125 ms typical
		Full stroke	< 250 ms typical
	Start-up time		< 4 seconds typical
	Buffer size	2 MB	
	Disc diameter	120 mm or 80 mm	
	Operating conditions	Temperature	41° to 104°F /5° to 40°C
		Humidity	10% to 90% (non-condensing)
	Mounting orientation	Horizontal or vertical	
	Weight	0.9 kg/2.0 lb	
	Approvals/environmental	UL 1695 (US and Canada), CE, FDA, FCC, TUV, C-TICK	
	Software supplied	WinDVD 3.2 or later, Roxio Easy CD Creator 5.3 or later, DVD-It 2.5 or later	
	Operating systems supported	Microsoft Windows XP Professional, Microsoft Windows 2000 SP2	

48X CD-ROM Drive	**Disk**	CD-ROM (Mode 1 and 2), CD-R/W, CD-R Photo CD (Single and Multi-session), Mixed Mode (Audio and Data combined), CDI Ready, CD-XA Ready, CD TEXT, CD EXTRA	18.0 ms (21.1 ms quiet seek)
		540 MB (Mode 1, 12 cm)	7200 rpm
		650 MB (Mode 2, 12 cm)	
	Rotational Speed	8750 maximum	
	Diameter	4.7 in, 3.15 in/12 cm, 8 cm	
		Center Hole	0.6 in/15 mm diameter
		Thickness	0.05 in/1.2 mm
		Track Pitch	1.6 µm
	Block Size	Mode 1	2,048 bytes
		Mode 2	2,340, 2,336 bytes
		CD-DA	2,352 bytes
		CD-XA	2,328 bytes
	Interface	IDE	
	Access Times (typical)	Random	< 100 ms
		Full-Stroke	< 150 ms
	Audio Output Level	Line-Out	0.7 VRMS
	Data Transfer Rate	Sustained	150 KB/s (1X, using audio disc)
		Variable	3,000 to 7,200 KB/s
	Cache Buffer	128 KB minimum	
	Start-up Time (typical)	< 7 s	
	Stop Time	< 4 s	
	Operating Conditions	Temperature	41° to 113°F/5° to 45°C
		Humidity	10% to 80%
	Dimensions	(HxWxD, maximum)	1.7 x 5.9 x 8.19 in/4.29 x 15 x 20.8 cm
		Weight	2.65 lbs/1.2 kg

40X/12X/40X CD-RW Drive	**Interface**	ATAPI IDE	
	Media formats written	CD-R and CD-RW	
	Media capacity	700 MB	
	Write methods	Disc-at-once, track-at-once, session-at-once, fixed packet, and variable packet	
	Recording/playing time	80 minutes	
	Data transfer rates	**Sustained**	CD-R write—6,000 Kbps (40X) (CLV)
			CD-RW write (1-4X media) —6,000 Kbps (4X)
			CD-RW write (4-10X media) —1,800 Kbps (12X)
			CD-RW read—6,000 Kbps (40X)
			CD-RW read—1,800 Kbps (12X)
			Digital audio extraction (minimum) —4,800 Kbps (32X)
		Variable	CD-ROM, CD-R read—1,500 to 6,000 Kbps (10X to 40X) CD-R write – 2,400 to 6, 000 kbps (16X to 40X)
	Data transfer modes	ATA PIO mode 4—16.7 Mbps	
		ATA multi-word DMA mode 2—16.7 Mbps	
		ATA UltraDMA mode 0—16.7 Mbps	
		ATA UltraDMA mode 1—24 Mbps mode 2—33 Mbps (default)	
	Media formats read	audio, CD-ROM (modes 1 and 2), CD-ROM XA (mode 2, forms 1 and 2), single- or multi-session photo CD, CD-I, video CD, CD-text	
	Access times	**Random**	< 120 ms typical
		Full stroke	< 200 ms typical
	Start-up time	**Single**	< 7 seconds typical
		Multi-session	< 30 seconds typical
		Stop time	< 4 seconds
		Block size	Mode 1—2,048/2,352 bytes
			Mode 2, Form 1—2,048/2,328/2,336/2,340/2,352 bytes
			Mode 2, Form 2—2,328/2,336/2,340/2,352 bytes
			CD-DA—2,352/2,368 bytes
	Disc diameter	120 mm or 80 mm	
	Track pitch	1.6 µm	
	Disc loading mechanism	Half-height, tray load	
	Operating conditions	**Temperature**	Operating 41° to 113° F/5° to 45° C
		Humidity	10% to 80%
	Mounting orientation	Horizontal or vertical	
	Dimensions	Fits in a standard 5.25-inch drive bay	
	Weight	1.2 kg (2.6 pounds)	
	Approvals/environmental	UL 94 and 1950, CSA, CE, FDA	
	Operating systems supported	Microsoft® Windows® XP, Microsoft Windows 2000, Microsoft Windows 98, Microsoft Windows NT® 4.0	

SoundBlaster 128 Audio	**Type**	PCI	
	Sound Quality	20-bit Stereo Full-Duplex (CD Quality)	
	Sampling	Variable 4 kHz to 48 kHz	
	Audio Compression/ Decompression	ESPCM and ADPCM compression	
	Full Scale Input Voltage (RMS)	Microphone-in	40 mVolts
		Line-in	1.0 Volts
	Full Scale Output Voltage (RMS)	Line-out	2.0 Volts
	Impedance (nominal)	Line-out	800 ohms (typical)
		Line-in	20 Kohms (typical)
		Microphone-in, Microphone-out	
	Playback (PC-D-A)	Dynamic Range	–91 dB (typical)
		Total Harmonic Distortion + Noise	–69 dB (typical)
		Frequency Response (–3 dB)	20 Hz to 20 kHz
	Line Output Crosstalk (10 kHz)	–88 dB	
	Headphone Maximum Output (1 kHz)	60 mWrms into 32 ohms (THD+N < 1%)	
	Internal Power Amplifier Rating	Nominal	1.5 Watts RMS @ 8 ohms
		Maximum	5 Watts RMS @ 8 ohms
	Speaker	Frequency Response	200 Hz to 15 kHz
		Equalizer	5 stages of fixed equalization
		Design	High-performance, infinite baffle loudspeaker
	Connectors	Line-in, line-out, microphone-in, headphone-out	
	Operating System Driver Support	Windows NT 4.0, Windows 98, Windows 2000, Windows XP Professional	

Intel PRO/100 + Management Adapter	**Network Interface**	10Base-T or 100Base-TX	
	Expansion Bus Architecture	PCI 2.2	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
	Connectors	RJ-45	
	Standards Compliance	10-MB/s Ethernet	IEEE 802.3
		100-Mb/s Ethernet	IEEE 802.3µ
	I/O Address	Auto-configured	
	Remote Wakeup	Yes	
	Operating Temperature	0° to 55°F/10° to 35°C	
	Operating Humidity (non-condensing)	85% at 131°F/55°C	
	Operating Altitude	10,000 ft/3,048 m	
	Communication Processor	Intel 82559	
	OS Driver Support	Windows XP Professional Windows NT 4.0	Supported NDIS 3.0, 4.0 Compliant
		Windows 95, 98, 2000	NDIS 3.0, 4.0, 5.0 Compliant
		Novell NetWare Server v. 3.x, 4.x and 5.0	ODI Compliant
		SunSoft Solaris™	Not supported
		SCO UnixWare, OpenDesktop, OpenServer	Supported

Matrox Millennium G450 Graphics Controllers

Form Factor	ATX	
Bus Type	AGP 1X, 2X, 4X	
Standard Memory	32 MB	
DAC Speed	360 MHz (secondary DAC: 200 MHz)	
Data Path	64-bit DDR External/256-bit Internal	
Internal Bus Width	256-bit DualBus	
Memory Interface	64-bit DDR Memory	
Frame Buffer	32 MB	
TwTwo Integrated RAMDACS	Yes	
Engine Acceleration	3 ROP bitBLT, line draw, text, color expansion, basic video color conversion and scaling, triangle setup engine	
Output	Analog, 2 ports	
OS Support	Microsoft Windows 2000, Windows 98 and Windows NT 4.0, Windows XP Professional	
Other	Texture mapping support, flat and Gouraud shading, direct 3D support, Anisotropic Filter, perspective texture, specular highlighting, wireframe, dithering, full scene anti-aliasing, vertex fog, dual texture mapping, Plug-and-Play AGP 2X and AGP 4X, 0.18-micron technology (lower heat/power consumption), high-quality DVD playback with full access to Windows, Color Space Conversion, Quick Draw support, DCI and DirectX video playback, MS DirectDraw support	
3D Features	Single-cycle multi-texturing	Yes
	Environment-Mapped Bump Mapping	Yes
	Internal Rendering	32-bit
	Source Textures	Up to 32-bit
	Maximum Texture Size	2048 x 2048
	Hardware non-power-of- 2 textures	Yes
	32-bit Color Output	Yes
	32-bit Independent Z-buffer	Yes
	Stencil Buffering	Yes
	AGP Texturing	Yes
	Trilinear Filtering	Yes
	DirectX Support	Yes
	OpenGL Support	Yes
DualHead Display Features	Multi-Display Mode, DVD Max Mode, DualHead Zoom Mode, DualHead Clone Mode, DualHead TV Output Mode, Single Chip Multi-Monitor Support	

Matrox Millennium G450 Graphics Controllers *(continued)*

Supported Modes

This list assumes setup to be DualHead multi-display running Microsoft Windows 98. If using Windows 2000 while in multi-display, primary CRT is limited to modes supported by 2nd CRT.

Primary CRT Color Depths	***Color Depths (bpp)***	***Refresh Rates***
640 x 480	8, 16, 24, 32	60 Hz, 72 Hz, 75 Hz, 85 Hz
800 x 600	8, 16, 24, 32	60 Hz, 72 Hz, 75 Hz, 85 Hz
1024 x 768	8, 16, 24, 32	60 Hz, 70 Hz, 75 Hz, 85 Hz
1152 x 864	8, 16, 24, 32	75 Hz
1280 x 960	8, 16, 24, 32	60 Hz, 75 Hz, 85 Hz
1280 x 1024	8, 16, 24, 32	60 Hz, 75 Hz, 85 Hz
1600 x 1200	8, 16, 24, 32	60 Hz, 65 Hz, 70 Hz, 75 Hz, 85 Hz (available in single monitor configuration only)
1800 x 1440	8, 16, 24	60 Hz, 72 Hz, 75 Hz, 85 Hz
1856 x 1392	8, 16, 24	60 Hz, 75 Hz, 85 Hz
1920 x 1440	8, 16, 24	60 Hz, 75 Hz, 85 Hz
2048 X 768	8, 16	60 Hz, 75 Hz
Secondary CRT Color Depths	***Color Depths (bpp)***	***Refresh Rates***
640 x 480	16, 32	60 Hz, 72 Hz, 75 Hz, 85 Hz
800 x 600	16, 32	60 Hz, 72 Hz, 75 Hz, 85 Hz
1024 x 768	16, 32	60 Hz, 70 Hz, 75 Hz, 85 Hz
1152 x 864	16, 32	75 Hz
1280 x 960	16, 32	60 Hz, 75 Hz, 85 Hz
1280 x 1024	16, 32	60 Hz, 75 Hz, 85 Hz
1600 x 1200	16, 32	60 Hz, 65 Hz, 70 Hz, 75 Hz, 85 Hz

Matrox Millennium G550 AGP Graphics Controller

Form factor	Low profile (LP) board with ATX bracket attached (kit also includes a Small Form Factor (SFF) bracket	
Bus type	AGP 4X, AGP 2X, and AGP 1X	
Standard memory	32-MB, high-speed DDR	
DAC speed	360-MHz RAMDAC; secondary 230-MHz RAMDAC	
Data path	64-bit DDR external bus to frame buffer memory/256-bit internal	
Internal bus width	256-bit DualBus	
Memory interface	64-bit DDR Memory	
Frame buffer	32 MB	
Operating systems supported	Microsoft Windows 2000, Microsoft Windows 98, Microsoft Windows NT 4.0, Microsoft Windows XP Professional	
Two integrated RAMDACs	Yes	
3-D engine acceleration	Matrox HeadCasting* engine, two dual-textured 3-D pixels/clock for fast 3-D game play, dual pixel pipelines with dual texturing units per pipeline, floating point 3-D setup engine with dynamically re-allocatable resources; Microsoft DirectX Environment-Mapped Bump Mapping; Vibrant Color Quality rendering; bilinear, 8-sample-per-pixel trilinear, and anisotropic filtering; Microsoft DirectX and OpenGL® alpha blending modes; Z-buffer support	
3-D features	Single cycle multi-texturing	Yes
	:nvironment-mapped bump mapping	Yes
	Internal rendering	32-bit
	Source textures	Up to 32-bit
	Maximum texture size	2048 x 2048
	32-bit color output	Yes
	32-bit independent Z-buffer	Yes
	Stencil buffering	Yes
	AGP texturing	Yes
	Trilinear filtering	Yes
	Microsoft DirectX support	Yes
	OpenGL support	Yes, through Matrox
DualHead 3-D display features	HeadCasting, Microsoft DirectX compliant, dual texturing units per pixel pipeline, two pixel pipelines, single-cycle multi-texturing, environment-mapped bump mapping, 32-bit internal rendering precision, up to 32-bit source textures, 32-bit color output, bilinear, trilinear and anisotropic 3-D filtering, 32-bit independent Z-buffer, OpenGL support	
Other 3-D features	Alpha blending, fogging, specular highlighting, environment mapping, stencil buffering, triple buffering, AGP texturing	
Other	Texture mapping support; true color RGB, flat, and Gouraud shading; Direct3-D support; anisotropic filter; perspective-correct texture mapping; specular highlighting (any color); hardware dithering (including dithering of LUT textures); sort-dependent antialiasing; vertex and table fogging; dual texture mapping; Plug-and-Play; 0.18-micron technology (lower heat/power consumption); high-quality DVD playback with DVDMax; color space conversion; QuickDraw supported DCI and Microsoft DirectX and OpenGL blend modes; Microsoft DirectDraw support; support for picture-in-picture and multiple video windows; Unique Motion Video Rendering support	
Optional software bundles (not included)	Matrox Virtual Presenter for Microsoft PowerPoint; Digimask™ System, HeadFone™ by LipSinc; The Matrox Software DVD Player; eDualHead browser enhancements (PageWrap, PageLog, and PageJump); Matrox PowerDesk	

Matrox Millennium G550 AGP Graphics Controller *(continued)*

DualHead configurations	VGA monitor/analog flat panel + VGA monitor/analog flat panel VGA monitor/analog flat panel + television Digital flat panel + VGA monitor/analog flat panel Digital flat panel + television
DualHead 2-D display features	DualHead Multi-Display support; DualHead Browser Enhancement Suite, DualHead DVDMax, DualHead Zoom, DualHead Clone, DVDMax, DualHead MultiDesk, DualHead TV-out, DualHead Snapshot, Dual DVI support, ; True Multi-Display support with Microsoft Windows 2000
DualHead display technology chip specifications	Multiple independent displays with a single AGP card: analog flat panel (RGB monitor)/analog flat panel (RGB monitor); digital flat panel/digital flat panel

Note: System recommendations for HeadCasting and DVD—450-MHz or higher computer; 128 MB RAM; 56-K or higher modem with minimum 40-K connection, microphone, and DVD-ROM; Internet Explorer 5.5 or higher, Microsoft PowerPoint 2000 or Microsoft PowerPoint XP (for Matrox Virtual Presenter)

Resolutions Supported	Maximum Colors Supported	Refresh Rates
640 x 480	16 million	200 Hz vertical, 130 kHz horizontal
800 x 600	16 million	200 Hz vertical, 130 kHz horizontal
1024 x 768	16 million	160 Hz vertical, 130 kHz horizontal
1152 x 864	16 million	150 Hz vertical, 130 kHz horizontal
1280 x 1024	16 million	120 Hz vertical, 130 kHz horizontal
1600 x 1200	16 million	100 Hz vertical, 130 kHz horizontal
1800 x 1440	16 million	90 Hz vertical, 120kHz horizontal
1920 x 1440	16 million	85 Hz vertical, 115 kHz horizontal
2048 x 1536	16 million	85 Hz vertical, 110 kHz horizontal

Secondary Resolutions Supported	Maximum Color Depths (bpp)	Refresh Rates
640 x 480	16 million	200 Hz vertical, 130 kHz horizontal
800 x 600	16 million	200 Hz vertical, 130 kHz horizontal
1024 x 768	16 million	160 Hz vertical, 130 kHz horizontal
1152 x 864	16 million	140 Hz vertical, 130 kHz horizontal
1280 x 1024	16 million	120 Hz vertical, 130 kHz horizontal
1600 x 1200	16 million	100 Hz vertical, 130 kHz horizontal

Matrox G200 Quad Multi-Monitor Series (MMS) Graphics Controller

Dimensions (HxW)	4.5x8 in/11.43x20.32 cm		
Refresh Rate (per display)			
Aspect Ratio	**Resolution**	**Vertical**	**Horizontal**
4:3/5:4	640 x 480	60 to 200 Hz	31 to 102 kHz
	800 x 600	60 to 200 Hz	38 to 114 kHz
	1024 x 768	60 to 140 Hz	48 to 113 kHz
	1152 x 864	60 to 120 Hz	54 to 110 kHz
	1280 x 1024	60 to 100 Hz	64 to 107 kHz
	1600 x 1200	60 to 90 Hz	75 to 113 kHz
	1800 x 1440	60 to 70 Hz	89 to 104 kHz
16:9/16:10	856 x 480	60 to 200 Hz	30 to 108 kHz
	1280 x 720	60 to 100 Hz	44 to 76 kHz
	1600 x 1024	60 to 100 Hz	64 to 108 kHz
	1920 x 1080	60 to 80 Hz	70 to 94 kHz
	1920 x 1200	60 to 76 Hz	75 to 95 kHz

With DVI digital flat panel displays, the maximum display resolution is 1280 x 1024.

Maximum refresh rates may not be attainable at the highest display resolutions with 24 or 32-bit color palettes.

Interface	PCI	
Standard Memory	32-MB SGRAM (8 MB per port)	
DAC Speed	250 MHz	
Data Path	128-bit Internal/64-bit External	
Color Space Conversion	Yes	
Scaling	Yes	
Quick Draw Support	Yes	
DCI & DirectX Video Playback	Yes	
Direct3D Support	Yes	
Engine Acceleration	3 ROP bitBLT, Line Draw, Text, Color Expansion, Basic Video Color Conversion and Scaling, Triangle Setup Engine	
Output	Two output ports, which require 2 adapter cables to connect analog or digital output displays	
	Analog Display Support	2 RGB cables support two DB-15 analog displays per cable
	DVI (Digital Visual Interface) Display Support	DVI cable option kit provides two DVI cables for connecting two DVI compliant displays per cable
	Display options supported	Four analog displays via two RGB cables Four DVI displays via two DVI cables Two analog displays via one RGB cable and two DVI displays via one DVI cable
Other	PCI bus-mastering, texture mapping support, flat and Gouraud shading, Anisotropic Filter, perspective texture, specular highlighting, dithering, full scene anti-aliasing, Vertex fog	
OS Support	Windows 2000 Professional (not available for Chinese, Taiwanese, or Korean languages), Windows NT 4.0, Windows XP Professional	

NVIDIA Quadro2 EX Graphics Controller

Resolution	Maximum Colors Supported	Maximum Refresh Rate	Memory Dedicated to Texture Support
640 x 480	16.7 M	240 Hz	28.4 MB
800 x 600	16.7 M	240 Hz	26.4 MB
1024 x 768	16.7 M	200 Hz	22.8 MB
1152 x 864	16.7 M	170 Hz	20.3 MB
1280 x 1024	16.7 M	150 Hz	16.6 MB
1600 x 1200	64 K	100 Hz	20.8 MB
1600 x 1200	16.7 M	100 Hz	9.5 MB
1600 x 1280	64 K	100 Hz	20 MB
1600 x 1280	16.7 M	100 Hz	8 MB
1920 x 1080	64 K	85 Hz	19.9 MB
1920 x 1080	16.7 M	85 Hz	7.7 MB
1920 x 1200	64 K	85 Hz	18.5 MB
1920 x 1200	16.7 M	85 Hz	5 MB

Dimensions (LxHxW)	Approximately 6.5 x 2.5 x 0.6 in/16.5 x 6.4 x 1.5 cm
3D/2D Controller	Integrated Quadro2 EX 2D/3D 128-bit graphics processor unit (GPU)
VGA Controller	Integrated into the Quadro2 EX GPU
Bus Type	AGP 2X, 4X Graphics Bus
RAMDAC	350 MHz
Memory Type	183 MHz SDR 2Mx32
Memory Amount	32 MB
Memory Speed	166 MHz
Controller Clock Speed	175 MHz
Color Planes	32-bit color buffer
Overlay Planes	1 16-bit Video overlay plane, software emulation for OpenGL overlay planes
Stencil Planes	8-bit stencil buffer
Alpha Planes	8-bit alpha buffer
Z-buffer	24-bit Z buffer
Total bits/pixel	64-bits
Maximum Vertical Refresh Rate	240 Hz
Maximum Pixel Clock	350 MHz
Multi-display support	No
Operating Systems	Microsoft Windows 2000 Professional, Windows NT 4.0, Windows XP Professional

Note: All drivers and enhanced software, including ELSA POWERdraft, can be found on the Compaq web site at: http://www.compaq.com/support/files/workstations/us/index.html.

NVIDIA Quadro4 200 NVS Graphics Controller

3D/2D Controller	Integrated Quadro4 2D/3D 128-bit graphics processor unit (GPU)
VGA Controller	Integrated into the Quadro4 GPU
Bus type	AGP4x
RAMDAC	Dual 350 MHz
Memory speed and type	166 MHz 4Mx16 SDR 6ns
Memory amount	64 MB
Texture memory	Unified with frame buffer
Form factor	ATX and SFF
Controller clock speed	250 MHz
Color planes	32-bit color buffer
Overlay planes	One 16-bit Video overlay plane, software emulation for OpenGL overlay planes
Stencil planes	8-bit stencil buffer
Alpha planes	8-bit alpha buffer
Z-buffer	24-bit
Total bits/pixel	64
Maximum vertical refresh rate	120 MHz
Maximum pixel clock	350 MHz
Dual screen support	Yes, with nView
Single DVI support	Yes
Dual DVI support	Yes
Operating systems	Microsoft Windows XP, Windows 2000
nView hardware architecture	32-bit color
	2048 x 1536 @ 60 Hz maximum resolution
	2D rendering engine optimized for 32-, 24-, 16-, 15-, and 8-bpp modes
High-definition video processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content
	DVD-ready motion compensation for MPEG-2
	Independent hardware color controls for video overlay
	Hardware color-space conversion (YUV 4:2:2 and 4:2:0)
	IDCT motion compensation
	5-tap horizontal by 3-tap vertical filtering
	8:1 up/down scaling

Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	120 Hz
800 x 600	16.7 M	120 Hz
1024 x 768	16.7 M	120 Hz
1152 x 864	16.7 M	120 Hz
1280 x 1024	16.7 M	120 Hz
1600 x 1200	64 K	100 Hz
1600 x 1200	16.7 M	85 Hz
1920 x 1080	64 K	100 Hz
1920 x 1080	16.7 M	75Hz
1920 x 1200	64 K	85 Hz
1920 x 1200	16.7 M	70 Hz
1920 x 1440	64k	75Hz
1920 x 1440	16.7M	60Hz
2048 x 1536	64k	60Hz

NVIDIA Quadro4 400 NVS Graphics Controller	**3D/2D Controller**	Integrated Quadro4 2D/3D 128-bit graphics processor unit (GPU)
	VGA Controller	Integrated into the Quadro4 GPU
	Bus Type	PCI
	RAMDAC	Dual 350 MHz
	Memory Speed, Type, Capacity	220 MHz, 4mx 32 DDR per GPU, 32 MB per GPU, 64 MB total
	Texture Memory	Unified with frame buffer
	Form Factor	ATX
	Controller Clock Speed	220 MHz
	Color Planes	32-bit color buffer
	Overlay Planes	1 16-bit Video overlay plane, software emulation for OpenGL overlay planes
	Stencil Planes	8-bit stencil buffer
	Alpha Planes	8-bit alpha buffer
	Z-buffer	24-bit
	Total bits/pixel	64
	Maximum Vertical Refresh Rate	120 MHz
	Maximum Pixel Clock	343 MHz based on resolutions shown below
	Multi Screen VGA Support	Yes, 1 to 4 displays with nView
	Single DVI Support	Yes
	Multi screen DVI Support	Yes, 1 to 4 displays
	Operating Systems	Microsoft Windows XP, Microsoft Windows 2000
	nView Hardware Architecture	32-bit color
		2048 x 1536 @ 60 Hz maximum resolution
		2D rendering engine optimized for 32-, 24-, 16-, 15-, and 8-bpp modes
	High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content
		DVD-ready motion compensation for MPEG-2
		Independent hardware color controls for video overlay
		Hardware color-space conversion (YUV 4:2:2 and 4:2:0)
		IDCT motion compensation
		5-tap horizontal by 3-tap vertical filtering
		8:1 up/down scaling

NVIDIA Quadro4 400 NVS *(continued)*	**Resolution**	**Maximum Colors Supported**	**Maximum Refresh Rate**
	640x480	16.7 M	120 Hz
	800 x 600	16.7 M	120 Hz
	1024 x 768	16.7 M	120 Hz
	1152 x 864	16.7 M	120 Hz
	1280 x 1024	16.7 M	120 Hz
	1600 x 1200	64 K	100 Hz
	1600 x 1200	16.7 M	85 Hz
	1920 x 1080	64 K	100 Hz
	1920 x 1080	16.7 M	75 Hz
	1920 x 1200	64 K	85 Hz
	1920 x 1200	16.7 M	70 Hz
	1920 x 1440	64 K	75Hz
	1920 x 1440	16.7M	60Hz
	2048 x 1536	64 K	60Hz

NVIDIA Quadro4 550 XGL Graphics Controller

3D/2D Controller	Integrated Quadro4 Pro 2D/3D 128-bit graphics processor unit (GPU)
VGA Controller	Integrated into the Quadro4 GPU
Bus Type	AGP4x
RAMDAC	350 MHz
Speed & Type	200 MHz 4Mx 32 DDR SDRAM
Memory Amount	64 MB
Controller Clock Speed	270 MHz
Color Planes	32-bit color buffer
Overlay Planes	1 16-bit Video overlay plane, software emulation for OpenGL overlay planes
Stencil Planes	8-bit stencil buffer
Alpha Planes	8-bit alpha buffer
Z-Buffer	24-bit
Total Bits/Pixel	64
Maximum Vertical Refresh Rate	120 Hz
Multi-Display Support	Yes
Operating Systems	Microsoft® Windows® 2000, and Microsoft Windows XP

Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	120 Hz
800 x 600	16.7 M	120 Hz
1024 x 768	16.7 M	120 Hz
1152 x 864	16.7 M	120 Hz
1280 x 1024	16.7 M	120 Hz
1600 x 1200	64 K	100 Hz
1600 x 1200	16.7 M	85 Hz
1920 x 1080	64 K	100 Hz
1920 x 1080	16.7 M	75 Hz
1920 x 1200	64 K	85 Hz
1920 x 1200	16.7 M	70 Hz
1920 x 1440	64 K	75 Hz
1920 x 1440	16.7 M	60 Hz
2048 x 1536	64 K	60 Hz

NVIDIA Quadro4 750 XGL Graphics Controller

3D/2D Controller	Integrated Quadro4 Pro 2D/3D 128-bit graphics processor unit (GPU)
VGA Controller	Integrated into the Quadro4 Pro GPU
Bus type	AGP4x
RAMDAC	350 MHz
Speed & type	275 MHz 4Mx32DDR 5ns
Memory amount	64 to 128 MB
Controller clock speed	275 MHz
Color planes	32-bit color buffer
Overlay planes	1 16-bit Video overlay plane, software emulation for OpenGL overlay planes
Stencil planes	8-bit stencil buffer
Alpha planes	8-bit alpha buffer
Z-buffer	24-bit
Total bits/pixel	64
Maximum vertical refresh rate	120 Hz
Multi-display support	Yes
Operating systems	Windows 2000 and Windows XP

Resolution	**Maximum Colors Supported**	**Maximum Refresh Rate**
640 x 480	16.7 M	120 Hz
800 x 600	16.7 M	120 Hz
1024 x 768	16.7 M	120 Hz
1152 x 864	16.7 M	120 Hz
1280 x 1024	16.7 M	120 Hz
1600 x 1200	64 K	100 Hz
1600 x 1200	16.7 M	85 Hz
1920 x 1080	64 K	100 Hz
1920 x 1080	16.7 M	75 Hz
1920 x 1200	64 K	85 Hz
1920 x 1200	16.7 M	70 Hz
1920 x 1440	64k	75 Hz
1920 x 1440	16.7 M	60 Hz
2048 x 1536	64k	60 Hz

NVIDIA Quadro4 900 XGL Graphics Controller

3D/2D Controller	Integrated Quadro4 2D/3D 128-bit graphics processor unit (GPU)
VGA Controller	Integrated into the Quadro4 GPU
Bus Type	AGP4x
RAMDAC	350 MHz
Speed & Type	325MHz 4Mx32DDR 5ns
Memory Amount	128 MB
Controller Clock Speed	300 MHz
Color Planes	32-bit color buffer
Overlay Planes	1 16-bit Video overlay plane, software emulation for OpenGL overlay planes
Stencil Planes	8-bit stencil buffer
Alpha Planes	8-bit alpha buffer
Z-Buffer	24-bit
Total Bits/Pixel	64
Maximum Vertical Refresh Rate	120 Hz
Multi-Display Support	Yes
Operating Systems	Microsoft® Windows® 2000, and Microsoft Windows XP

Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	120 Hz
800 x 600	16.7 M	120 Hz
1024 x 768	16.7 M	120 Hz
1152 x 864	16.7 M	120 Hz
1280 x 1024	16.7 M	120 Hz
1600 x 1200	64 K	100 Hz
1600 x 1200	16.7 M	85 Hz
1920 x 1080	64 K	100 Hz
1920 x 1080	16.7 M	75 Hz
1920 x 1200	64 K	85 Hz
1920 x 1200	16.7 M	70 Hz
1920 x 1440	64 K	75 Hz
1920 x 1440	16.7 M	60 Hz
2048 x 1536	64 K	60 Hz

3Dlabs Wildcat III 6110 Graphics Controller

Dimensions (L x H x W)	Approximately 13.5 x 4.25 x 1.5 in/ 34.29 x 10.8 x 3.81 cm
3D/2D controller	3Dlabs Wildcat III 2D/3D graphics controller technology
VGA controller	Standard VGA on board
Bus type	AGP Pro-50
RAMDAC	320 MHz
Memory type	DDR SDRAM
Memory amount	Frame buffer: 64 MB DDR Texture: 128 MB DDR DirectBurst: 16 MB
Memory speed	Frame buffer: 182 MHz Texture: 166 MHz Direct Burst: 133 MHz
Controller clock speed	Geometry Engine: 222 MHz Rasterization Engine: 213 MHz
Color planes	32-bit color buffer
Overlay planes	8-bit double buffer
Stencil planes	8-bit stencil buffer
Alpha planes	8-bit alpha double buffer
Z-buffer	32-bit Z buffer
Total bits per pixel	96, 128, 160, 192
Maximum vertical refresh rate	90 Hz
Maximum pixel clock	320 MHz (single head analog); 162 MHz (single head digital)
Multi-display support	Yes – (dual VGA or Dual DVI-I)
Operating systems	Microsoft® Windows 2000, Windows XP

Resolutions	Max Refresh Rate (Hz)	SuperScene Antialiasing Supported	Stereo Available at (Hz)
2048 x 1152	75	-	-
1920 x 1440	75	-	-
1920 x 1200	76	-	-
1920 x 1080	85	-	-
1856 x 1392	80	-	-
1824 x 1368	75	-	-
1824 x 1128	75	-	-
1792 x 1344	75	-	-
1792 x 1120	75	-	-
1600 x 1200	90	-	-
1600 x 1024	76	-	-
1600 x 900	85	-	-
1520 x 856	90	-	106
1440 x 900	90	-	100
1360 x 766	90	yes	118
1280 x 1024	85	-	120
1280 x 960	85	-	120
1280 x 800	90	yes	112
1280 x 720	75	yes	120
1152 x 864	85	yes	120
1024 x 768	85	yes	120
856 x 480	75	yes	120
800 x 600	85	yes	120
640 x 480	85	yes	120

ATI Fire GL 8800 Graphics Controller

Form factor	ATX
Graphics controller	RADEON™ 8800
Bus type	AGP 4x
RAMDAC	400 MHz/30-bit
Memory speed & type	300 MHz 4Mx32 DDR SGRAM 3.3ns
Memory amount	128 MB
Controller clock speed	275 MHz
Color planes	32-bit, True Color
Overlay planes	8-bit
Stencil planes	8-bit
Alpha planes	8-bit
Z-buffer	24-bit
Video engine support	YUV (4:2:2, 4:2:0) conversion, point and bilinear scaling
Monitor	15-pin D-type analog
Flat panel interface	DVI-I digital (supported resolutions up to 1600 x 1200)
Video timings compliance	VESA DMT 1.0 and VESA GTF 1.0 specifications
Maximum vertical refresh rate	100 Hz / 120 Hz when quad buffer stereo is enabled
Operating systems	Microsoft Windows XP and Windows 2000

Note: All drivers can be found on the Compaq web site at: http://www.compaq.com/support/files/workstations/us/index.html.

Analog or digital monitor with 15-pin VGA connector - single monitor

Resolution	**Line Frequency** (kHz)	**Refresh Rate** (Hz)	**Color Depth** (bits)
640 x 480	31.5, 37.5, 43.3, 50.9	60, 75, 85, 100	16 / 32
800 x 600	37.7, 46.9, 54.1, 63.9	60, 75, 85, 100	16 / 32
1024 x 768	48.4, 60.0, 68.7, 80.8	60, 75, 85, 100	16 / 32
1152 x 864	53.7, 67.5, 77.1, 91.5	60, 75, 85, 100	16 / 32
1280 x 960	60.0, 75.1, 85.7, 101.7	60, 75, 85, 100	16 / 32
1280 x 1024	64.0, 80.0, 91.1, 107.0	60, 75, 85, 100	16 / 32
1600 x 1000	62.1, 78.3, 89.2, 105.9	60, 75, 85, 100	16 / 32
1600 x 1024*	63.6, 80.2, 81.3, 91.4, 107.5	60, 75, 76, 85, 100	16 / 32
1600 x 1200	75.0, 93.8, 106.3	60, 75, 85, 100	16 / 32
1792 x 1344	83.6, 106.3, 119.9	60, 75, 85	16 / 32
1920x1080**	67.1, 84.6, 96.4, 114.4	60, 75, 85, 100	16 / 32
1920 x 1200*	74.5, 94.0, 95.0, 107.1, 127.1	60, 75, 76, 85, 100	16 / 32
2048 x 1536	95.3, 120.2	60, 75	16 / 32

*: Wide Screen Aspect Ratio Mode (16:10)
**: Wide Screen Aspect Ratio Mode (16:9)

Compaq PCs use genuine Microsoft® Windows®

http://www.microsoft.com/piracy/howtotell