WHITE PAPER

April 1998

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Workstation Marketing

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Contents

The Compaq Professional Workstation 6000 Key Technologies White Paper

The purpose of this paper is to provide an overview of the Key Technologies incorporated into The Compaq Professional Workstation 6000. This paper concentrates on covering those new features and technologies that have unique customer benefits. The objective is to provide the technical information and benefits of these features, so that geographic regions can market them successfully.

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The Compaq Professional Workstation 6000 Key Technologies White Paper

April 1998

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THE NEW COMPAQ PROFESSIONAL WORKSTATIONS

The Compaq Professional Workstation 6000 is a powerful, industry standard workstation specifically designed to deliver leading performance with today's demanding CAD/CAE, digital content creation, and EDA applications. Compaq Professional Workstation is backed by strong partnerships with leading ISVs to provide highly integrated and optimized solutions, which can be confidently deployed in the most demanding, business critical environments. The Compaq Professional Workstation 6000 combines powerful industry standard components, strong partnerships with leading ISVs, and traditional Compaq quality and reliability, giving users the time-to-market advantage they need to succeed.

Though the physical appearance of the Professional Workstation 6000 and 8000 is very similar, they are targeted at very different markets whose computing requirements lead to some key feature differences between the products. The Compaq Professional Workstation 6000 combines performance and expandability to meet the needs of a broad set of users. In particular, it is targeted at users in the CAD/CAE, DCC, and EDA segments who may require more expandability than that provided by the Compaq Professional Workstation 5100. The Compaq Professional Workstation 6000 supports up to two Pentium II 266MHz, 300MHz, 333MHz or 333MHz (with Extended Tag RAM or ETR) processors with a 512KB L2 cache. Combined with the Compaq Highly Parallel System Architecture, this workstation provides customers with industry leading system performance.

Table 2. Listing of Professional Workstation Target Market by Product

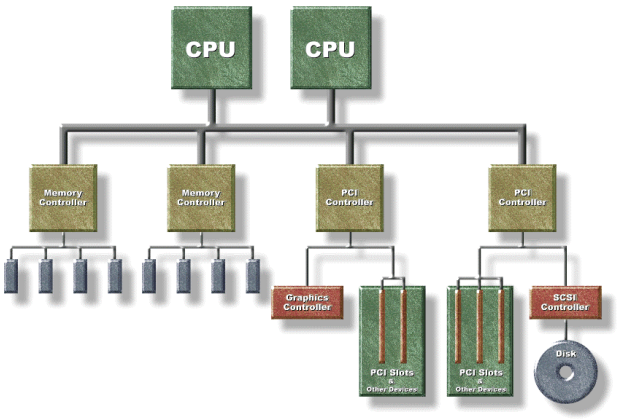
	Finance	CAD	CAE	DCC	EDA	Other
Professional Workstation 5100	✓ Trading	✓ MCAD/AEC (2D/3D Design, Solids modeling, Plant design)		✓ Graphics design, Animation, Web authoring	✓ Design entry & editing, Layout	✓ Software development
Professional Workstation 6000	Trading	✓ MCAD/AEC (3D Design, Solids modeling, Plant design, req. fast 3D graphics)	✓ Part and small assembly analysis	✓ Animation, Video editing, Compositing	✓ Place and route, Verification	✓ Software development
Professional Workstation 8000	Risk management; Financial analysis	MCAD (Large assembly modeling and design having large mem. Req.)	✓ FEA, Thermal & vibration analysis; Computational fluid dynamics	✓ Final rendering, Image processing	✓ Synthesis, Simulation	✓ Geophysical

COMPAQ HIGHLY PARALLEL SYSTEM ARCHITECTURE

The Compaq Professional Workstation 6000 has been designed with a Highly Parallel System Architecture that maximizes system bandwidth to improve performance in demanding applications. Most workstations in the Intel based Windows NT market support two CPUs to process instructions concurrently. However, overall system bandwidth is limited since each CPU must compete for access to critical subsystems such as memory and I/O whose bandwidth has not been correspondingly increased.

The Highly Parallel System Architecture used with the Compaq Professional Workstation 6000 addresses the need for greater overall system bandwidth by using dual memory controllers, dual-peer PCI buses, and advanced multiprocessing support.

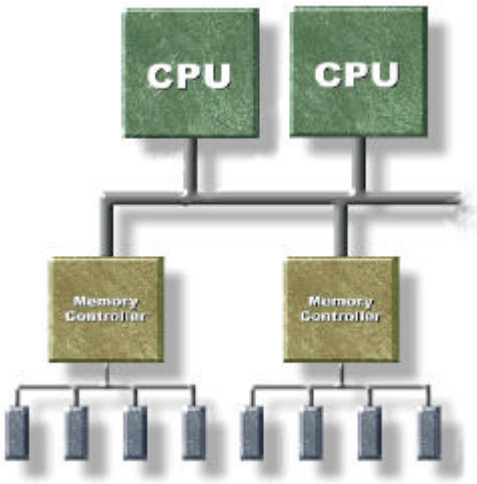
Diagram 1: The Compaq Highly Parallel System Architecture.



Dual Memory Controllers

The Compaq Professional Workstation 6000 uses dual memory controllers that can process memory requests in parallel, significantly increasing overall memory bandwidth. Other workstations in the Intel based Windows NT market offer memory bandwidth of either 267MB/second or 533MB/second depending on the chipset used. The Compaq Professional Workstation 6000 uses two memory controllers, each with a bandwidth of 533MB/second. Therefore, total memory bandwidth increases to 1.07GB/second- two to four times that of other systems.

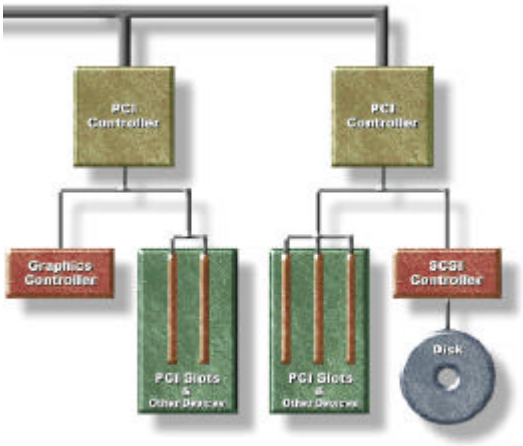
Diagram 2: Dual Memory Controllers Architecture.



Dual-Peer PCI Buses

The Compaq Professional Workstation 6000 also uses dual-peer PCI buses to increase system I/O bandwidth. A single PCI bus provides I/O bandwidth of 133MB/second that must be shared by many key peripherals such as the graphics controller, hard drive, and NIC. With dual-peer PCI buses, each bus can provide peek bandwidth in parallel with the other controller, allowing an aggregate I/O bandwidth of 267MB/second. This implementation provides twice the bandwidth of single bus architectures. Also, dual PCI buses allow key peripherals to be connected to separate buses to balance overall system throughput. The dual PCI buses also allow for greater system I/O integration and expandability by supporting up to 12 PCI devices which is twice the number supported on single bus implementations. This allows the Compaq Professional Workstation 6000 to deliver six PCI-based I/O expansion slots while also integrating other PCI components such as the SCSI and network controllers on the system board.

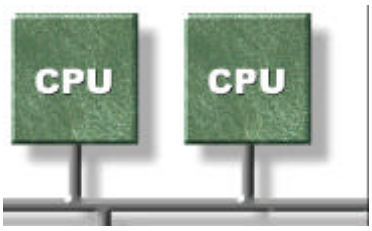
Diagram 3: Dual-Peer PCI Buses.



Optimized Multiprocessing Support

Finally, with dual memory controllers and dual-peer PCI buses, the Compaq Professional Workstation 6000 is able to deliver optimized multiprocessing support. The Intel Pentium II processor enables multiprocessor support by including circuitry in the processor that determines how multiple processors can share the CPU bus. However, most multiprocessing implementations in the Intel based Windows NT workstation market take advantage of this support by simply adding an additional processor to an already existing desktop design. Compaq takes multiprocessing to the next step with the Compaq Highly Parallel System Architecture by enhancing memory and I/O bandwidth as well. Multiprocessor Systems designed without the Compaq Highly Parallel System Architecture will quickly encounter a bottleneck as the multiple processors try to access the other system resources, such as memory and I/O subsystems, that have not been enhanced to accommodate the additional data traffic. The Compaq Highly Parallel System Architecture significantly reduces these bottlenecks by incorporating enhanced subsystem resources, such as dual memory controllers and dual- peer PCI buses, to accommodate the increased data traffic from the multiple CPUs.

Diagram 4: Multiprocessing Support



PROCESSOR TECHNOLOGIES

The Compaq Professional Workstation 6000 uses Intel's Pentium II processor, which incorporate Dynamic Execution and the Dual Independent Bus architecture technologies to provide the highest performance next generation processors.

Dynamic Execution

The Pentium II processor design is based on Intel's Dynamic Execution technology that combines three advanced processing techniques to increase the performance. The three techniques are multiple branch prediction, dataflow analysis and speculative execution.

Multiple branch prediction means that the processor looks ahead several steps in the software and predicts which groups of instructions are likely to be processed next. This increases the amount of work delivered to the processor, improving how efficiently the processor is used and ultimately, system performance.

Dataflow analysis analyzes which instructions are dependent on each other's results, or data. This technique allows an optimized schedule of instructions to be created so they can be processed in the most efficient order.

Speculative Execution means that the instructions are then carried out based on the schedule created by the dataflow analysis. Thus, the entire processor's superscalar processing power is kept busy, boosting overall software performance.

This combination of new technology enables the Pentium II processor to deliver the processing performance workstation applications requires.

Dual Independent Bus Architecture

The Pentium II uses Intel's Dual Independent Bus architecture providing two (dual) independent buses versus the single bus architecture of the Pentium processor. The dual buses are the L2-cache-to-processor bus and the processor-to-main-memory system bus. This design delivers up to three times the bandwidth of a single bus architecture processor because the buses can work independently which essentially doubles the throughput. This technology will enable the evolution of today's 66MHz system memory bus to the faster 100MHz system memory bus later this year.

PENTIUM II

The Compaq Professional Workstation 6000 uses the Pentium II processor, which is Intel's newest processor that incorporates P6 technology along with Intel's new MMX processor instruction set. The Pentium II will come in 233MHz, 266MHz, 300MHz, 333MHz, and 333MHz (with ETR) versions with the 512KB cache. Once again, because performance is a primary requirement for workstation customers, the Compaq Professional Workstation 6000 will only use the 266MHz/512KB, 300MHz/512KB, 333MHz/512KB, or 333MHz/512KB (with ETR) processors.

To improve ease of manufacturability, the Pentium II uses a new form factor. Instead of the traditional single chip package, the Pentium II comes with the processor and cache mounted on a PCB (substrate). The PCB, processor and L2 cache are enclosed in a Single Edge Contact (S.E.C.) cartridge. Instead of a socket, the Pentium II now plugs into a slot using the S.E.C. cartridge. This new form factor is similar to a video game cartridge in appearance and measures approximately 4.9" wide by 2.1" high by 0.5" deep.

The Pentium II provides some enhancements over the Pentium Pro. The MMX instruction set improves performance of multimedia processing in MMX-enabled applications. Additionally, the Pentium II uses industry standard SRAMs for the L2 cache. However, the SRAMs run at half the core frequency of the processor. The replacement of the full-speed secondary (L2) internal cache (Pentium Pro) with the industry standard SRAM cache improves manufacturability; however, this new design takes longer to access the cache versus the Pentium Pro. Although, with its larger L1 cache and high clock speeds (266MHz, 300MHz, 333MHz, or 333MHZ (with ETR) versus 200MHz for the Pentium Pro), a single processor Pentium II system will outperform a single processor Pentium Pro system in most applications.

The new design also places some limitations on scalability. Pentium II systems will only be able to support up to two processors and will be limited to 512MB of addressable system memory, on Pentium II processors without ETR. The Pentium II 333MHz (with ETR) will support up to 3GB of addressable system memory. This memory expandability offers greater ability to run very large models and simulations that require system memory of more over 512MB.

MMX

MMX (MultiMedia Extensions) is the name for the 57 multimedia instructions Intel has added to its new generation of processors. These multimedia extension instructions are expected to significantly improve performance on CPU-intensive multimedia applications. MMX is tailored to audio, video, and other multimedia tasks. An MMX-equipped workstation will use one instruction to execute a task it may take a Pentium Pro up to 16 instructions to perform. Because multimedia operations such as video and audio use a number of redundant instructions, MMX achieves some efficiencies by using a technique called SIMD (Single Instruction Multiple Data), which saves on clock cycles by using a single instruction to perform these redundant functions on multiple sets of data.

The greatest benefits of MMX will be demonstrated in playback applications such as games, where 3D effects and video/audio processing are critical for realism and are usually done without the benefit of dedicated hardware. Additionally, some professional applications such as Adobe PhotoShop also benefit because their filter and effects functions are paralleled with MMX, which greatly increases the performance of the application.

For additional information on MMX, please access the Intel web site at http://developer.intel.com/drg/mmx/Support/faq.htm.

GRAPHICS

Three graphics solutions are available for the Compaq Professional Workstation 6000. All are PCI local bus implementations designed to maximize system performance and have been tested to ensure optimum compatibility and reliability.

- For 2D applications, the Compaq Professional Workstation 6000 includes the Matrox Millennium II graphics controller. The Matrox provides fast 2D windowing for applications such as financial analysis and software development. It comes standard with 4 MB WRAM and is upgradeable to either 8 MB or 16 MB of WRAM.
- For 2D and entry 3D applications, the Compaq Professional Workstation 6000 includes the ELSA GLoria Synergy. The GLoria Synergy comes standard with 8 MB SGRAM and provides even faster 2D windowing and also provides entry level 3D performance for the occasional 3D needs
- For 3D graphics needs, the Compaq Professional Workstation 6000 includes models with the Diamond Fire GL 4000 graphics controllers.
    - The Fire GL 4000 is the high performance, 3D graphics solution for users working in demanding, true color environments. The Fire GL 4000 uses the high performance REALimage rendering engine from Evans and Sutherland along with specialized graphics memory from Mitsubishi. This controller comes standard with the maximum memory configuration which is 15MB 3D-RAM for frame buffering and Z-buffering and 16MB of Cache DRAM (CDRAM) for texture memory. It provides true color resolution (16million colors) at up to 1280 x 1024 resolution.

Compaq Graphics Driver Compatibility

All three controllers are high-performance graphics solutions, optimized for Windows NT applications that require up to 16.7 million color processing and high resolutions. The drivers for each are developed by their respective manufacturers, and have been thoroughly tested to ensure compatibility with existing applications.

Matrox Millennium II

The Compaq Professional Workstation uses the Matrox Millennium II graphics controller to provide fast 2D performance for applications such as software development, electronic design automation (EDA), financial planning, and digital editing and compositing.

Color and resolution support for the Millennium II:

Table 1
Maximum Color Support
Millennium II
Single-Buffer Mode

Resolution	4 MB WRAM	8 MB WRAM	16 MB WRAM
1800 x 1440	256	65,536	65,536
1920 x 1200	256	65,536	65,536
1920 x 1080	65,536	16.7 million	16.7 million
1920 x 1035	65,536	16.7 million	16.7 million

Table 1
Maximum Color Support
Millennium II
Single-Buffer Mode

Resolution	4 MB WRAM	8 MB WRAM	16 MB WRAM
1600 x 1200	65,536	16.7 million	16.7 million
1600 x 1024	65,536	16.7 million	16.7 million
1280 x 1024	16.7 million	16.7 million	16.7 million
1152 x 882	16.7 million	16.7 million	16.7 million
1024 x 768	16.7 million	16.7 million	16.7 million
800 x 600	16.7 million	16.7 million	16.7 million
640 x 480	16.7 million	16.7 million	16.7 million

Matrox Millennium II Technical Specifications

The main enhancements Matrox has implemented in the Millennium II are:

- PCI 2.1 compliant
- PC 97 compliant
- 3D texture mapping
- 16-bit or 32-bit z buffer
- 250MHz RAMDAC to support resolution up to 1920 x 1200@ 75Hz
- Memory expandability up to 16MB WRAM for higher 3D resolution
- Bus mastering with scatter/gather to free-up the CPU for other processing tasks and improve overall system performance in a multitasking environment
- Larger PCI input FIFO buffer for improved 2D and 3D performance (32 double word vs. 64 double word FIFO)
- Supports the Compaq P1610 24" monitor
- 4MB WRAM standard, upgradeable to 16MB WRAM for greater color depth and higher resolutions
- Multiple display support using additional controllers
- Drivers for Windows NT 4.0, Windows NT 3.51, Windows 95, AutoCAD, and Heidi

Table 2: Millennium II technical specifications

Features	Technical specification
Controller	Matrox 2164W
Bus Type	PCI
RAMDAC	TVP 3026 250 MHz
Memory Type	WRAM
Memory Amount	4 + 4 or 12 MB
Max Memory	16 MB
Memory Speed	50 ns
Data Path	64-bit
Controller Clock Speed	50 MHz
Max Vertical Refresh Rate	200 Hz
Max Horizontal Scan Rate	113 KHz
Max Pixel clock	250 MHz

Features	Technical specification
Video Features:	
Interface	VGA Feature Connector
Multimedia Connector	Optional Multimedia module*
MPEG HW Acceleration	Yes – on the optional module*
Scaling	Yes
Color Space Conversion	Yes
Engine Acceleration:	
BitBLT	Yes
Line Draw	Yes
Polygon	Yes
3D	Yes
Autodesk Display list driver	Yes
Heidi drivers support for 3D Studio Max	Yes
Operating Systems	Windows 95 Windows NT 3.51/4.0

* Available from Matrox

3D Capabilities

Although the Millennium II has improved its 3D capabilities as compared to the original Millennium graphics controller, there are significant differences between it and other 3D graphics controllers offered on the Compaq Professional Workstation 5100. The new features in the Millennium II support texture mapping and Gouraud shading along with 32-bit Z-buffering. The Millennium II does not support fogging, alpha-blending, depth-queuing, MIP-mapping, anti-aliasing and bilinear interpolation making it inappropriate for applications in the CAD and DCC segments that require this level of 3D functionality.

Additionally, the Millennium II 3D capabilities are implemented mainly through software (i.e. drivers). Thus, those functions not supported by the hardware graphics controller must be emulated in software and processed by the CPU. This has a significant impact on performance and makes it far slower than a hardware-based implementation. The Millennium II 3D graphics capabilities make it appropriate for 3D games, viewing 3D web sites, and entry-level CAD where rudimentary, low cost 3D capabilities are needed.

ELSA GLoria Synergy Graphics Controller

The GLoria Synergy controller in Compaq Professional Workstation 6000 comes standard with 8 MB of SGRAM memory to provide greater color depth in higher resolution modes. Unified 2D/3D graphics controllers available for the Compaq Professional Workstation provide exceptional performance at a low cost. Professionals who require fast window and menu level performance as well as robust 3D rendering capabilities use 2D/3D graphics. The 2D performance of these solutions is competitive with 2D only controllers such as the Matrox Millennium II.

Requirements for the 2D/3D graphics segment include exceptional 2D/3D-vector performance, 3D shading and lighting, and some texture mapping support. These features used by mainstream OpenGL and Heidi based applications typically offer great price/performance without sacrificing required functionality. This combination is important for mainstream CAD applications, such as AutoCAD, Microstation, and SolidWorks that have recently integrated 3D techniques into their environment. It is also useful in DCC where 2D and 3D animation applications are used in the same environment. Financial analysis and trading environments can benefit from the 2D performance provided by these solutions. Graphics controllers in this segment also provide

investment protection as financial analysis application developers add 3D modeling to their environment in FY98.

A low-cost / high-performance leader in this area is the ELSA GLoria Synergy. This controller is based on the new Permedia-2 graphics engine from 3Dlabs. It provides the 2D performance of a Matrox Millennium II while adding a robust 3D environment that rivals the performance of previous GLINT Delta/TX boards, such as the GLoria-L. The GLoria Synergy is the perfect low-cost solution for mainstream CAD, web authoring, pre-print, and 2D/3D animation applications that don't require greater than 1280x1024 resolution for true-color rendering.

ELSA GLoria Synergy Features

- Provides 2D windowing performance equivalent to the Matrox Millennium II
- A low-cost solution for professional 3D applications, such as AutoCAD, Microstation, SolidWorks, and 3D Studio Max
- Supports a wide range of resolutions and color depths for flexibility and performance in a variety of 3D graphics environments
- Supports up to 4 displays using multiple controllers (depending on slot availability)
- Uses 3Dlabs Permedia 2 processor for highly integrated 2D and robust 3D rendering requirements
- Comes standard with 8MB of SGRAM
- Supports a wide range of resolutions (up to 1600 x 1280) and color depths for flexibility and performance in a variety of 3D graphics environments
- Optimized graphics drivers for OpenGL and Heidi under Windows NT 4.0 and 3.51; display list drivers for AutoCAD; Direct3D driver for Windows 95

Table 1: ELSA GLoria Synergy Color and Resolution Support

2D Resolutions*; Max Colors 8MB SGRAM Standard	**GLoria Synergy** Max Hz Refresh
1920 x 1200; 32K	70
1920 x 1080; 32K	75
1600 x 1280; 32K	75
1600 x 1200; 32K	85
1600 x 1000; 16.7M	60
1536 x 1152; 32K	85
1280 x 1024; 16.7M	70
1152 x 864; 16.7M	85
1024 x 768; 16.7M	100
800 x 600; 16.7M	100
640 x 480; 16.7M	100

* Refer to the Compaq Professional Workstation 6000 Reference Guide for additional display modes and resolutions

Table 2: ELSA GLoria Synergy Technical Specifications

Features	**Technical Specifications**
Controller	3Dlabs Permedia-2
Bus Type	PCI
RAMDAC	Integrated 230 MHz
Memory Type	SGRAM
Memory Amount	8 MB
Memory Speed	8 ns
Data Path	64-bit
Controller Clock Speed	80 MHz
Max Vertical Refresh Rate	219 Hz

Features	Technical Specifications
Max Horizontal Scan Rate	281 KHz
Max Pixel clock	230 MHz at 8bpp and 16bpp/5:5:5 135 MHz at 32bpp/8:8:8
Video Features: Interface	 VGA
3D Graphics Features: Integrated geometry pipeline setup processor True-color 3D graphics Polygon based with Z-buffer Texture decompression Full scene anti-aliasing Enhanced GUI Acceleration: Ultra-fast BLT engine and 2D rasterizer Stretch BLTs, monochrome/color expansion and logic ops Fast on-chip SVGA Autodesk Display list driver Heidi drivers support for 3D Studio Max	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
Operating Systems	Windows 95 Windows NT 3.51/4.0

The Diamond Fire GL 4000

Select models of the Compaq Professional Workstation 6000 includes the Diamond Fire GL 4000 graphics controller which delivers high performance 3D graphics capabilities for users working in demanding, true color environments such as 3D animation, visualization, simulation, and mechanical CAD.

The Fire GL 4000 uses the Mitsubishi 3DPro chipset based on the REALimage rendering technology from Evans & Sutherland to deliver a very high level of 3D performance. It provides hardware acceleration for OpenGL 1.0 (NT 3.51 only), OpenGL 1.1 (NT 4.0 only), and HEIDI (NT 3.51 and 4.0). Support for Direct3D and HEIDI under Windows 95 will be available at a later date.

The Fire GL 4000 delivers industry leading 3D graphics performance by combining a comprehensive set of hardware acceleration features including rasterization, texture mapping and triangle set-up with the new 3D-RAM and CDRAM memory architectures.

3D-RAM is a new technology used for the Frame buffer and Z-buffer memory on the Fire GL. This design includes a small arithmetic logic unit in the DRAM that performs a number of the calculations locally. This improves performance by reducing traffic to and from memory.

The Fire GL uses CDRAM (Cache DRAM) for the texture memory. This technology provides a small SRAM cache built into the DRAM. This high-speed cache provides a buffer for texture between the controller and the DRAM memory, which reduces data access times and ultimately, increase graphics performance.

With all of the Fire GL's high performance features, it can deliver performance exceeding the throughput capabilities of the PCI bus. One component of the Highly Parallel System

Architecture in the Compaq Professional Workstation 6000 is dual peer-PCI buses, which eliminates the potential PCI bus bottleneck to provide improved throughput and overall system performance when compared to single bus implementations.

The Fire GL 4000 comes standard with 15 MB of 3D-RAM for frame buffer and Z-buffer memory, 16MB of CDRAM for texture memory, and 1 MB DRAM Frame Buffer memory for the CIRRUS Logic 5446 VGA controller. The maximum resolutions, colors, and refresh rates are outlined in the chart below; other resolutions are selectable:

Table 5: Fire GL 4000 double buffered resolutions

Double Buffered Capabilities Resolution; Max Colors	***Fire GL 4000*** Max Hz
1280 x 1024; 16M	85
1024 x 768; 16M	100
800 x 600; 16M	120
640 x 480; 16M	120

Fire GL 4000 Features

Features of the Fire GL 4000 graphics controller include:

- Support for major industry 3D APIs, including
  - OpenGL –- Open Graphics Library is a software interface to graphics hardware developed by Silicon Graphics Inc. The Fire GL supports OpenGL 1.0 under Windows NT 3.51 only and OpenGL 1.1 under Windows NT 4.0 only.
  - Direct3D – A set of APIs for real-time 3D graphics that are an addition to the Microsoft DirectX interactive media technologies. They provide a comprehensive 3D solution for software developers building interactive media programs and games. Fire GL 4000 support for this API under Windows 95 will be provided at a later date.
  - Heidi – 3D API from Kinetix (an AutoDesk company) that provides an immediate 2D and 3D mode drawing interface for 3D Studio Max. Support for Windows NT 3.51 and 4.0 are available immediately. Support for Windows 95 will be provided at a later date.
  - BigFocus Display list drivers – Provide performance acceleration for AutoCAD R13.
  - 3D-Win – 3D viewer software for AutoCAD R13, Windows NT and OpenGL
- On-board VGA support with CIRRUS Logic 5446 VGA chip for full-screen DOS box support on Windows NT Workstation 3.51 and 4.0.
- Hardware accelerated 3D, 24-bit Z-buffering for realistic depth perception and texture mapping.
- Full, 32-bit RGBA double buffering for smooth animation by allowing the next image to be created in off-screen memory while displaying the current image.
- Gouraud shading for smooth surfaces.
- Texture mapping for creating realistic images.
- Fog for fading effects, atmospheric effects, and depth-queuing.
- Anti-aliasing to provide smooth colors and removes jagged lines for high quality, realistic rendered scenes.
- Alpha-blending for creating transparent effects such as an object behind a window.
- Bilinear and trilinear mip mapping
- 2,000,000 Gouraud shaded, textured polygons per second (25 pixel triangles) with lighting, z-buffering, blending, and fogging enabled.
- 60 million bilinear MIP-mapped pixels per second.
- 30 million trilinear textured pixel per second.

Diamond Fire GL 4000 Technical Specifications

Table 6: Fire GL Technical specifications

Features	Technical Specifications
3D/2D Controller	3DPro (Mitsubishi/Evans & Sutherland)
VGA Controller	CIRRUS Logic 5446
Bus Type	PCI
RAMDAC	220 MHz Texas Instruments TVP3026
Memory Type	3D-RAM and CDRAM
Frame Buffer and Z-buffer Memory Amount	15MB 3D-RAM
Texture Mapping Memory Amount	16MB CDRAM
Memory throughput	3D-RAM- 10ns CDRAM- 15ns
Data Path	64-bit (3Dpro) 32-bit (CIRRUS)
Controller Clock Speed	70MHz
Max Vertical Refresh Rate	120Hz
Max Pixel clock	220MHz
Hardware Accelerated 3D: 32-bit Z-buffering Gouraud shading Stencils Texture mapping Trilinear mip mapping	 Yes Yes Yes Yes Yes
Operating Systems	Windows NT 3.51/4.0 Windows 95*

*** Available at a later date.**

Monitors

The recommended monitors for Professional Workstations are the Compaq P75, 17", P110, 21", and P1610, 24" and the Compaq TFT500 and TFT450 Flat Panel Monitors.

The Compaq P75 monitor:

- On-Screen Display
- Digital Dynamic Convergence
- Clarifies corner-to-corner focus.
- Graphic Picture Enhancement
- Automatically optimizes screen adjustments for text, presentation or full-motion video through the on-screen controls.
- AssetControl
- Space-saving design
- New reduced-depth Trinitron tube and concealed cables saves four inches of desk space.
- Plug and Play and Microsoft PC97 Compliant
- Macintosh Compatibility
- TCO95 Compliant

The Compaq P110 monitor

- Trinitron Technology
- 21" Screen (19.8" diagonal viewable image)
- Flatter, bigger screen minimizes distortion and external light reflection.
- Ambient light sensor
- Universal Serial Bus (USB) Hub

- .25 - .27 mm variable aperture grille pitch
- Offers 85Hz refresh rates at resolutions up to 1600 x 1200.
- TCO 95 certified
- Plug and Play and Microsoft PC97 Compliant

The Compaq P1610 monitor

- 16:10 aspect ratio
- 24" screen (22.5" viewable image size)
- Delivers maximum image area to increase productivity for intensive applications like CAD/CAM, 3D design, prepress, animation, and financial modeling.
- Trinitron Technology
- .25 - .28 mm variable aperture grille pitch
- Supports 1920 x 1200 resolution at a refresh rate of 76 Hz.
- Expert user controls - Allows high-end users to control advanced geometry and color adjustments, so they can get the best performance from their monitors.
- Plug and Play and Microsoft PC97 Compliant
- TCO 95 certified

The Compaq TFT500 Flat Panel Monitor provides an unprecedented combination of size and performance for the flat panel revolution.

- 15.1" (38.3 cm) viewable Active Matrix Display
- Wide viewing angle: 120 degrees horizontal and 80 degrees vertical
- 1024 x 768 resolution
- USB Hub with 3 downstream ports for connecting USB peripherals
- TCO-95 compliant
- low power requirements (<40 watts)
- Light weight (20 lbs.)
- detachable base
- Optional Desk Arm Mount
- Wall mountable.

The Compaq TFT450

- Space-Saving and Lightweight Weighs 13.5 pounds (with base) with a 2.8" thick panel.
- Thin Film Transistor (TFT) active matrix screen.
- Brightness of 185 nits offers a brighter picture than a standard CRT monitor.
- Wide Angle Viewing
- Arm Mount: frees up to 100% of desk space while increasing mobility. Wall Mount: hangs on a wall like a painting. Standard Mount: offers small footprint and compatibility with Compaq's Multimedia Sound System.
- DisplayAssistant
- TCO 92 Compliant
- AssetControl
- Fault Management
- Plug and Play and Microsoft PC97 certified

16X MAXIMUM IDE CD-ROM

The Compaq Professional Workstation 6000, models 266 MHz and 300 MHz include a 5.25", half-height auto-slot load 16X Maximum CD-ROM Drive using the new Constant Angular Velocity (CAV) technology. Previous CD-ROMs included a tray or caddy to hold the CD. This CD-ROM uses a slot-load mechanism, similar to car stereos, where the CD slides directly into the slot in the CD-ROM drive. Additionally, previous CD-ROM technology used Constant Linear Velocity (CLV) technology which allowed the disc to rotate at a faster rate while reading the inner tracks and a slower rate when reading the outer tracks. Conversely, the CAV technology, used in the new products, spins the disc at a fixed rate and the data transfer rate increases as it moves toward the outer tracks. This is the same technology that is used for hard

drives where it has demonstrated excellent performance in high data transfer and fast access times. Using this technology enables reliable CD-ROM speeds above 8X. The 16X CAV CD-ROM dramatically increases the access time performance of the CD-ROM in the Compaq Professional Workstation 6000.

Technical Specifications

Access Time	**Average = <100 MS**
Transfer Rate	**1200 - 2400 KB/second**

24X MAXIMUM IDE CD-ROM

The Compaq Professional Workstation 6000, models 333 MHz and 333 MHz (with ETR) include a 5.25", half-height auto-slot load 24X Maximum CD-ROM Drive using the new Constant Angular Velocity (CAV) technology. This CD-ROM uses a slot load mechanism, similar to car stereos, where the CD slides directly into the slot in the CD-ROM. Additionally, previous CD-ROM technology used Constant Linear Velocity (CLV) technology which allowed the disc to rotate at a faster rate while reading the inner tracks and a slower rate when reading the outer tracks. Conversely, CAV technology spins the disc at a fixed rate and the data transfer rate increases as it moves toward the outer tracks. This is the same technology that is used for hard drives where it has demonstrated excellent performance in high data transfer and fast access times. Using this technology enables reliable CD-ROM speeds above 8X. The 24X CAV CD-ROM dramatically increases the access time performance of the CD-ROM in the Compaq Professional Workstation 6000.

Technical Specifications

Access Time	**Average = <80 MS**
Transfer Rate	**3600 KB/second MAX**

PREMIERSOUND AUDIO

The Compaq Professional Workstation 6000 includes Compaq's *PremierSound* audio solution. The *PremierSound* design incorporates a high performance, custom designed loudspeaker, a ported (bass reflex) enclosure for extended low frequency output, a low distortion amplifier (less then 0.3 % at the rated power of 3 W), and 5 bands of fixed equalization with the ESS Audio 16-bit solution to provide a complete, optimized audio solution.

The high performance loudspeaker and the ported enclosure are designed in conjunction with the equalization to provide crisp, clean, wide bandwidth audio from a small, integrated mono solution. The low frequency capability of the enclosure and speaker are dramatically better than typical business audio solutions.

The five stages of fixed equalization are used to "tune" the audio system to the acoustic environment, lower distortion and smooth the response of the speaker. The tuning allows us to shape the frequency response to provide exceptionally clear, natural, voice quality, whether under a desk or in a rack.

The result is a well-balanced audio system capable of delivering clean, undistorted output at a level needed to support an office environment.

To use the audio capabilities, volume controls, headphone and microphone connections are conveniently located on the front of the chassis above the speaker, and line in/out and microphone connections are provided on the back of the chassis.

The software driver for the PremierSound audio solution is part of the standard workstation software platform that is used for all Compaq Professional Workstations.

UNIVERSAL SERIAL BUS (USB)

The Compaq Professional Workstation 6000 includes two Universal Serial Bus (USB) ports.

USB is a peripheral bus standard developed by a group of PC and telecom industry leaders including Compaq, DEC, IBM, Intel, Microsoft, NEC and NORTEL. USB enables hot plug and play of computer peripherals outside of the workstation eliminating the need to install cards into expansion slots and then having to reconfigure the system. Workstations equipped with USB will allow peripheral devices to be automatically configured as soon as they are physically attached - without the need to reboot or run setup. USB also allows up to 127 devices to run simultaneously with peripherals such as monitors and keyboards acting as additional plug-in sites, or hubs.

USB peripherals will include telephones, modems, keyboards, mice, CD-ROM drives, joysticks, tape and floppy drives, scanners, and printers. USB has a 12 Mbits/sec data rate, compared to 115.2Kbits/sec for serial ports and 2Mbits/sec for enhanced parallel ports. This improved transfer rate will accommodate a new generation of peripherals, including MPEG-2 (compressed data) video based products and digitizers.

Drawing its intelligence from the host workstation, USB will detect when devices are added and removed. USB automatically determines what host resource each peripheral need, including driver software and bus bandwidth, and makes those resources available without user intervention.

Currently, there are different ways to implement USB. The Compaq Professional Workstation 6000 implements the OpenHCI USB interface. OpenHCI reduces CPU overhead for USB devices compared to other implementations and is fully compatible with UniversalHCI.

Currently, Microsoft Windows NT Workstation 4.0 does not support USB, but future versions are expected to include USB drivers that will allow the workstation to recognize USB peripherals.

Please refer to the Universal Serial Bus whitepaper for additional information on this topic.

CHASSIS AND SERVICEABILITY FEATURES

The chassis for Compaq Professional Workstation 6000 has been designed to optimize both expandability and serviceability. Both systems come standard in a 10 bay minitower form factor. The main features of this workstation chassis are:

- 10 bays (7 available; 1/3 height bay occupied by 3.5" floppy drive, ½ height bay occupied by CD-ROM and one 1" hard drive cage bay occupied by 2GB or 4GB hard drive), 2-5.25" and 5-3.5" available
- Hard drive cage supporting up to 6- 1" hard drives or 4- 1.6" hard drives
- Locking removable media door and front bezel to inhibit unauthorized access to drive bays
- Volume, Microphone and Headphone jacks located on the front of the chassis
- Easy access (tool-less) to internal components through small access panel on the top or large access panel on the side of the workstation
- Quick access to all system components through modular design and simple levers to remove the entire processor cage or I/O cage.
- Tool-less access to I/O slots for easy addition of PCI and ISA cards.

- Optional rack conversion kit available for the Compaq Professional Workstation 6000, which is 5U allowing for up to 8 workstations in a standard Compaq 42U rack. This provides customers with a high density, space saving solution for compute intensive applications such as a render farm for 3D animation, or analysis workstations being used for finite element analysis.
- Complete access through front and rear only. Simplifies service and upgrades, especially in a rack configuration.

Compaq continues to deliver products that lower the total cost of ownership. The flexible new Compaq Professional Workstation 6000 chassis design continues that focus by including features that provide for maximum serviceability and ease of maintenance. Some of the main serviceability features are:

Easy access to internal components

This minitower chassis provides front, rear, top, and side access for service or upgrade tasks. Most of the major chassis elements are removable without the use of tools. This reduces the time it takes to access the internal components of the system and enables upgrades and maintenance to be performed quickly.

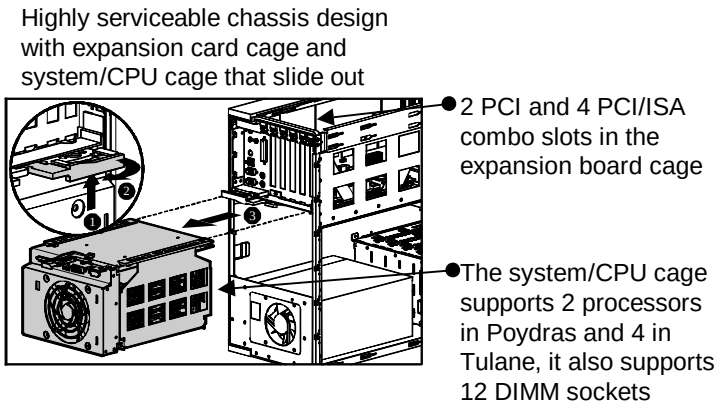
Removable I/O cage

Access to the PCI and ISA slots is done easily with access from the top by removing the small access panel or access from the back of the workstation. Access from the back of the workstation is made easy because the entire I/O cage is rail-mounted in a lever-actuated quick release cage that allows its quick removal and replacement. This allows for quick and easy installation of additional expansion boards.

Removable processor and memory cage

The processors and memory are located in the processor and memory cage. This cage, similar to the I/O cage, is easily removed from the back of the workstation because it is also rail-mounted in a lever-actuated quick release cage. Simply pull the lever and slide the processor and memory cage out from the back of the workstation. This allows for quick and easy upgrades of both system memory and processors.

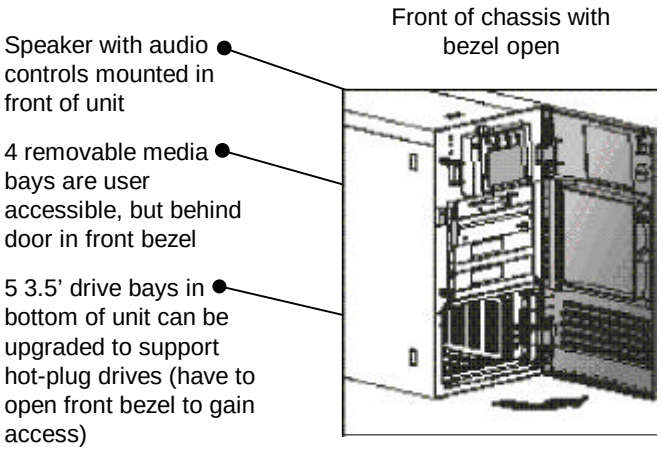
Diagram 5-1: Serviceable Chassis Design



Lockable, removable front bezel

Access to the front of the system is made easy with a removable front bezel. This bezel provides easy access to the removable media bays and the hard drive cage.

Diagram 6-2: Serviceable Chassis Design



Rackable

The ability to reconfigure a Compaq Professional Workstation 6000 quickly and easily from a minitower to a rack and back to a minitower enclosure provides for end-of-life redeployment and protection of the hardware investment.

Overall, the Compaq Professional Workstation 6000 minitower is designed for easy access to components, which reduces the down time associated with upgrades and field replacement, reduces the required skill level for performing routine maintenance, and therefore helps to reduce the total cost of ownership for Compaq Professional Workstations.

ENHANCEMENTS TO THE WORKSTATION SOFTWARE PLATFORM

This section will highlight the enhancements to the workstation software platform that were made since the introduction of the Professional Workstation 5000. For a complete overview of the software platform, please refer to the Compaq Professional Workstation Software area on the Workstation web site:

http://www.compaq.com/products/workstations/software-platform/index.html.

COMPAQ PROFESSIONAL WORKSTATION SOFTWARE PLATFORM

Software Tools and Solutions - To Meet Your Most Demanding Business Needs

The Compaq Professional Workstation Software Platform satisfies the productivity needs of the highly competitive business organization and the performance needs of the workstation environment. It combines traditional RISC-based UNIX workstation capabilities with industry-standard flexibility and the price/performance of a personal computer. The Professional Workstation Software Platform consists of a powerful software base that is thoroughly tested, easily installed, and efficiently managed.

Operating Systems - All Professionals Workstations are pre-installed with Microsoft Windows NT® 4.0, Internet Explorer 4.01, and Service Pack 3. Compaq also provides Web-based driver

support for Microsoft Windows 95, Microsoft Windows NT Workstation 3.51, and Sunsoft Solaris 2.5.

Restore Mechanism-A SmartStart for Workstations CD and a Windows NT 4.0 CD are included if re-installation of the operating systems and device drivers is needed. The SmartStart for Workstation CD also includes utility software and applications for customer convenience.

Software Maintenance - Keep your software up-to-date with Compaq's latest device drivers, flashable ROM images, and utilities via both the Compaq web site and the Compaq Support Software CD subscription service.

Intelligent Manageability - Compaq keeps you up and running, while lowering your total cost of computing by making clients more manageable from a single point on the network. Together, Compaq Insight Manager and Compaq System Management Partners deliver the information required for an effective management solution. Select your mix of management tools from industry leading management ISVs.

Interoperability - Compaq has partnered with the best ISVs in the industry to deliver high-performance interoperability solutions for integrated UNIX, Windows NT, and Apple Macintosh environments.

For a complete overview of the software platform, please refer to the Compaq Web site, www.compaq.com.

APPENDIX:

QUESTIONS AND ANSWERS

System Design

Q. What is Compaq Highly Parallel Systems Architecture?

A. Compaq's Workstation engineers did extensive application profiling to understand the nature of the bottlenecks inherent when running complex, resource intensive applications such as those found in CAD/CAE, EDA, and financial trading environments. To provide a truly balanced, high performance system, we realized there was a need to offer not only multiprocessing capabilities, but also dual memory controllers so memory requests can be processed in parallel. In addition, dual-peer PCI buses were implemented so I/O requests can also be processed in parallel.

The Compaq Professional Workstation 6000 has been designed with the Highly Parallel Systems Architecture to maximize system bandwidth, which improves overall system performance. No other Intel based Windows NT system on the market today provides this optimized architecture. Designed using industry standard components to deliver the uncompromising performance that workstation users require, Compaq Highly Parallel System Architecture consists of the following:

- Dual memory architecture: provides exceptional performance in resource-intensive applications by providing 1.07GB/sec memory bandwidth: two to four times faster than other Windows NT / X86 systems
- Dual-peer PCI buses: provides I/O bandwidth of 267MB/sec – twice that of single bus implementations – and allow for better balanced I/O system performance

- Optimized multiprocessing support: 1-2 Pentium II processors; 266MHz/512KB, 300MHz/512KB, 333MHz/512KB, or 333MHz/512KB (with ETR)

Typical workstation designs include dual processing capabilities with a single memory controller and a single PCI bus. Under this design the processors must compete for access to the critical subsystems such as memory and hard drives. By providing dual memory controllers with dual peer PCI buses, data from the multiple processors has double the access to critical subsystems, which significantly improves overall system performance for the demanding applications in the target segments.

Processors

Q. What applications specifically can take advantage of the multiprocessor capabilities of these products?

A. In general, applications in the DCC and CAE segments benefit most from the multiprocessing capabilities of these workstations.

In the DCC segments, applications such as 3D Studio Max, Macromedia Director, Adobe PhotoShop 4.0 and Illustrator and Net Objects Fusion include multiprocessing functionality enabling them to more fully take advantage of the Compaq Highly Parallel System Architecture which optimizes multiprocessing capabilities.

In the CAE segment, analysis applications such as those offered by ANSYS and MSC's NASTRAN use multiple processing capabilities.

Additionally, Compaq has announced its Multiprocessing (MP) Initiative through which we are working with ISVs and Intel in various target market segments to help take full advantage of the multiprocessing capabilities of our Professional Workstation product line.

Q. How does the 333MHz product introduced in April 1998 differ from the 333MHz product introduced in February 1998 for the Compaq Professional Workstation 6000 line?

A. Models introduced in April 1998 feature extended memory support (also known as ETR RAM or ETR). This allows system cache to recognize up to 3-GB of memory, instead of 512-MB, in one interval, thus optimizing system performance. Models introduced in February 1998 support only up to 512-MB of system memory.

Q. Can a user mix a non-ETR 333MHz Pentium II processor with a new ETR 333MHz Pentium II processor?

A. A user can upgrade from a non-ETR to an ETR processor, but you cannot mix the two different types because there would be no benefit to do that. Memory would remain at a maximum of 512 MB. The system will display the message "System halted: Incompatible CPU types" during boot-up and will halt operation.

Q. How can a user tell which 333MHz processor is in the Compaq Professional Workstation 6000 unit?

A. ETR processors are physically marked with an Intel number "SL2S5" whereas non-ETR processors are physically marked with "SL2KA".

Also, during initialization or boot up, system will show which processor the unit has. System will display message "Initialized Processor 0 – ETR" (for single processor system) and "Initialized Processor 1 – ETR" (for the second processor).

Usage

Q. Can the Compaq Professional Workstation 6000 be deployed as a server?

A. Although several features of the Compaq Professional Workstation 6000 have been leveraged from server technologies, these workstations are not supported as servers. Among the major differences between a server and these workstations are:

- Compaq servers support multiple network operating systems while the Compaq Professional Workstation 6000 primarily support Microsoft Windows NT Workstation (with some support for Windows 95 and Solaris)
- Servers provide redundant features for high availability. These features are not included with the Compaq Professional Workstations since they are not particularly useful in the targeted applications.
- The workstations provide capabilities such as 3D graphics which are not available or required for the server products
- These workstations are tested and certified to run specific applications such as CAD and 3D animation. Servers are designed to support deployment into environments such as file and print, database and application servers.

System Board

Q. What chipset does the Compaq Professional Workstation 6000 use?

A. The Compaq Professional Workstation 6000 uses a standard based solution from Reliance Computer Corporation (RCC). This solution is available to other OEMs and is fully Intel compatible. It is implemented on the Compaq Professional Workstation 6000 to enable the Highly Parallel System Architecture.

Q. Will Compaq continue to support the RCC chipset in future workstation products?

A. Compaq will continue to evaluate new technologies, as they become available. As always, those technologies that provide the best performance using the target segment applications will be incorporated in future workstation products.

Q. What advantages does the RCC chipset provide over the Intel 440LX chipset?

A. The RCC chipset allows for the use of dual memory controllers. This represents a significant feature of the Highly Parallel System Architecture implemented in the Compaq Professional Workstation 6000. This design provides a significant bandwidth improvement over traditional workstation designs using the 440LX chipset.

Memory

Q. What are the benefits of having DIMM slots on the system board and a memory expansion board?

A. The memory architecture design in the Compaq Professional Workstation 6000 includes dual memory controllers. To maximize performance, one memory controller is dedicated to the DIMM slots on the system board and the other memory controller is dedicated to the memory expansion board.

Additionally, the combination of the system board and memory expansion board provides a total of twelve DIMM slots. This allows customers to reach higher memory levels using less expensive, 16-bit technology. For example, a customer with 256MB of memory installed (four-64MB DIMMs) in a Compaq Professional Workstation 6000 333MHz (without ETR) can add eight more 32MB DIMMS to reach the maximum

system memory of 512MB. This is significantly less expensive than using higher density memory.

The Pentium II 333MHz (with ETR) will support up to 3GB of addressable system memory. Because the Professional Workstation 6000 has 12 DIMM slots, less expensive DIMMs can be used in order to reach the 3GB maximum memory on Pentium II processors with ETR.

Q. Does the Compaq Professional Workstation 6000 support Synchronous DRAM (SDRAM)?

A. No. By interleaving EDO memory, the Compaq Professional Workstation 6000 achieves the same transfer rate of SDRAM while maintaining customer investment in EDO memory. High performance systems will move to the 100MB/sec. memory architectures in 2H98, so we expect 66MHz SDRAM to have a short life.

Q. In the past, Compaq has had proprietary memory architectures that prevented users from using 3rd party memory. Can I use 3rd party memory in these machines?

A. Yes. The Compaq Highly Parallel System Architecture, which includes dual memory controllers, is a standards-based design allowing for the use of third-party memory. Third party memory, however, is not tested or supported by Compaq, nor is it covered under the Compaq pre-failure warranty.

Graphics

Q. Does the Compaq Professional Workstation 6000 support Intel's Advanced Graphics Port (AGP)?

A. No. AGP provides a mechanism by which main memory can be used as texture memory. The ELSA GLoria-XL card supports up to 40MB of texture memory on the graphics controller card itself, providing a fast, local source of memory for high performance applications requirements. The Diamond Fire GL 4000 has local texture memory providing a very tightly coupled high bandwidth path between texture memory and the frame buffer. AGP technology has been implemented on mainstream and high end desktop PCs to provide a low cost of texture memory for entry level 3D applications.

In addition, Microsoft will not fully support AGP in Windows NT until revision 5.0. The current Compaq Professional Workstation products, therefore, will not support AGP. As newer implementations of AGP become available and as support for this emerging technology is built into Windows NT, Compaq will incorporate AGP into its future workstation designs.

Hard Drive

Q. Are 10,000 rpm drives supported on the Compaq Professional Workstation 6000?

A. Yes. Three 4.3GB 10,000 rpm hard drives are supported on the Compaq Professional Workstation 6000, one in drive bay 7 and two more in drive bays 0 and 5.

Q. What is Compaq's recommendation when operating this workstation with 10,000 rpm drives?

A. Compaq recommends operating the workstation with one 10,000-rpm drive at the following environmental specifications:

- Maximum ambient temperature of 30^0C or 86^0F
- Maximum operational altitude of 10,000 feet.

For units with two to three 10,000-rpm drives, Compaq recommends operating the workstation at the following environmental specifications:

- Maximum ambient temperature of 30^0C or 86^0F
- Maximum operational altitude of 7,500 feet.

Compaq also highly recommends that adjacent bays be left empty. For example, leave Drive Bay 1 empty if Drive Bay 0 has a 10,000-rpm drive. Reason: the high performance and speed of the 10,000-rpm drive may create a thermal condition causing drive failure and data loss.

Operating Systems

Q. What Operating Systems do the Compaq Professional Workstations support?

A. Microsoft Windows NT® Workstation 4.0 is pre-installed with every Compaq Professional Workstation. Compaq also provides driver support for Microsoft Windows 95, Microsoft Windows NT Workstation 3.51 and 4.0, and Sunsoft Solaris 2.5.

Operating System	Performs Testing	Operating System	Technical Support	Available Management Support
Microsoft Windows NT Workstation 4.0 and 3.51	Compaq	Microsoft	Compaq	Full from Compaq
Microsoft Windows 95	Compaq	Microsoft	Compaq	No
SunSoft Solaris Intel Edition	SunSoft	SunSoft	SunSoft	No

Q. Does Compaq Provide Multi-Processor Operating System Support for the Professional Workstation 6000?

A. Yes. Compaq provides one of two versions of Windows NT 4.0, depending on the number of processors your system supports. One to two processor capable systems include a version of Windows NT 4.0 that supports up to two processors.

Q. What if I want to use Windows NT 3.51 rather than Windows NT 4.0, which is pre-installed on the Professional Workstation 6000?

A. Compaq Professional Workstations support Windows NT 3.51. You can obtain NT 3.51 support software from the Compaq web site and via the Support Software CD subscription.

Q. How does a customer obtain Microsoft Windows 95 and related support software?

A. Customers can obtain Windows 95 through their software vendors. Compaq Workstation drivers and related support software for Windows 95 are available on the Compaq web site and via the Support Software CD subscription.

Q. Are Compaq Professional Workstations Microsoft certified?

A. Yes. Compaq Professional Workstations have achieved the Designed for Windows NT (DFWNT**) certifications.**

Intelligent Manageability

Q. What management software is included with the Compaq Professional Workstation?

A. Each Compaq Professional Workstation ships with the Compaq Management CD, a set of tools designed to lower your total cost of computing by making clients more manageable from a single point on the network. The hard drive is preinstalled with Compaq utilities for local diagnostics inspect, and hardware setup. The Management CD includes: Compaq Insight Manager, Compaq Insight Management Agents, and the Compaq Systems Management Toolkit. The Workstation supports Intelligent Manageability, the Desktop Management Solutions Partners Program, the Systems Management Toolkit, the Systems Management Partners Program, Insight Manager, and Insight Manager for HP OpenView and TME 10 NetView.

Q. What management agents does the Workstation use, and how are they delivered/updated?

A. Compaq Workstations and Servers both use Microsoft NT 3.51 and 4.0 Insight Management Agents. The Insight Management agents are provided with each Workstation as part of the Compaq SmartStart for Workstations CD package. Updated agents and management software for Workstations and Servers can be obtained from the SmartStart for Servers/Support Software CD or the Compaq Management CD Volume License Agreement

Q. Does Compaq provide support for HP OpenView and TME 10 NetView?

A. Yes. Compaq recognizes the need for network and systems managers to be able to manage many heterogeneous hardware components from a central management console. Compaq Insight Manager for OpenView and TME 10 NetView provides a fault management tool that enables real-time event management of Compaq Workstations, Servers, Desktops, and Portables.

Interoperability

Q. How will Compaq ensure that new products fit in today's heterogeneous environments?

A. Compaq has announced Phase I of a program to address interoperability and migration issues for customers moving from UNIX or Mac environments to Microsoft Windows NT®. Compaq has partnered with the best integration ISVs in the industry to deliver high-performance interoperability solutions. Integration problems such as application access, resource access and sharing, distributed application execution, system administration, as well as the need for migration tools and internetwork integration, are addressed by our tested partner solutions. Industry leaders such as DataFocus Inc., Equilibrium, Hummingbird Communications, Ltd., Intergraph Corporation/ISS Division, Mortice Kern Systems, Inc., (MKS), and Softway Systems, Inc., have tested their products on our workstations and will provide support for their products on the Compaq Professional Workstations.

Q. What is Compaq doing with these vendors to provide an easier migration path from RISC / UNIX to Windows NT?

A. Compaq has identified the top migration and interoperability issues facing potential workstation customers today and has identified partners who provide solutions to solve these problems. Each partner's solution has been evaluated and tested at Compaq. Additionally partners are required to test on Compaq hardware and certify where applicable. Compaq and their partners have developed a "UNIX, Macintosh, and Windows NT Interoperability and Migration" whitepaper. Over time Compaq and its partners will participate together in activities to enhance joint marketing, training, selling, and relationships.

Q. How do customers find out more and/or purchase interoperability solutions?

A. Customers may refer to the "UNIX, Macintosh, and Windows NT Interoperability and Migration" whitepaper or contact the respective partner. Se the Compaq Web site at, www.compaq.com.

ISVs

Q. Who are our ISV partners?

A. The following is a current list of our workstation ISV partners.

Segment	ISV Partner
CAD	Autodesk, Bentley, EDS/Unigraphics, Intergraph Software Solutions, PTC, SDRC, Solidworks
CAE	ANSYS, Fluent, MacNeal-Schwendler Corp., Mechanical Dynamics, MARC Analysis
DCC	Adobe, Kinetix, Macromedia, Softimage
Finance	Applix, C*ATS, Infinity, MarketNet Group, NeoVision Hypersystems, Summit Systems
EDA	Mentor Graphics, Viewlogic, VeriBest, Cadence, Quickturn, Synopsys
Technical	Oxford Molecular, Mechanical Dynamics, Platform Computing, Visual Numerics, Inc.
Interoperability	DataFocus Inc, Equilibrium, Hummingbird Communications, Ltd., Intergraph Corporation/ISS Division, Mortice Kern Systems, Inc. (MKS), Softway Systems, Inc.