sgi™

Product Guide

Silicon Graphics® 320

Visual Workstation

The Silicon Graphics® 320 Visual Workstation

Astonishing Performance. Breathtaking Quality. Surprisingly Affordable.

The Silicon Graphics 320 visual workstation from SGI is nothing short of a revolution in computing—the first system to deliver world-class graphics and media capabilities in a compatible, affordable workstation. Silicon Graphics 320 combines spectacular 2D and 3D graphics, video, and multimedia with astonishing performance at a surprisingly low price.

Silicon Graphics 320 is part of a breakthrough family of Silicon Graphics® visual workstations designed especially for designers, artists, engineers, and scientists who create, transform, and analyze visual information. The new systems team the performance of SGI™ technology with the compatibility of Microsoft® Windows NT® and Intel® Pentium® III processors. In addition to the Silicon Graphics 320 workstation, the new family includes Silicon Graphics® 540, the industry's most scalable graphics and professional media system. Together, these systems put unprecedented power in the hands of visual computing professionals everywhere.

Uncompromising Performance for the Visual Computing Professional

The Silicon Graphics 320 visual workstation gets its extraordinary capabilities from a new-generation computing architecture, light-years ahead of other Windows NT workstations. PC-architecture systems, with their slow buses and need to support legacy protocols, lack the resources needed for leading-edge visual tasks such as advanced 3D modeling, complex image processing, and sophisticated video editing. They're missing the accelerated 2D and 3D graphics processing, the enormous throughput, and the large graphics memory support that those tasks require. Attempts to get around such limitations through add-on cards such as graphics accelerators and video capture cards, and through buses such as AGP and PCI, yield only modest gains.

In response, SGI wiped the slate clean by designing a personal workstation from the ground up, creating a 21st-century architecture free from the limitations of the past. The Integrated Visual Computing (IVC) architecture provides a tightly integrated combination of high-speed graphics acceleration, high-speed in-terconnects, and scalable graphics memory that allows for truly astonishing performance. The IVC architecture also integrates analog video, CD-quality audio, high-speed networking, and fast, high-capacity disk drives, making Silicon Graphics 320 a complete multimedia system. In addition, the architectural innovation is visually extended by integrating support for the revolutionary Silicon Graphics® 1600SW digital flat panel monitor. This combination of leading technologies sets a new standard for visual computing solutions.

Equally remarkable, Silicon Graphics 320 provides these next-generation technologies without sacrificing compatibility. It fully supports Intel Pentium III processors, Microsoft Windows NT, PCI v 2.1, and USB. Standard graphics and media software APIs such as OpenGL®, DirectX®, and QuickTime® are preloaded and accelerated. You can now run your favorite Windows NT applications with unsurpassed performance.

**Silicon Graphics 320
Quick Specs**

- SGI IVC architecture with Cobalt™ graphics chipset
- Supports up to two Intel Pentium III processors
- Scalable to 1GB ECC SDRAM memory
- Standard Ultra ATA/33 drive with up to 28GB disk capacity
- Optional high-performance Ultra2 SCSI drive with up to 18GB disk capacity
- 10/100Base-T Ethernet, IEEE 1394*, USB, S-Video, composite video, and audio

Additional software required.

The Complete Graphics and Media Workstation

Silicon Graphics 320 is designed to provide a complete solution for visual computing professionals. The 320 addresses the full array of visual tasks, from 3D modeling and image editing to analysis, video editing, and visualization. These are the basic building blocks of visual computing. Whether you're an architect or a graphic artist, a game designer or an automotive engineer, a satellite image analyst or a video effects specialist, your work involves some combination of these fundamental tasks. Unfortunately, the capabilities visual professionals need most are the areas where traditional Windows NT workstations are weakest. Silicon Graphics 320 provides outstanding performance in all facets of visual computing, enabling you to move from task to task with unprecedented speed and responsiveness. The result is an explosive productivity boost, accelerated time to insight, and exciting new creative possibilities.

Visualization

Interacting with large, complex data sets, including 3D textured scenes, requires geometry and texturing capabilities beyond the reach of ordinary Windows NT workstations. With the extraordinary geometry and texturing capabilities of the Silicon Graphics 320 workstation, architectural walk-throughs, flight and battle simulations, and 3D game environments can be visualized in real time.

Image Editing and Manipulation

High-resolution 2D images of several hundred megabytes or more are becoming commonplace in desktop publishing, digital photography, and satellite image analysis. To manage these large images efficiently, a system requires bandwidth and memory capacities beyond the reach of ordinary Windows NT workstations. Silicon Graphics 320 has all the resources needed to efficiently load, view, and edit large images and files, translating to maximized productivity.

3D Modeling

The task of creating and manipulating realistic 3D models calls for large amounts of geometry and texture processing, graphics memory, and system bandwidth. Complex modeling can slow conventional Windows NT workstations to a crawl. Silicon Graphics 320 overcomes these limitations, packing all the graphics acceleration, memory, and throughput needed to render the most complex 3D scenes with rich textures and sophisticated shading and lighting at interactive speeds.

Analysis

Computer-aided analysis is among the most processing-intensive tasks, requiring high performance of the CPUs, memory, and system bandwidth. It is also becoming an essential part of mechanical design and scientific research where visualization tools are required. With its multiprocessing architecture, large system memory, and extraordinary system throughput, Silicon Graphics 320 provides a seamless combination of analysis and graphics capabilities.

Video Editing

Silicon Graphics 320 supplies the video interfaces and high system bandwidth needed to work with compressed and uncompressed video in real time. Moreover, its integrated graphics and video architecture allows high-quality compositing and video texture mapping—impossible with separate graphics and video cards. You can perform nonlinear editing using two streams of video or mix video with 2D or 3D graphics—all in real time, without sacrificing quality.
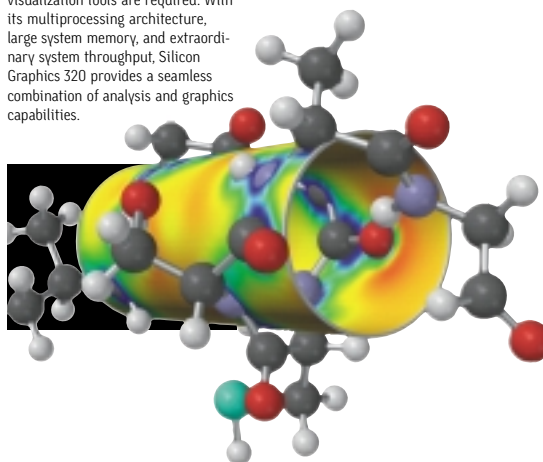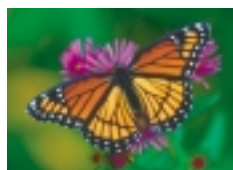
Breaking the Barriers

IVC—Integrated Visual Computing Architecture

The heart of the Silicon Graphics 320 visual workstation is the IVC architecture, designed to move and process visual data at unprecedented rates. From graphics to video, all functions take advantage of a common set of resources—high-speed processing, large system memory, and fast system interconnects—providing seamless integration and astonishing performance.

Silicon Graphics Cobalt Graphics Chipset

This combination of graphics, CPU, memory, and I/O control features provides a quantum leap compared to traditional PC architectures. These custom chips provide some of the fastest graphics and multimedia performance at any price.

Cobalt Graphics and Memory Controller

Combining the most advanced graphics engine available for Windows NT, 3.2GB per second of memory bandwidth, and a multiprocessor interface, the memory controller ensures that your most critical data is on the shortest possible path. The Cobalt graphics engine performs lightning-fast 3D geometry, sophisticated shading, lighting, hardware-accelerated texturing, and pixel fill.

The memory controller also includes a unique dynamic memory allocation feature whereby large amounts of memory (up to almost 1GB) can be made available on an as-needed basis for texturing, frame buffering, z-buffering, video, I/O buses, and other DMA (direct memory access) transactions.

I/O Coprocessor

In traditional PC-architecture systems, graphics, media, and other I/O functions are supplied by add-in cards, which support much smaller memory capacities and squeeze data through much slower interconnects such as PCI and AGP.

In contrast to traditional PC architectures, Silicon Graphics 320 has an integrated input/output co-processor, delivering high throughput and advanced multimedia capabilities. It integrates S-Video, composite video, and IEEE 1394*, providing 12 times the bandwidth of a 32-bit PCI subsystem.

High-Speed Interconnects

The bus connecting the memory controller and RAM moves data to and from main memory at an astounding 3.2GB per second—six times faster than an AGP 2X graphics bus.

Two independent 64-bit PCI buses provide exceptional I/O bandwidth, supporting high-speed disk drives and networks (such as ATM or FDDI) without bus contention. Three PCI slots support a wide range of Universal PCI add-in cards. With Fast Ethernet, analog video, high-quality audio, and an IEEE 1394* connector already built in, Silicon Graphics 320 provides plenty of slots for add-on peripherals and extra connectivity.

*Additional software required.

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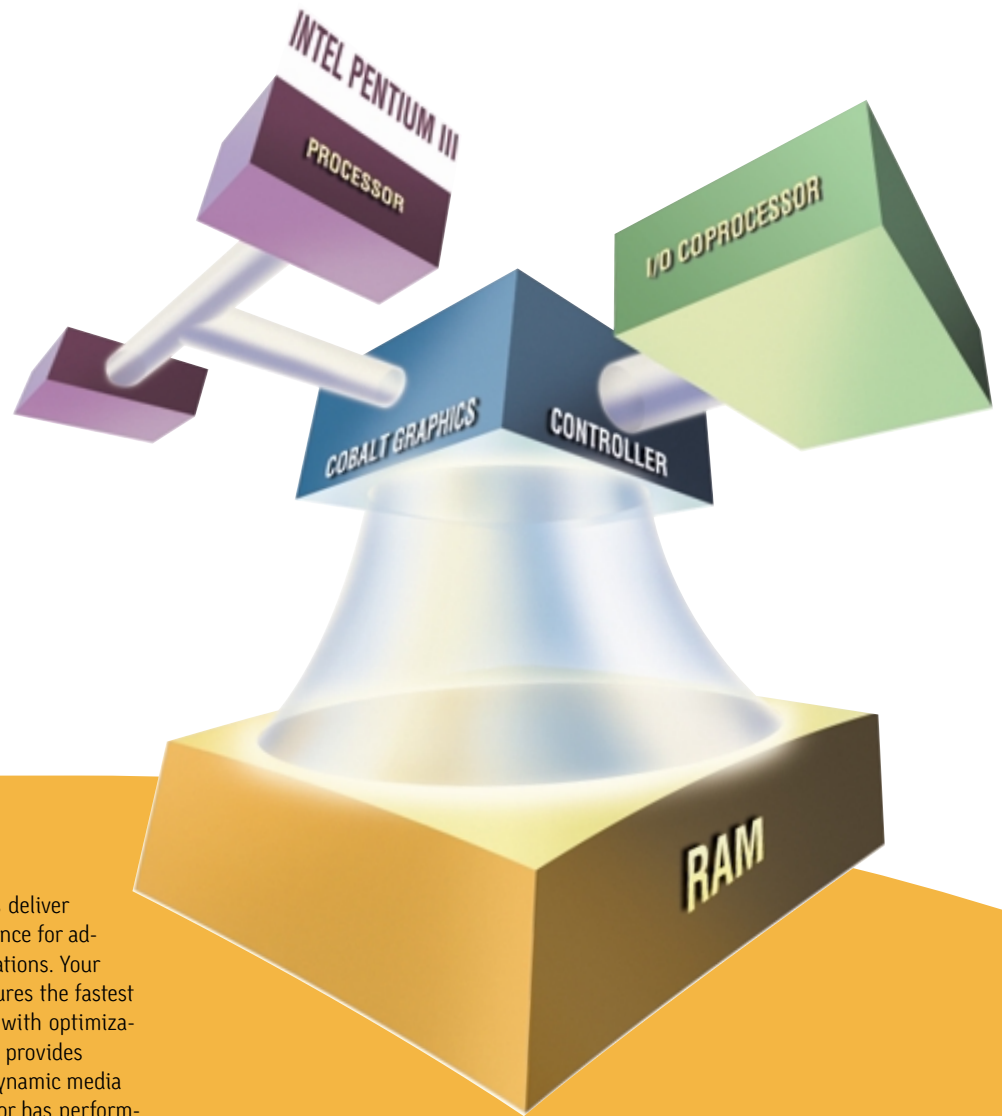
Intel Pentium III Processors

Up to two Intel Pentium III processors deliver exceptional multiprocessing performance for advanced technical and business applications. Your Silicon Graphics 320 workstation features the fastest Intel Pentium III processors available, with optimization for the SIMD instructions set that provides even greater graphics, imaging, and dynamic media performance. The Pentium III processor has performance-enhancing features such as a dual independent bus architecture, dynamic execution, Intel MMX™ multimedia technology, and a closely coupled 512KB Level 2 cache.

Fast, High-Density Storage

Choose Ultra ATA/33 hard disk drives or optional Ultra2 SCSI hard disk drives for maximum performance and scalable storage. In addition, a 1.44MB floppy disk drive and 32X max CD-ROM drive are standard, as well as a 3.5-inch expansion bay for removable media devices.

Ultimate Display Technology

The Silicon Graphics® 1600SW Flat Panel Monitor
What good is visual computing without visible results? Select from a wide array of high-quality monitors from SGI, including the category-defining new Silicon Graphics 1600SW flat panel monitor. This affordable 17.3-inch (17.3-inch viewable), high-resolution flat panel monitor provides stunning realism with brilliant color and crisp, precise lines for uncompromised quality and performance. With its unique 1600x1024 resolution and 110 dpi, Silicon Graphics 1600SW increases screen real estate and viewing angle while enhancing image quality. Its advanced digital interface drives consistent corner-to-corner 24-bit color. Silicon Graphics 1600SW provides many advantages over CRTs, including superior color saturation, brightness, and contrast (350:1 contrast ratio) as well as smaller size and weight, lower heat dissipation, and lower power consumption.

Silicon Graphics 1600SW is part of a complete family of display products that includes 17-inch (16.3 viewable area) and 21-inch (19.8-inch viewable area) CRT monitors.

ColorLock™—Color Calibration Solution
The revolutionary Silicon Graphics 1600SW monitor is the first flat panel display with ColorLock, a built-in color calibration solution that manages the adjustment, measurement, and setting of display characteristics to a known standard. When combined with the Silicon Graphics 320 visual workstation, Silicon Graphics 1600SW comes complete with calibration hardware and easy-to-use software. Setting display parameters remotely ensures color consistency across multiple devices and throughout the workgroup.
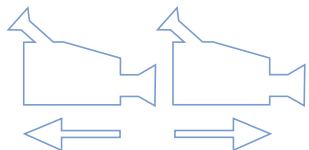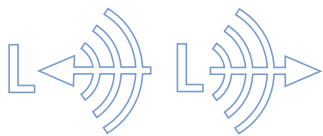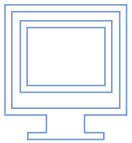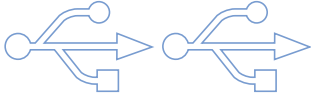
Integrated Professional Digital Media

SGI Peripherals

When it comes to digital media, these visual workstations go far beyond the capabilities of any other Windows NT workstation. Analog audio and video capabilities are built into every Silicon Graphics 320 with the system bandwidth to support two simultaneous streams of uncompressed video I/O. Silicon Graphics 320 can also display full-screen uncompressed NTSC or PAL video. Integrating digital media and powerful 3D acceleration at the system level gives these visual workstations capabilities that previously existed only on proprietary video process- ing systems costing many times as much. Map a live video stream around a 3D object as a living texture, or create 3D DVE effects in real time. Extend your visual computing environment with an array of peripherals designed by SGI specifically for your visual workstation. Add the eight-bay Silicon Graphics® DS1100 external disk array via the 64-bit Fibre Channel or the 64-bit dual-channel Ultra2 SCSI interface for two simultaneous streams of uncompressed video. There's also the Silicon Graphics® DA1100 eight-channel digital audio interface card that connects the visual workstation to a vast array of professional audio and video devices. A complete selection of high-quality displays, high-speed storage interfaces, disk drives, removable media, and much more is also available.

Software Solutions

Out of the Box Connectivity

Industry-Standard Manageability Features
Silicon Graphics 320 supports industry standards like DMI 2.0 and SNMP. Bundled with every Silicon Graphics 320 is Intel LANDesk® Client Manager, which takes full advantage of industry-leading manageability solutions, including CA Unicenter, Tivoli TME, HP Openview, and Microsoft SMS. Administrators can remotely manage these systems with powerful features like hardware performance monitoring, asset management, security monitoring, and remote troubleshooting, lowering the cost of technical computing.

Standard Interoperability Software and Upgrade Options
Included with every visual workstation is the SGI Interoperability Toolkit. These industry-leading interoperability applications enable connectivity and collaboration with Mac® and UNIX® environments. You'll be able to share UNIX files and printers, read Mac formatted media, remote telnet, enter UNIX commands, and even translate Mac and UNIX graphics files to Windows NT. In addition, upgrade options help you migrate your existing UNIX applications to Windows NT.

Visual Explorations CD
This multimedia CD showcases the power of your Silicon Graphics visual workstation. Interact with a 3D model of the system, or get a hands-on introduction to the unique features of the system. You'll also learn about the extraordinary technology behind visualization, along with its real-world uses and market applications.

Industry-Leading Applications, Optimized for Performance
SGI has teamed with leading software developers to ensure that the applications you run on your Silicon Graphics 320 visual workstation are optimized. Applications written to graphics APIs such as OpenGL run even faster due to the visual workstation's hardware API acceleration. And a new wave of advanced applications is taking advantage of the system's unique API extensions to further enhance functionality and productivity.

Interoperability Toolkit

	Standard Capabilities	Upgrade	
UNIX Network Connectivity			
Hummingbird NFS Maestro Solo	●		*www.hummingbird.com*
Hummingbird Telnet Daemon	●		*www.hummingbird.com*
UNIX Application Compatibility			
DataFocus NuTCRACKER		●	*www.datafocus.com*
Hummingbird Exceed		●	*www.hummingbird.com*
MKS Toolkit		●	*www.mks.com*
UNIX File Management			
MKS File Manipulation commands	●		*www.mks.com*
Graphics Processing and Translation			
Equilibrium Debabelizer Pro 4.5 LE	●		*www.equilibrium.com*
Equilibrium Debabelizer Pro 4.5		●	*www.equilibrium.com*
Macintosh® Interoperability			
Media4 Productions MacDrive98	●		*www.media4.com*
Apple® QuickTime 4	●		*www.apple.com*
Adobe Type Manager™ Light 4.0	●		*www.adobe.com*
Macintosh Networking			
Miramar Systems PC MACLAN		●	*www.miramarsys.com*
Systems Management			
Intel LANDesk Client Manager v3.3	●		*www.intel.com*

interoperability

Silicon Graphics 320
Technical Specifications

Processor Support

Intel Processor	Pentium III 450 MHz	Pentium III 500 MHz	Pentium III 550 MHz	Pentium III 600 MHz
L2 Cache	512KB	512KB	512KB	512KB
Support	1P or 2P	1P or 2P	1P or 2P	1P or 2P

- Integrated L1 cache of 32KB (16KB instruction set and 16KB data set)
- Processor-integrated L2 cache
- Optimization of Pentium III SIMD instruction set

System and Graphics Memory
- 128MB to 1GB 100 MHz ECC synchronous dynamic RAM (SDRAM)
- 256-bit memory bus provides 3.2GB/sec bandwidth

Cobalt Graphics Chipset
- Rasterization of point, line, triangle, and rectangle primitives
- Rasterizer setup, attribute interpolation setup, and anti-aliased line setup from primitive vertices and vertex attributes
- Front and back face culling
- Per-vertex lighting computation for up to four lights
- Connected line and triangle mesh interface
- Window clipping support through screen masks and clip IDs
- Scissored rendering, line and polygon stippling, Gouraud shading
- Texture mapping with nearest, bilinear, and trilinear mip-mapped filtering
- Anti-aliased lines
- Fogging, alpha and chroma keying, alpha blending
- Dithering for 4- and 5-bit RGB components
- Logical operations
- Color plane mask
- Specular highlights on textures
- 8-, 16-, 32-bit color formats and 16/16, 32/32 double buffer formats
- Depth buffering for 16-bit floating point and 24-bit fixed point z values
- Off-screen buffers (p-buffers), fast buffer to buffer copy, overlay buffer
- Stencil buffering for 8-bit stencil values
- Instrument/statistics (occlusion testing and occlusion correction)
- Pixel transfers with format conversion
- Approximately 80% of total system memory available for textures
- Support for 4K by 4K pixel per texture
- Color space conversion using 4x4 color matrix
- Frame lock video synchronization
- Pixel format YCrCb 4:2:2, 4:4:4, YCrCbA 4:4:4:4
- 16-bit or 32-bit, double buffered
- 16-bit or 24-bit Z buffer
- 8-bit overlay, 8-bit stencil

Supported Resolutions

Resolution	Always 16.7M colors (24-bit double buffered)
640x480	60 Hz
800x600	120 Hz
1024x768	120 Hz
1280x1024	85 Hz
1600x1200	75 Hz
1920x1080	72 Hz
1920x1200	66 Hz
1600x1024	60 Hz (Silicon Graphics 1600SW digital flat panel monitor)

Silicon Graphics 320 System Features
- Minitower design for easy access to storage and media devices
- 485 W input power supply switch selected AC, soft-power control input, LED power status indicator
- 104-key USB keyboard with integrated mouse connector, three-button mouse
- One front-accessible bay with standard, third-height, floppy drive preinstalled
- One front-accessible bay, 3.5" x 1.0" height for additional accessory
- One front-accessible bay, 5.25" CD drive preinstalled
- Two internal bays, 3.5" x 1.0" for hard disk drives (one preinstalled, one available)
- Two full-length PCI-64 slots, one half-length PCI-32 slot, on two PCI buses

Disk drives
- 6.4GB/5,400 RPM, 10.1GB/7,200 RPM, or 14.4GB/7,200 RPM Ultra ATA/33 or 9.1GB/7,200 RPM or 9.1GB/10,000 RPM Ultra2 SCSI non-SCA disk drives (single-channel SCSI controller required)
- 1.44MB floppy drive and 32X CD-ROM drive

Integrated audio
- 16-bit, 44.1 KHz (CD-quality) stereo input and output subsystem (RCA connector)
- MPC-3- and Direct Sound III-compatible
- Microphone and stereo speaker minijacks
- Optional high-fidelity 6 W speakers and powered microphone
- Yamaha S-YXG50 software synthesizer

System Features (Cont.)

Integrated video subsystem
- System bandwidth support for 2 streams of uncompressed video subsystem
- One RCA composite video (NTSC or PAL) input/output
- One mini-DIN S-Video input/output
- One IEEE 1394* (400Mb/sec) connector supporting digital cameras and other consumer media devices

Integrated I/O
- One RJ-45 10/100Base-T Fast Ethernet connector (Intel 82557)
- One 25-pin parallel port, one 9-pin serial port (16550 UART)
- Audio ports (line-in, line-out, microphone-in, speaker-out)
- Two Universal Serial Bus (USB) connectors for keyboard and mouse

Digital flat panel option
- One multipin LVDS digital interface support panel option for the Silicon Graphics 1600SW flat panel monitor

Operating System Support
- Windows NT Workstation 4.0 with Service Pack 4 preloaded
- SGI drivers preloaded
- Windows NT recovery and SGI drivers CD included

Service and Support
- Three-year limited warranty
  - 1 year on-site, next business day service included with purchase
- Industry-leading technical support program
  - 90 days free phone support from SGI customer support center for questions covering system setup and configuration, operating system installation and configuration, and hardware diagnosis
  - Warranty upgrade to 2- or 3-year on-site service with 4-hour maximum response time available for an extra charge

Additional product and technical support information is available online from *www.sgi.com/visual* or by calling (888) 400-4SGI.
*Additional software required.

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