

# Silicon Graphics 320™ Visual Workstation



## System Features

- Support for up to two Intel® Pentium III® processors
- Optimization of Pentium III SIMD instruction set
- Silicon Graphics Integrated Visual Computing (IVC) architecture with Cobalt™ graphics chipset
- Scalability to 1GB ECC SDRAM
- Standard Ultra ATA/33 with up to 28GB disk capacity
- Optional Ultra2 SCSI with up to 18GB disk capacity
- Interoperability and manageability software

## State-of-the-Art Visual Computing in a Compatible, Affordable System

The Silicon Graphics 320 visual workstation is a revolutionary new computer that delivers world-class graphics and media capabilities in a compatible, affordable desktop system. Silicon Graphics 320 provides dazzling 2D and 3D graphics, video, multimedia, and multiprocessing—at a remarkably low price. Despite its extraordinary performance and features, Silicon Graphics 320 costs less than many 3D graphics cards.

Silicon Graphics 320 is part of a breakthrough family of desktop workstations created especially for visual computing professionals. This system is designed to harness the processing power of one or two Intel® Pentium III® processors and is optimized for the new Pentium III SIMD floating-point instruction set for even greater acceleration of graphics and media operations. Silicon Graphics teams the power of Intel processors with the application availability of Microsoft Windows NT® to provide industry-leading 100% compatible workstation products.

## IVC—Integrated Visual Computing Architecture

The Integrated Visual Computing (IVC) architecture provides a tightly integrated combination of lightning-quick graphics processing, huge interconnects, and high-capacity graphics memory to move and process visual data at unprecedented rates. The Cobalt™ graphics chipset is the heart of the architecture that includes high-performance 2D and 3D graphics processing, advanced multimedia features such as S-video, composite video, CD-quality audio, USB, and IEEE-1394\*, as well as three available PCI slots on two PCI-64 buses for additional connectivity and expandability.

## Manageability and Interoperability Solutions

Bundled with every Silicon Graphics 320 is Intel's LANDesk® Client Manager, combining manageability standards such as DMI 2.0 and SNMP. Also bundled is an interoperability toolkit, providing the industry's leading interoperability applications for Windows NT workstations, including connectivity and collaboration solutions with Mac® and UNIX® environments.

## PROCESSOR SUPPORT

	Pentium II	Pentium III	Pentium III
Intel Pentium Processor	400 MHz	450 MHz	500 MHz
L2 Cache	512KB	512KB	512KB
Support	1P or 2P	1P or 2P	1P or 2P

- 100 MHz front side bus
- SIMD instruction sets (single instruction multiple data)
- Integrated L1 cache of 32KB (16KB instruction set and 16KB data set)
- Processor-integrated secondary level cache

## SYSTEM AND GRAPHICS MEMORY

- 100 MHz (50 ns) ECC synchronous dynamic RAM (SDRAM)
- 256-bit memory bus provides 3.2GB/sec bandwidth
- Expandable to 1GB through two DIMM slots
- 128MB, 256MB, and 512MB DIMM modules available
- ECC detection and correction of 1-bit errors and detection of 2-bit errors

## 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-, 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
- Color space conversion using 4x4 color matrix
- Color space conversion in both YCrCb-to-RGB and RGB-to-YCrCb
- Frame lock video synchronization
- Pixel format YCrCb 4:2:2, 4:4:4 and YCrCbA 4:4:4:4

### Scalable graphics memory (approximately 1GB)

- 16-bit or 32-bit, double buffered
- 16-bit or 24-bit Z buffer
- 8-bit overlay
- 8-bit stencil
- Resolution up to 1920x1200 at 66 Hz in 32-bit RGBA (24-bit color plus 8-bit alpha)

### Integrated hardware texture acceleration

- Approximately 80% of total system memory available for textures
- Point-sampled bilinear and trilinear mip-mapping
- Support for 4K by 4K pixel per texture

### Supported noninterlaced resolutions

Resolution	Always 16.7M colors (true color) (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

### Available graphics drivers (all preloaded)

- Windows NT Workstation 4.0 with Service Pack 4
- OpenGL® 1.1 installable client driver with broad support of OpenGL extensions
- Direct X, GDI

**SYSTEM FEATURES**

	<ul style="list-style-type: none"> <li>Extended ATX tower chassis</li> <li>Minitower design for easy access to storage and media devices</li> <li>Optimal air flow and cooling</li> <li>Low-noise, variable-speed fans for optimal temperature control and air flow</li> <li>Tool-free easy access to internal components</li> <li>485 W input power supply switch selected AC, soft-power control input, power good status output</li> <li>104-key USB keyboard with integrated mouse connector</li> <li>Three-button mouse</li> <li>Large selection of MPRII and EPA ENERGY STAR certified CRT and flat panel monitors</li> <li>Standard 15-pin DSUB VGA monitor connector</li> </ul>
<b>Operating System and drivers support</b>	<ul style="list-style-type: none"> <li>Windows NT Workstation 4.0 with Service Pack 4 preloaded</li> <li>Silicon Graphics drivers preloaded</li> <li>Windows NT recovery and Silicon Graphics drivers CD included</li> </ul>
<b>Disk drive</b>	<ul style="list-style-type: none"> <li>6.4GB/5,400 RPM, 10.1GB/7,200 RPM, or 14.4GB/7,200 RPM Ultra ATA/33</li> <li>9.1GB/7,200 RPM Ultra2 SCSI non-SCA disk drives (single-channel SCSI controller required)</li> </ul>
<b>Disk drive controller</b>	<ul style="list-style-type: none"> <li>PCI bus master Ultra ATA interface for system and storage disk and one optional 3.5" removable media device</li> <li>Optional PCI-64 single-port Ultra2 SCSI interface for internal SCSI disk and external SCSI devices</li> <li>Optional PCI-64 dual-port Ultra2 SCSI interface for external SCSI devices</li> <li>Optional PCI-64 Fibre Channel interface for external fiber disk array</li> </ul>
<b>Floppy drive</b>	<ul style="list-style-type: none"> <li>3.5" x 1.0" 1.44MB floppy disk drive preinstalled</li> </ul>
<b>CD-ROM drive</b>	<ul style="list-style-type: none"> <li>32X max-speed ATAPI CD-ROM drive preinstalled</li> </ul>

**INTEGRATED PROFESSIONAL MEDIA FEATURES**

<b>Integrated audio subsystem</b>	<ul style="list-style-type: none"> <li>16-bit, 44.1 kHz (CD-quality) stereo input and output (RCA connector)</li> <li>MPC-3- and Direct Sound III-compatible</li> <li>Microphone and stereo speaker minijacks (self-powered microphone and externally amplified speakers required)</li> <li>Yamaha S-YXG50 software synthesizer</li> </ul>
<b>Integrated video subsystem</b>	<ul style="list-style-type: none"> <li>System bandwidth support for 2 streams of uncompressed video</li> <li>Composite video (NTSC or PAL) input and output (RCA connector)</li> <li>S-video input and output (mini-DIN connector)</li> </ul>
<b>Integrated IEEE-1394</b>	<ul style="list-style-type: none"> <li>One IEEE-1394* (400Mb/sec) connectors supporting digital cameras and other consumer media devices (supported in a future release of Windows NT)</li> </ul>
<b>Integrated I/O</b>	<ul style="list-style-type: none"> <li>One RJ-45 10/100Base-T Fast Ethernet connector</li> <li>One 25-pin parallel port (ECP bidirectional Centronics supporting IEEE-1284)</li> <li>One 9-pin serial port (16550 UART)</li> <li>Audio ports (line-in, line-out, microphone-in, speaker-out)</li> <li>One Universal Serial Bus (USB) connector for keyboard and mouse</li> <li>One additional USB connector for additional devices (supported in a future release of Windows NT)</li> </ul>
<b>Digital flat panel option</b>	<ul style="list-style-type: none"> <li>One OpenLDI multipin LVDS digital flat panel connector interface with support for Silicon Graphics 1600SW™ 1600x1024 digital flat panel monitor</li> </ul>

**EXPANDABILITY AND FLEXIBILITY**

<b>Storage bays</b>	<ul style="list-style-type: none"> <li>One front-accessible bay with standard, third-height, floppy drive preinstalled</li> <li>One front-accessible bay, 5.25" CD drive preinstalled</li> <li>One front-accessible bay, 3.5" x 1.0" height for additional accessory</li> <li>Two internal bays, 3.5" x 1.0" for hard disk drives (one preinstalled, one available)</li> </ul>
<b>PCI expansion slots</b>	<ul style="list-style-type: none"> <li>Two PCI-64 buses</li> <li>Two full-length 64-bit PCI slots on bus one</li> <li>One half-length 32-bit PCI slot on bus two</li> <li>All slots available for 2.1 compliant Universal card-based options operating at 3.3 V</li> </ul>
<b>Product dimensions</b>	<ul style="list-style-type: none"> <li>Product dimensions: 20" L x 9.25" W x 18.75" H</li> <li>Shipping dimensions: 24" L x 18" W x 24.75" H</li> <li>Product weight 34 lb maximum</li> <li>Shipping weight 53 lb maximum</li> </ul>

**MANAGEABILITY AND INTEROPERABILITY FEATURES**

<b>Upgradable firmware</b>	<ul style="list-style-type: none"> <li>Advanced graphical user interface for easy setup and configuration</li> <li>DMI 2.0 compliant</li> <li>Integrated, multiprotocol, software-selectable boot</li> </ul>
<b>Hardware support</b>	<ul style="list-style-type: none"> <li>Microsoft Zero Administration Kit (ZAK) capabilities</li> </ul>
<b>Software manageability</b>	<ul style="list-style-type: none"> <li>SNMP compliant</li> <li>DMI 2.0 compliant</li> <li>Intel LANDesk Client Manager v.3.3 ensures availability of common management features: <ul style="list-style-type: none"> <li>Features <ul style="list-style-type: none"> <li>ECC memory error reporting</li> <li>Prealerts for S.M.A.R.T. hard drive failure</li> <li>Memory and CPU utilization reporting</li> <li>Ability to view hardware and software configurations</li> </ul> </li> <li>Benefits <ul style="list-style-type: none"> <li>Gain insight to memory errors to prevent system locking remotely</li> <li>Detect disk failure early</li> <li>Monitor system performance and eliminate bottlenecks</li> <li>Easy upgrades and version control</li> </ul> </li> </ul> </li> </ul>

## BUNDLED SOFTWARE (CD-ROM PACK)

<b>Silicon Graphics Interoperability Toolkit</b>	<ul style="list-style-type: none"> <li>• Features <ul style="list-style-type: none"> <li>– Hummingbird NFS Maestro Solo</li> <li>– MKS File Manipulation Commands</li> <li>– Template Graphics Livework 3D</li> <li>– Template Graphics 3Space Assistant</li> <li>– Equilibrium Debabelizer Pro 4.5 LE</li> <li>– Media4 Productions MacDrive98</li> <li>– Apple QuickTime® 3</li> <li>– Adobe Type Manager Light</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Benefits <ul style="list-style-type: none"> <li>– UNIX network connectivity</li> <li>– Familiar UNIX commands for Windows NT Workstation</li> <li>– 3D desktop viewer—AutoCAD DXF, OpenInventor™, and VRML files</li> <li>– 3D art and animation for Microsoft Office</li> <li>– Graphics processing and translation</li> <li>– Read and write to Mac-formatted media</li> <li>– Play QuickTime movies</li> <li>– Organize type faces</li> </ul> </li> </ul>
<b>Virus protection</b>	<ul style="list-style-type: none"> <li>• Features <ul style="list-style-type: none"> <li>– McAfee VirusScan</li> <li>– McAfee WebScanX</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Benefits <ul style="list-style-type: none"> <li>– Detects and removes over 15,000 viruses from any source: removable media, Internet, and e-mail</li> </ul> </li> </ul>
<b>Internet ready</b>	<ul style="list-style-type: none"> <li>• Microsoft Internet Explorer</li> <li>• Netscape Communicator®</li> <li>• Adobe Acrobat Reader™ plug-in</li> </ul>	
<b>UNIX compatibility (try before you buy)</b>	<ul style="list-style-type: none"> <li>• Datafocus Nutcracker—allows UNIX applications to be easily ported to Windows NT</li> <li>• MKS Toolkit—210 UNIX commands, utilities, and scripts for Windows NT</li> <li>• Hummingbird Exceed 3D—industry-leading X server with OpenGL plug-ins</li> </ul>	
<b>Graphics processing (try before you buy)</b>	<ul style="list-style-type: none"> <li>• Equilibrium Debabelizer Pro 4.5 automated graphics processing and scripting</li> </ul>	
<b>Mac networking (try before you buy)</b>	<ul style="list-style-type: none"> <li>• Miramar PC MacLAN—Appletalk® connectivity solution</li> </ul>	

## SERVICEABILITY, WARRANTY, AND SUPPORT

<b>Ease of setup and service</b>	<ul style="list-style-type: none"> <li>• Simplified service: internal components easily accessible and replaceable by tool-less access</li> <li>• Fast chassis access; no screws</li> <li>• Easy removal of power supply</li> <li>• Easy upgrade to firmware</li> <li>• Setup program in firmware</li> <li>• Automatic detection of major components at power-on</li> <li>• Power-on self test (POST) displays startup errors; suggests solutions</li> </ul>
<b>Service and Support</b>	<ul style="list-style-type: none"> <li>• Three-year limited warranty <ul style="list-style-type: none"> <li>– 1 year on-site, next business day service included with purchase</li> </ul> </li> <li>• Industry-leading technical support program <ul style="list-style-type: none"> <li>– 90 days free phone support from Silicon Graphics' customer support center for questions covering system setup and configuration, operating system installation and configuration, and hardware diagnosis</li> <li>– Warranty upgrade to 2- or 3-year on-site service with 4-hour maximum response time available at an extra charge</li> </ul> </li> </ul>

## TECHNICAL SPECIFICATIONS AND REGULATORY COMPLIANCE

<b>Mechanical environment specifications</b>	<ul style="list-style-type: none"> <li>• Power: 90-132 VAC or 176-264 VAC, switch select, 47-63 Hz, 9 A maximum, 485 W input power supply</li> <li>• Temperature: Nonoperating: -40° to 85°C; operating: 0° to 35°C</li> <li>• Altitude: Nonoperating: sea level to 40,000 ft.; operating: sea level to 10,000 ft</li> <li>• Humidity: 5% to 85% R.H.</li> <li>• Shock: Nonoperating half sine shock: 20g, 10 msec on 3 axes; operating half sine shock: 5g, 15 msec horizontal, 7.5g, 10 msec vertical</li> <li>• Vibration: Nonoperating vibration: 3 to 10 Hz, 5dB/octave; operating vibration: 3 to 10 Hz, 5dB/octave</li> <li>• Acoustics: 35 dBA</li> </ul>
<b>Safety certification</b>	<ul style="list-style-type: none"> <li>• UL listed (UL 1950)</li> <li>• CSA certified (CSA 22.2 No. 950)</li> <li>• TUV (EN 60950)</li> <li>• NOM (NOM-019-SCFI-1993)</li> <li>• SASO (IEC 950: 1991, SSA 16, 17, 18, 86, 182)</li> <li>• IEC 950: 1991 + A1 + A2 + A3</li> <li>• IEC 825-1</li> <li>• Europe 60950: 1992 + A1 + A2</li> <li>• EN 60825-1</li> </ul>
<b>Ergonomic certification</b>	<ul style="list-style-type: none"> <li>• ZH1/618 compliant</li> <li>• MPRII (Sweden) (VDT Ergonomics)</li> </ul>
<b>Special certification</b>	<ul style="list-style-type: none"> <li>• CE Mark</li> <li>• CB Scheme Report (safety)</li> </ul>
<b>Electromagnetic certification</b>	<p>This list is a subset of the complete certification; please see online technical specification for additional certification</p> <ul style="list-style-type: none"> <li>• FCC Class B</li> <li>• European EMC Directive 89/336 EEC, Low Voltage Directive 72/23 EEC</li> <li>• EN 55022 1988: Class B, EN 50082-1: 1992 (ESD)</li> <li>• CISPR 22: 1985: Class B</li> <li>• VCCI Class II</li> <li>• Canada ICES-003, Taiwan CNS 13438, RRL Korea, SABS, New Zealand</li> </ul>

Additional product and technical support information is available online from [www.sgi.com/visual](http://www.sgi.com/visual) or by calling (888) 400-4SGI.



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