

**Sun™ Ultra™ 30**

**Just the Facts**



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# Sun™ Ultra™ 30 Systems Positioning

## Introduction

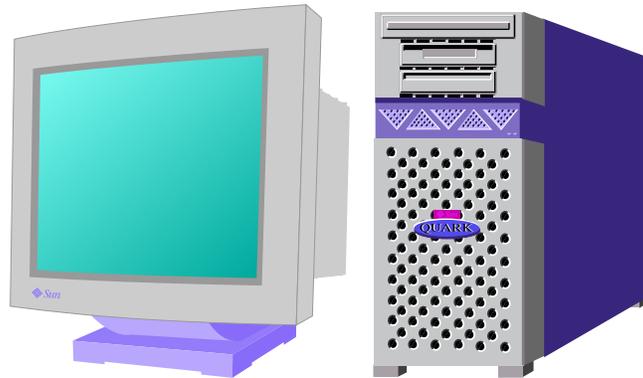


Figure 1. The Ultra 30 System

## High-Performance Graphics and Network, I/O, UltraSPARC™-II Processing Power

The introduction of the Sun™ Ultra™ 30 workstation in July 1997 raised UltraComputing™ to an entirely new level with UltraSPARC™-II processors, UltraSCSI disks, and an innovative, high-performance Peripheral Component Interconnect (PCI) I/O bus. Sun now extends the power of the Ultra 30 with the new Elite3D Graphics and the third generation of Creator Graphics technology. The minitower system enclosure is modular and expandable, providing a platform for access to new performance and technology options. Sun's commitment to high-performance computing and UltraComputing means the new Ultra 30 system delivers increasing levels of industry-leading performance and preserves binary compatibility with application software. The new performance levels will enable a whole new class of applications to be realized and used in the workstation environment.

## Sun Ultra 30 Systems

The modular Sun Ultra 30 systems are available in two different processor configurations: Model 250 and Model 300. Both systems include the highly-integrated Creator and Elite3D Graphics, which provide high performance and a comprehensive range of graphics functionality without the high cost of conventional "large, expensive frame buffer through I/O bus" technology used by the competition.

The Ultra 30 system continues the Sun tradition of delivering balanced system design and innovation. The powerful Ultra Port Architecture (UPA), introduced on the original Ultra systems, continues in the Ultra 30 system with new enhancements. It now includes a memory-interleaving mode with double the memory capacity of the Ultra 1, and dual UPA graphics slots to support monitors driven by up to two Creator or one Elite3D Graphics cards.

# Sun Ultra 30 Systems Positioning (cont.)

## Sun Ultra 30 Systems (cont.)

The Ultra 30 was Sun's first system to deliver the industry standard PCI I/O bus, enabling access to hundreds of expansion and networking options. Sun has added innovation to this system PCI I/O bus with dual bus channels, ensuring sustained high performance to the system's PCI slots. In addition, Sun is the first in the industry to deliver a system with 66-MHz PCI, which is capable of a whopping 200 MB per second throughput, ideal for high-performance networking requirements.

The new Ultra 30 is *not* just an Ultra system with PCI slots. All UltraComputing technologies have been scaled to higher-performance UltraSPARC-II processing power, UPA interconnect with memory interleaving, new-generation Creator Graphics, dual Creator Graphics support, and UltraSCSI disk technology. The Ultra 30 also introduces a revolutionary and innovative multiple-channel PCI bus—with the first 66-MHz capability. Ultra 30 demonstrates that UltraComputing delivers increasing industry-leading performance and preserves compatibility with existing application software. Ultra systems will continue to set high standards for both the RISC and high-end PC competition.

## Product Family Placement

The Ultra 30 is a relatively new addition to the current desktop product family, which scales from the low-cost, high-performance Ultra 5 and 10, up to the two-way Ultra 60 workstation.

The Ultra systems have several things in common, including:

- The SPARC™ processor
- 100-percent binary compatible from the low-end to the high-end, including Sun's server family
- Scalable from the low-end uniprocessor systems to the 64-way Starfire™ (Sun™ Enterprise™ 10000)
- Modular—easy to swap components
- Price/performance leaders in their class

<b>Ultra 5</b>	<p>The Ultra 5 is Sun's lowest-priced workstation. Designed to meet the needs of price sensitive and volume purchase customers without sacrificing performance, the Ultra 5 is Sun's entry-level offering in the personal workstation market.</p> <p>Target markets include software and Java™ development, 2-D content creation, finance, EDA, telecommunications, and embedded systems.</p>
<b>Ultra 10</b>	<p>The Ultra 10 is Sun's most powerful and expandable entry-level workstation and is the entry point of Sun's high-performance graphics computing systems. The Ultra 10 provides greater PCI expansion, faster processing, twice the memory capacity, and optional UPA-based graphics cards when compared to the Ultra 5 workstation.</p> <p>Target markets for this workstation include software and Java development, MCAD, electronic design automation, and financial analysis and modeling. With the installation of Creator or Elite3D m3 Graphics, the markets are extended to animation, 3-D content creation, and simulation.</p>

# Sun Ultra 30 Systems Positioning (*cont.*)

## Product Family Placement (*cont.*)

<b>Ultra 30</b>	<p>Announced in July 1997, the Ultra 30 workstation is aimed at high-performance computing and graphics markets. This includes both technical and commercial users who need the strong performance and expansion potential.</p> <p>Target markets includes both technical (MCAD, financial analysis, oil and gas) and commercial users.</p>
<b>Ultra 2</b>	<p>The Ultra 2 system is an SBus-based multiprocessing workstation. It is targeted for the technical user who requires high-performance and multiprocessing (MP) capability.</p> <p>The market includes both technical and commercial users who need the large number of applications and the functional capabilities of the Solaris environment, the high-performance of the UltraSPARC CPU, and the integration and support capabilities provided by the Sun channels.</p>
<b>Ultra 60</b>	<p>Ultra 60 is a more-advanced Ultra 2 workstation. Like the Ultra 2 system, the Ultra 60 workstation is designed for the technical user who requires high performance and MP capability. The Ultra 60 workstation also addresses the needs of graphics-intensive users and continues to support and build upon the upgradability features to which Ultra 2 users have grown accustomed.</p> <p>The target customer is the traditional “power desktop” user who has performance and expansion requirements that exceed the capabilities of the Ultra 10, Ultra 2, or Ultra 30 systems. This includes both technical and commercial users who need the large number of applications and the functional capabilities of the Solaris™ operating environment, the high-performance of the UltraSPARC-II processor(s), dual UPA-based graphics, and superior throughput and bandwidth.</p>

# Sun Ultra 30 Systems Positioning (*cont.*)

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## Key Messages

Sun Ultra 30 is a member of the UltraSPARC processor-based desktop systems. UltraComputing has evolved to new levels of performance and technology innovation.

- New innovative minitower system design provides modularity for flexibility, maximum system growth, and expansion potential
  - Easy-to-upgrade processor using the module design (same module and interchangeable with processor modules from Ultra 2 system)
  - Increased memory capacity to 2 GB maximum (16 slots using existing Ultra 16-, 32-, 64-, or 128-MB SIMMs)
  - Supports 2-, 4-, or 9-GB drive options (supports 1-inch or 1.6-inch height, 3.5-inch, 7200-rpm UltraSCSI disk drives)
  - Two UPA graphics slots able to support two Creator, Creator3D, or Elite3D m3 cards (in any combination), or one Elite3D m6 and one Creator, Creator3D, or Elite3D m3 card
  - Expanded front access capabilities: power switch, five-inch removable media bay for options such as 12x CD-ROM or tape options. Optional front-access floppy plus second 3.5-inch front-access bay for options that can interface using the PCI slots such as PCMCIA adapters
  - High I/O expansion with four full-sized, industry-standard PCI bus slots
- High-performance UltraSPARC-II CPU processor module
  - 64-bit SPARC version 9 at 250 MHz or 300 MHz
  - Provides 50 percent more of the raw processor computing power of the previous Ultra 1 uniprocessor systems
  - 2 MB second-level cache memory (on Model 300)
  - 100-percent binary compatibility with existing Solaris 2.5 and 2.6 software
  - Runs 32-bit applications unmodified from the Solaris 2.3 and Solaris 2.4 operating environments
- Exceptional throughput
  - UPA provides a crossbar-oriented interconnection establishing a 144-bit wide, ECC-protected data path to the CPU
  - Clocked at 100 MHz, Ultra 30 gives a peak throughput of 1.6 GB per second
  - Memory subsystem offers dual, 288-bit-wide memory paths with an interleaving feature for improved system performance
  - Flexible architecture allows memory to be installed in pairs for 288-bit-wide memory path or in sets of four to utilize the dual 288-bit-wide memory path interleaving feature
  - UltraSCSI Fast/Wide SCSI is integrated on the motherboard, offering double the disk performance (40 MB per second) of the current Ultra 1 or Ultra 2 systems

# Sun Ultra 30 Systems Positioning (*cont.*)

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## Key Messages (*cont.*)

- One of the industry leaders for networking, connectivity, and I/O performance ratings
  - 100-Mbps Fast Ethernet through twisted pair is a standard feature in all Ultra 30 systems, but the system also maintains connectivity with 10-Mbps networking technology through an autosensing speed-switch feature
  - Standard MII port connects to external transceivers, providing connectivity to media other than the standard integrated 100/10BASE-T twisted pair
  - Advanced networking options include FDDI and additional Fast Ethernet ports through industry-standard PCI option cards
  - Innovative multiple-channel, industry-standard PCI I/O bus provides sustained high throughput on all four full-sized PCI slots
  - Industry's first 66-MHz PCI I/O slot capable of delivering 200 MB per second throughput—ideal for high-performance networking requirements
- Creator Graphics Series 3 provides comprehensive range of graphics functionality at low cost: 2-D, windowing, 24-bit true color graphics, and support for both imaging and advanced 3-D graphics in one architecture
  - Creator Graphics Series 3 is enhanced, with up to 50 percent graphics-performance improvement over Series 1, plus high-resolution support for new 24-inch wide-screen monitors (up to 1920 x 1200).
  - Four 8-bit color maps for dynamic color map segment allocation within the 8-bit color overlay plane and for adjustable gamma correction. This gives applications greater access to colors even in 8-bit mode and gives the user the ability to color adjust (gamma correct) for optimal display quality.
- Support for new high-power Elite3D Graphics family provides high-end graphics for a mid-range price
  - Elite3D m3 Graphics is Sun's new high-power, mid-range 3-D graphics option in the new Elite Graphics product line. It offers more than twice the 3-D performance of Creator3D.
  - Elite3D m6 Graphics is Sun's new high-power, high-end 3-D graphics option in the new Elite Graphics product line. It offers four to five times the 3-D performance of Creator3D.

# Sun Ultra 30 Systems Positioning (*cont.*)

## Sun Ultra 30 System Models

The Sun Ultra 30 comes in two models that differ only in the installed processor module. Model 250 is the entry Ultra 30 system. Model 300 is Sun's premier uniprocessor system, used in situations that require the highest computing and graphics performance.

Sun Ultra 30	Model 250	Model 300
Processor speed	248 MHz	296 MHz
UPA speed	83.3 MHz	100 MHz
SPECint_95*	10.0	12.1
SPECfp_95*	14.9	18.3

\* SPECint\_95 and SPECfp\_95 results using SPARCompiler version ALPHA 5.0

## Availability

- Sun Ultra 30 Model 250 and Model 300 with Creator and Creator3D Graphics are currently available
- Sun Ultra 30 Model 300 with Elite3D Graphics begin shipping March 1998.

## Target Users

Sun Ultra 30 systems are aimed at high-performance computing and graphics markets, including both technical and commercial users who need the strong performance and expansion potential offered by the Ultra 30. Entry-level Ultra performance is available with the Ultra 5 and Ultra 10 systems. For Ultra multiprocessing requirements, the Ultra 60 system should be considered.

# Ultra 30 Positioning (cont.)

## Target Markets

The market opportunities for the Sun Ultra 30 are technical and commercial areas in which high-performance computing and graphics are required. Ultra 30 systems position above the current Ultra 5 and Ultra 10 markets (shown below for overall product line positioning).

Industry	Key Features to Highlight	Ultra 30 Model 250	Ultra 30 Model 300
<b>Software Development (CASE)</b> – ISVs – In-house development at large organizations	<ul style="list-style-type: none"> <li>• High-performance Solaris operating environment</li> <li>• Availability of applications</li> </ul>	✓	
<b>Mechanical Design (MCAD/MCAE)</b> – Automotive – Aerospace – Defense industry – Mechanical equipment designers	<ul style="list-style-type: none"> <li>• High-performance CPU</li> <li>• High-end graphics performance and functionality standard</li> <li>• Availability of applications</li> </ul>	✓	✓
<b>Electronic Design (EDA)</b> – Chip designers, board designers – System houses – Telco	<ul style="list-style-type: none"> <li>• High-performance CPU</li> <li>• High memory capacity</li> <li>• Availability of applications</li> </ul>	✓	✓
<b>Research and Development</b> – In-house development – Research institutions	<ul style="list-style-type: none"> <li>• High-computing performance</li> <li>• Feature-rich Solaris environment</li> </ul>	✓	
<b>Publishing and Imaging</b> – Newspapers – Magazines – Image banks – Advertising agencies	<ul style="list-style-type: none"> <li>• High-performance CPU</li> <li>• High-end performance and functionality for both graphics and imaging operations</li> <li>• Dual Creator Graphics monitors</li> </ul>	✓	✓
<b>Visualization and Simulation</b> – Scientific visualization – Technical simulation	<ul style="list-style-type: none"> <li>• High-performance CPU</li> <li>• High-end performance and functionality for both graphics and imaging operations</li> <li>• Dual Creator Graphics monitors</li> </ul>		✓
<b>Oil and Gas</b> – Visualization – Graphic modeling	<ul style="list-style-type: none"> <li>• High-performance CPU</li> <li>• High-end performance and functionality for both graphics and imaging operations</li> <li>• Dual Creator Graphics monitors</li> </ul>		✓
<b>Financial</b> – Stock and commodity traders – Banks	<ul style="list-style-type: none"> <li>• High performance</li> <li>• Compact design</li> <li>• Multimedia capabilities</li> </ul>	✓	

# Selling Highlights

## Key Applications

Sun has worked closely with major software vendors to see that their applications are tested and made available and officially supported on Sun™ Ultra™ 30 systems. Below is a partial list of the available applications. See our Catalyst™ catalog of third-party solutions for a more complete list.

Target Market	ISV— Software Applications	
Entertainment/ Animation/ Digital Creation	Adobe ArSciMed	Photoshop Kinema/Sim Kinetix (Lightwork's rendering tool kit) ( <a href="http://www.lightwork.com">www.lightwork.com</a> )
EDA	Avant!/ISS Avant!/Meta Software Cadence Design  Compass Design K2 Technologies Mentor Graphics  Mentor/Precedence Silvaco  SpeedSim Systems Science Viewlogic/Vantage Analysis Simplex Silvaco  For general information see: <a href="http://www.sun.com/desktop">http://www.sun.com/desktop</a> <a href="http://www.dacafe.com:80/DACafe/CORPORATE/corpeda.html">http://www.dacafe.com:80/DACafe/CORPORATE/corpeda.html</a>	DRC/ERC product HSpice Vampire Dracula Pathfinder Mask Compose and QuickView Caliber ICVerify Checkmate Co-Simulation Backplane Simulators Atlas Athena Spice SpeedSim Vera SpeedWave MT Thunder and Lightning Virtual Wafer Fab Automation Tools
Health care	Cemax Context Vision ISG Virtual Vision Software	VIP 2.0 ( <a href="http://www.cemax-icon.com">www.cemax-icon.com</a> ) Imaging processing for refining MR data Silohet ( <a href="http://www.isgtec.com">www.isgtec.com</a> )
MCAD	Computervision Dassault EDS/ Unigraphics Parametric Technologies SDRC	Computervision Catia Unigraphics Pro Engineer I-Deas Master Series

## Selling Highlights (cont.)

### Key Applications (cont.)

Target Market	ISV— Software Applications	
MCAE	ANSYS, Inc. Computational Dynamics, Inc. ESI EXA Corporation Fluent, Inc. Fluid Dynamics, Inc. (FDI) Hibbitt, Karlsson & Sorensen, Inc. (HKS) Livermore Software Technology Corporation (LSTC) MacNeal-Schwendler (MSC) MARC Analysis Research Corp	ANSYS StarCD Pam-Crash Powerflow Fluent/Fluent UNS/Rampant FIDAP ABAQUS LSDyna 3D  PATRAN/NASTRAN Mentat/MARC
	For general information see: <a href="http://www.sun.com/desktop">http://www.sun.com/desktop</a>	
Oil and gas	Cognesis GeoQuest Landmark Graphics	Charisma ProMax and Seisworks

### Compatibility

The Ultra 30 requires the Solaris™ operating environment. The version of Solaris required depends upon the graphics card installed on the system. The table below indicates the requirements.

Graphics Accelerator	Solaris 2.5.1 Hardware: 4/97	Solaris 2.5.1 Hardware: 11/97	Solaris 2.6 Hardware: 3/98
Ultra 30 with Creator Graphics series 2	Y	Y	Y
Ultra 30 with Creator Graphics Series 3	N	Y	Y
Ultra 30 with Elite3D Graphics	N	Y	Y

### Market Value Propositions

- As a result of the scalability and flexibility of UltraSPARC™ architecture, a company can better protect its investment in hardware and software.
- As a result of Sun's memory and UPA, a company will notice the significant improvement in application performance and user productivity.
- As a result of Sun's I/O networking, a company will have faster networking throughput, which will increase application performance and user productivity.

# Enabling Technologies

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## New UltraSPARC™ -II Processor

The Sun™ Ultra™ 30 is a shared-memory, multi-tasking system built around the new UltraSPARC-II microprocessor. The UltraSPARC-II is Sun's latest generation of the SPARC™ family and the second generation of 64-bit UltraSPARC chips. The UltraSPARC-II processors have clock rates of 250 MHz and 300 MHz.

- Modules have the 64-bit SPARC V9 architecture.
- Systems can have 2-MB of Ecache per CPU (Model 300)—4 times the cache size of Ultra 1.
- As a member of the UltraSPARC family of CPUs, full binary compatibility is assured.

## New PCI Technology

System I/O for the Ultra 30 is provided by two industry-standard Peripheral Component Interconnect (PCI) data buses. All PCI buses in the Ultra 30 comply with the 2.1 revision of the PCI specification, released in March 1995.

- Sun leads the industry with PCI/66, which has two times the throughput of standard PCI.
- Two independent PCI buses deliver excellent I/O bandwidth—up to 200 MB per second sustained throughput.

## Creator Graphics, Series 3

Creator leads the way, integrating high-performance graphics with 24-bit imaging, windowing, video playback and 2-D/3-D graphics with Sun's UltraSPARC-II processors. For accelerated imaging and video playback, Creator is combined with the Visual Instruction Set (VIS™), an extremely comprehensive set of imaging and graphics instructions built into a CPU.

Creator Graphics is designed as an integral part of the workstation system and is able to draw on system resources for functions traditionally built into the graphics board itself with specialized hardware. The result is that Creator is very fast and very cost effective.

Creator Graphics Series 3 is the latest generation of the Creator Graphics family of accelerators. With one architecture it can accelerate and support diverse types of graphics needs ranging from 8-bit and 24-bit windowing to high-end 3-D graphics. It is available in a version for 2-D oriented use, Creator, and in a version that also has high-resolution 2-D and 3-D acceleration, Creator3D. Creator3D provides fast, high-quality transformation and display of 3-D solid and wireframe objects.

Creator Graphics Series 3 has four 8-bit color maps for better dynamic color map segment allocation to applications running in 8-bit and 24-bit color. This feature gives applications better access to private color map segments that do not interfere with other applications. Creator Graphics Series 3 also supports adjustable gamma correction, which gives the user the ability to adjust display color to best match individual preferences. Creator3D Series 3 adds hardware acceleration of OpenGL™ stencil planes. This results in increased application performance for many OpenGL-based applications.

In addition, Creator3D Series 3 supports a 1920 x 1200 resolution with Sun's 24-inch monitors (in single-buffer mode). Typical uses for configurations with the 24-inch monitor are in prepress, publishing, imaging, and in other situations in which high-quality 2-D imaging or large amounts screen real estate are essential.

# Enabling Technologies (cont.)

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## Elite3D Graphics

Elite3D Graphics represents a new high-powered graphics subsystem for the 3-D graphics market and is complimentary to the Creator Graphics product line. Elite3D Graphics retains the basic underlying architecture of Creator graphics, and maintains full API layer compatibility and transparent acceleration of 3-D graphics APIs. Like the Creator Graphics, Elite3D Graphics is combined with VIS, an extremely comprehensive set of imaging and graphics instructions built into a CPU. Elite3D comes in two models: Elite3D m3 is twice as fast as Creator3D and Elite3D m6 four to five times the performance of Creator3D.

Elite3D provides very fast, high-quality transformation and display of 3-D solid and wireframe objects, and dramatically accelerates high-end functionality, such as double-buffering, triangle and quad rendering, and lighting and shading. At the same time, Elite3D accelerates 2-D objects that meet X11 rules. Fast 8- and 24-bit window system and imaging performance are provided. Elite3D systems provide 96-bit planes, including full 24-bit double-buffer planes required for smooth animation. A 28-bit Z-buffer is included to provides hardware assistance for hidden surface removal and dynamic rendering for 3-D objects.

Elite3D systems utilize 3D-RAM technology. This technology is responsible for implementing fast, inexpensive 3-D frame buffers. In addition, Elite3D has three or six (depending on the model) on-board floating-point processors to speed up floating-point intensive operations such as transformations, clip tests, face determinations, and lighting.

Elite3D is fully compatible with Creator3D accelerators, and does not compromise the window system, 2-D graphics, imaging, or video performance. Elite3D simply adds significant performance gains for 3-D applications.

# System Architecture

## Technology Overview—More Than Just a Fast Chip

Good performance through advanced applications typically demands excellent performance from more than one part of the system. Most often, an application consists of data fetching, computation, and presentation. Unless the system is designed to address all of these, it will always be limited by the weakest link in the chain.

The Sun™ Ultra™ 30 workstation is designed for balanced system performance, accelerating applications at every step. Faster I/O and networking, together with the Ultra Port Architecture (UPA) interconnect, allow fast data fetching. The UltraSPARC™ CPU provides supercomputing power, and moves data through the UPA at high speed. Tightly integrated Creator Graphics provides high-end graphics functionality and performance for the Ultra 30 Creator systems.

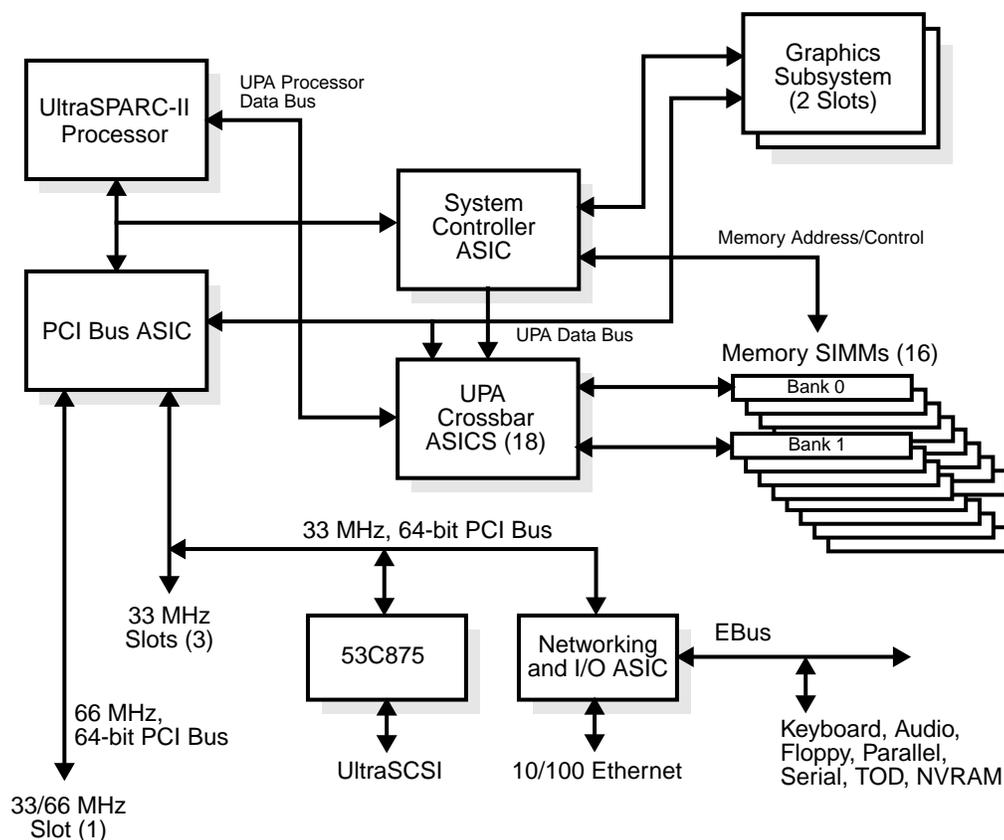


Figure 1. Architecture of the Ultra 30 systems

The Sun Ultra 30 system has UPA. This architecture is a packet-switched, cross-bar architecture and Sun is the first to provide such an architecture on the desktop. The Sun Ultra 30 has 18 buffered cross-bar switched chips that allow the memory and the graphics to interconnect. This architecture is the basis for the sensational compute and graphics performance.

# System Architecture (cont.)

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## Key Facts

- Excellent performance desktop system using the UltraSPARC-II processor
- High-end graphics functionality and performance at entry-level prices with Creator and Elite3D Graphics
- Balanced system design
  - Matching performance enhancement in I/O, networking, and memory access
  - Application performance without compromise

## Technical Fact Summary

- Higher-performance system bus provides fast access to memory and graphics
- Flexible hard disk expandability
  - Up to two internal UltraSCSI disks; either 2.1-, 4.2-, or 9.1-GB disks
  - Up to 288.2 GB of total disk storage
- High-performance memory subsystem
  - Up to 2 GB using 16 x 128-MB SIMMs, installed in pairs
  - Supports Ultra 1, Ultra 2, and SPARCstation™ 20 SIMMs for compatibility and investment protection
- High-performance I/O
  - 40 MB per second UltraSCSI
  - Innovative high-performance PCI I/O bus offering dual independent PCI buses, plus 66-MHz PCI capability
- Designed for interactive media applications
  - Integrated Visual Instruction Set (VIS™) in the UltraSPARC CPU
  - Advanced 24-bit accelerated Creator Graphics standard
  - 12x CD-ROM, photo-CD compatible
- Expansion to advanced networking
  - Fast Ethernet, 100BASE-T, auto-sensing, and autoswitching to 10BASE-T for backward compatibility
  - MII connector to Fast Ethernet for connection to other types of Ethernet transceivers and media
  - PCI networking options include Gigabit Ethernet, ATM, Token Ring, and FDDI to name a few
- New system enclosure
  - Cost-effective minitower enclosure offering strong expansion

# System Architecture (cont.)

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## UltraSPARC™ Processor

The Ultra 30 is a high-performance, uniprocessing system built around the UltraSPARC-II microprocessor. The UltraSPARC-II is Sun's latest generation of the SPARC family and the second generation of 64-bit UltraSPARC chips. It utilizes the latest 0.35-micron technology (versus the 0.5 micron technology of the UltraSPARC-I CPU), which shrinks the die size to 149<sup>2</sup>mm (from 218<sup>2</sup> mm). This reduced die size is the key to UltraSPARC-II CPU's higher clock rates and increased performance. This smaller die size also enables the UltraSPARC-II to operate at a core voltage of 2.5 volts, rather than UltraSPARC-I CPU's 3.3 volts. This lower voltage reduces power consumption and allows the chip to operate at higher frequencies without increasing total power requirements or heat dissipation—both major design issues in today's high performance systems.

UltraSPARC-II processors used in the Ultra 30 are individually mounted on 4-inch x 6-inch, field-installable module cards along with associated UPA data buffers and 2 MB of high-speed SRAM external cache memory (2 MB on Model 300, 1 MB on Model 250). These modules are the same as those used in the Ultra 2 workstation. This modular design facilitates easy system processor upgrades (to next generation UltraSPARC processors), and system service.

### • Features

- Integrated VIS instruction set
- Multilevel trap handling
- Utilizes the latest 0.35 micron technology which greatly decreases the die size
- CPU is mounted on field-installable module card with associated UPA data buffers and 1 MB or 2 MB of Ecache

### • Benefits

- Ready for increased performance on multimedia and networking operations
- Efficient process handling
- Results in a significant increase performance and a significant decrease in power consumption (due to a lower core voltage of 2.5 volts)
- Facilitates easy system processor upgrades and system service

# System Architecture (cont.)

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## UPA System Bus

The Ultra 30 processor, memory, and I/O subsystems are interconnected by the high-speed UPA cross-bar datapath. This is an enhanced implementation of the same UPA design used in the Ultra1 and Ultra 2. The CPU datapath is 144-bits wide, with 128 bits for data and 16 bits for error correcting code (ECC). The UPA data path that support system I/O is 72-bits wide, with 64 bits for data and 8 bits for ECC. The memory interface supports dual 288-bit wide datapaths.

With a 250-MHz CPU installed (Model 250), the UPA clocks at 83.3 MHz, and with 300-MHz CPU installed (Model 300), the UPA transfers data at 100 MHz, or one transfer every 10 ns. CPU segments, which transfer 16 bytes of data in parallel each clock cycle, each have a maximum transfer rate of 1.6 GB per second.)

- **Feature**

- Dual 288-bit wide, high-speed memory bus

- **Benefit**

- High-performance memory access
- Flexibility in memory expansion options

## Memory

The Ultra 30 supports up to 2 GB of 60-ns, 5-volt, dynamic RAM memory. Double in-line memory modules (DIMMs) used by the Ultra 30 are the same type as those used in the Ultra 1 and Ultra 2 workstations. Memory is organized into four banks of four DIMMs. To utilize the Ultra 30 memory interleaving feature for best system performance, memory DIMMs should be installed in sets of 4 of identical DIMMs. However, the Ultra 30 will also accept DIMMs installed in pairs. This memory interleaving feature allows flexibility in memory expansion options.

- **Features**

- Uses the same type of memory as Ultra 1 and Ultra 2
- With two banks of DIMMs installed, (memory installed in sets of four) memory operations can be two-way interleaved

- **Benefits**

- Protects customer's investment and enhances upgradability
- Improves memory throughput and average latency for reads and writes over non-interleaved operations

# System Architecture (cont.)

## System I/O—High-Performance PCI Technology

System I/O for the Ultra 30 is provided by two industry-standard Peripheral Component Interconnect (PCI) data buses. All PCI buses in the Ultra 30 comply with the 2.1 revision of the PCI specification, released in March 1995..

Slots	Slot Width	Clock Rate	Card Input Voltages Supported
1	32 or 64 bits	33 or 66 MHz	3.3 volt or universal
2-4	32 or 64 bits	33 MHz only	5 volt or universal

In addition to the I/O capabilities available through PCI option cards, the Ultra 30 provides the following I/O channels directly from the main system board:

- One internal/external 40-MB UltraSCSI channel with external 68-pin SCSI connector
- One external 10/100 auto-select Ethernet port (supports either a Cat-5 UTP, RJ45 connector, or 40-pin miniature “D” MII connection)
- Two external EIA-232D or EIA-423 serial ports via two DB25 connectors (support EIA-423 synchronous data rates from 50 baud to 384 Kbps, and asynchronous data rates from 50 baud to 460.8 Kbaud)
- One external 2-MB Centronics-compatible, bidirectional, EPP parallel port with one DB25 connector
- One external standard Sun Keyboard/Mouse port (mini DIN-8 connector)

### • Features

- Industry’s first 66-MHz PCI with 200-MB per second bandwidth (sustained)
- Two independent buses

### • Benefits

- High performance I/O throughput
- Access to many third-party solutions
- High, sustained I/O throughput

## System Architecture (cont.)

### Storage

Internal data storage for the Ultra 30 is provided by up to two 3.5-inch by 1-inch or 3.5-inch by 1.6-inch UltraSCSI disk drives. Drive sizes include 2.1-, 4.2-, and 9.1-GB UltraSCSI drives. These 7200-rpm drives offer a peak data transfer rate of 40-MB per second—twice the transfer rate of Fast/Wide SCSI controllers.

In addition to its internal and external high-speed fixed storage capabilities, the Ultra 30 provides an optional 12 x CD-ROM drive and a 1.44-MB 3.5-inch manual eject floppy drive for software installation and system management.

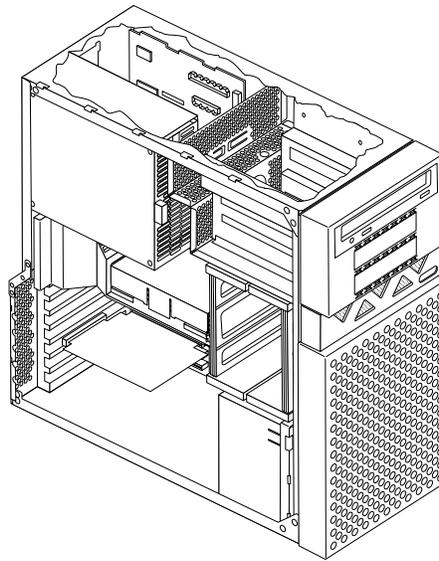
- **Feature**

- 40-MB/second UltraSCSI
- 2.1-, 4.2-, and 9.1-GB disk options

- **Benefit**

- Fast access and retrieval of mass storage data
- Flexibility in internal disk expansion and high internal capacity

The Ultra 30 minitower accommodates front-access peripheral expansion through one 1.6-inch drive half-height 5.25-inch bay, and two 3.5-inch bays for a diskette drive, PCMCIA adaptor, or other options.



**Figure 2.** Ultra 30 chassis with access panel removed, provides full access to internal options

# System Architecture (cont.)

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## Creator Graphics Series 3 Overview

Creator Graphics Series 3 is the latest generation of the Creator Graphics product family accelerates and supports diverse types of graphics needs ranging from 8-bit and 24-bit windowing to high-end 3-D graphics.

Creator Graphics Series 3 is designed to match the CPU performance increase beyond the currently available CPU speeds. Series 3 accelerators have one clock for the internal graphics processing and another clock for the frame buffer enabling each part to run at maximum speed independently from each other.

Creator Graphics performance is based on a unique system-level approach to designing graphics.

- UltraSPARC CPU
  - Creator Graphics relies on the power of the UltraSPARC CPU for floating-point calculations, and on the VIS instruction set to accelerate imaging. This eliminates the need for a dedicated graphics processor, and results in a significant cost advantage with Creator Graphics.
- UPA Graphics Interconnect
  - UPA provides a high-speed, high-bandwidth interconnect between the CPU, Creator Graphics, and system memory. It raises overall graphics performance while maintaining a balanced throughput. UPA interconnect ties Creator Graphics directly to the CPU and memory, and delivers orders of magnitude greater bandwidth compared to the traditional way of attaching graphics accelerators through a peripheral bus such as SBus or PCI.
- Creator Rendering ASIC
  - A powerful ASIC renders graphics primitives at very high speeds. The Creator ASIC accelerates fills, scroll, text, lines, polygon rendering, and color space conversion.
- 3D-RAM graphics memory
  - A breakthrough in graphics memory provides high bandwidth and built-in acceleration for 3-D graphics. Creator Graphics Series 3 uses the fastest available 3D-RAM chips.

## Creator Graphics Model Features

Creator Graphics is available in two configurations: Creator, a single-buffered version that provides hardware acceleration of 2-D graphics, and Creator3D, a double-buffered version that has the full capabilities of Creator, plus increased 3-D graphics acceleration.

The features provided by Creator Graphics, Series 3 on both the single-buffered and double-buffered cards are:

- Accelerated video decompression (playback) by YCC-to-RGB color space conversion
- Imaging and windowing support, including contrast stretch and consecutive block prefetch for SFB reads

# System Architecture (cont.)

## Creator Graphics Model Features (cont.)

- High-resolution video and monitor support
  - Line doubling for interlaced video writes
  - DDC2B monitor serial communication, with EDID default resolution support in the Creator bootprom
  - Provides a utility to change the resolution within the upper and lower limits of what the new Creator Graphics boards can easily support
- Accelerated imaging and advanced 3-D graphics with Gouraud shading, line anti-aliasing, per-pixel depth cueing, subpixel addressing, transparency, and stereo viewing with monitor
- Four 8-bit color maps for intelligent and dynamic color-map segment allocation give 8-bit and 24-bit color applications better color access and virtually eliminates interference (such as color flashing) between color intensive applications
- Adjustable gamma correction offers the user the ability to adjust color to individually preferred settings and optimal display quality

The double-buffered (Creator3D) option has the following additional features:

- Buffer B addressing for stateless (DFB) and video accesses
- Single-buffered, high-resolution (2.3 M pixels) support
  - 1920 x 1200 landscape mode (modified HDTV-style 16:10 format)
- Hardware acceleration of OpenGL™ stencil functions are provided for the double-buffered, including overlay SOV support

## Creator Graphics Model Summary

Creator	Creator3D
<ul style="list-style-type: none"> <li>• Full 2-D imaging and windowing acceleration</li> <li>• Suited for 2-D, windowing, and imaging applications including: CASE, color publishing, EDA, medical imaging, and general research</li> <li>• 24-bit true color, single-buffered</li> <li>• 8-bit overlay and visual planes</li> <li>• Stereo display up to 960 x 680 at 112-Hz non-interlaced</li> <li>• 5-MB 3D-RAM memory</li> <li>• 1280 x 1024 at 76 Hz standard with programmable bootprom resolution</li> <li>• NTSC/PAL video timings</li> <li>• 64-bit DAC</li> </ul>	<ul style="list-style-type: none"> <li>• Full 2-D imaging and windowing acceleration, plus full 3-D acceleration</li> <li>• Ideal for high-end 2-D, mid-range 3-D graphics, and solids in MCAD and MCAE, as well as high-end imaging and color publishing applications</li> <li>• 24-bit true color, double-buffered up to 1280 x 1024</li> <li>• 28-bit Z-buffer</li> <li>• 8-bit overlay and visual planes</li> <li>• Stereo display up to 960 x 680 at 112-Hz non-interlaced, double- and Z-buffered</li> <li>• 15-MB 3D-RAM memory</li> <li>• 1280 x 1024 at 76 Hz standard with programmable bootprom resolution</li> <li>• NTSC/PAL video timings</li> <li>• 128-bit DAC</li> <li>• High resolution 1920 x 1200 at 70 Hz (single buffered) supporting 24-inch wide screen display</li> </ul>

# System Architecture (cont.)

## Elite3D Overview

Elite3D greatly accelerates the rendering of 3-D triangles, vectors, and texture maps over what is possible with Creator or a raw CPU. It does this by adding specialized graphics floating-point units and more powerful pixel-drawing chips. It supports a 1280 x 1024 96-bit deep frame buffer, configured the same as the double buffered and Z-buffered Creator3D. The 96-bit pixels support two 24-bit color buffers, an 8-bit pseudo-color overlay buffer, and a 28-bit Z buffer, plus some miscellaneous control planes.

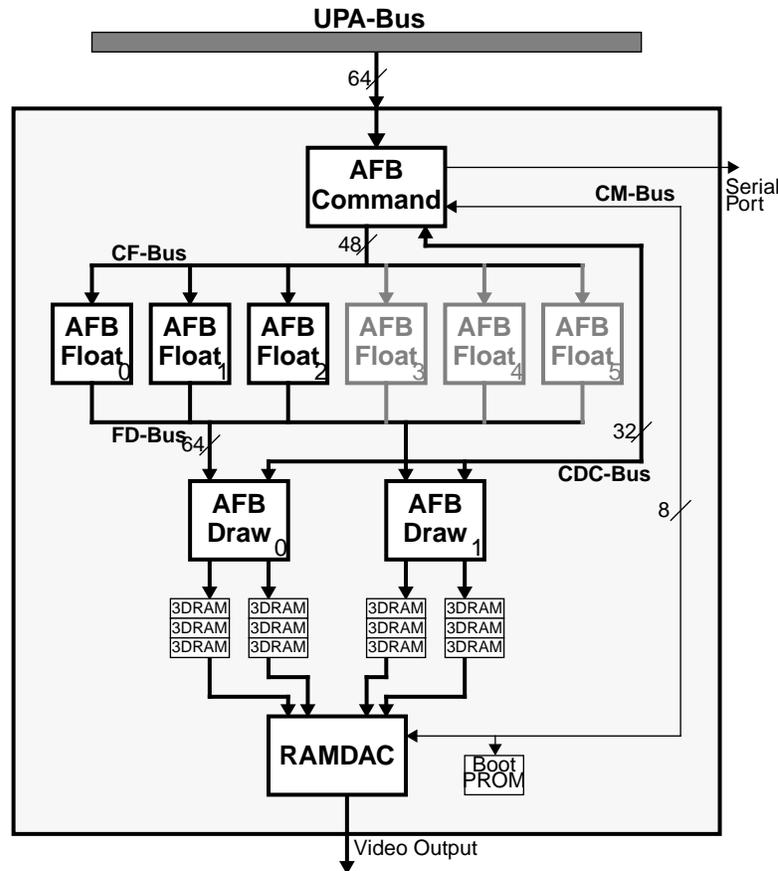


Figure 3. Elite3D Chip-level Diagram

Elite3D has a highly parallel and efficient graphics pipeline. The Elite3D architecture uses a new generation of 3D-RAM chip. This chip speeds up a read/modify/write pixel access from 160 ns to 10 ns, which changes all of the rules about graphics pipeline behavior.

# System Architecture (cont.)

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## Elite3D Overview (cont.)

AFB-Command, at the interface level, is a superset of the Creator ASIC chip. The additional functionality supports rendering of model space geometry. The main change is to allow the most important bits to be packaged up into single header words that can be passed down with the geometry data without stopping the pipeline. Additional functionality includes complete binary compatibility with the register set and function of Creator3D support for OpenGL.

Given the technological changes brought on by 3D-RAM, the primary justification for the existence of a 3-D graphics accelerator is to deliver an order of magnitude more floating-point performance than a contemporary general purpose RISC CPU, at a price less than that of a single CPU and cache.

## Elite3D Features and Benefits

### • Features

- Integrated imaging
- Very high performance accelerated 24-bit double-buffered 3-D graphics
- 28-bit Z-buffer
- 8-bit overlay plane
  
- Gouraud shading
- Alpha blending and screen door transparency
- Line and dot anti-aliasing
  
- Per pixel depth-cueing
- Per pixel alpha interpolation
- 4-bit stencil support with hardware acceleration of OpenGL stencil functions
- Accelerated lighting
  
- Compressed geometry decompression
  
  
- Four 8-bit color maps

### • Benefits

- Can perform fast imaging and 3-D on unified frame buffer.
- Smooth animation and interactivity of 3-D graphics.
  
- Improves visual quality and depth accuracy.
- Allows overlay of 8 bit windows on top of the 24 bit visuals without damaging the underlying visual. This allows seamless integration and manipulation of windows.
- Allows smooth shading of solid geometry.
- Used to simulate transparent materials such as glass.
  
- Needed in MCAD and visualization for better visual quality.
- More accurate depth-cueing or fog.
- Greater accuracy and image quality.
- Provide greater performance
  
- More lights can be turned on for enhanced visual display without encountering large performance penalties.
- The main purpose of this new feature is to allow much more geometry data to be stored in the available memory, but it also reduces bus bandwidth needs as well. For efficient geometry handling to enable network-centric graphics collaboration
- For dynamic colormap segment allocation when running 8-bit window systems should eliminate color flashing problems.

# System Architecture (cont.)

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## Elite3D Features and Benefits (cont.)

### • Features

- Adjustable gamma correction
- NTSC/PAL video timing support
- Stereo video output (960 x 680 at 112 Hz) supported with 19- and 21-inch monitors
- 1280 x 1024 at 76 Hz resolution standard
- Two serial port connectors
- Dual Headed Support (One Elite3D m6 frame buffer and an additional Elite3D m3 or Creator/Creator3D)
- OpenGL 1.1.1, XGL™ 3.0, XIL™, X, Java 3D™ support
- Binary compatibility with Creator Graphics product family.

### • Benefits

- Allows users to gamma correct visuals for enhanced visual quality
- Supports frame buffer to video output
- With frame buffer, monitor, and window systems support for stereo, users can get more accurate representation of 3-D data
- High resolution display quality
- For peripherals
- For users who need to be able to do multiple things simultaneously, i.e., command and control applications, 3-D and video playback for animators, design and analysis for engineers,
- A choice of APIs
- Interoperability with existing applications and users

# System Architecture (cont.)

## Sun Ultra 30 Graphics Performance

	Ultra 30 Creator Model 250/300	Ultra 30 Creator3D Model 250/300	Ultra 30 Elite3D m3 Model 300	Ultra 30 Elite3D m6 Model 300
Xmark	27.6/30.3	27.6/30.3	30.8	31.4
2-D vectors per second	3.9/4.1 M	3.9/4.1 M	2.6 M	3.7 M
3-D Performance				
• 3-D vectors/second	3.7/3.7 M	3.7/3.7 M	4.9 M	8.2 M
• 3-D mesh/second	—	1.1/1.2 M	2.9 M	5.9 M
• 3-D quads/second	—	411/458 K	1.2 M	1.2 M
GPC PLB				
• PLBwire93	179/213.0	193/225.0	272.7	372
• PLBsurf93	—	266/317.1	458.4	600
OpenGL				
• CDRS-03	—	47.0/50.7	74.5	129.1
• DX-03	—	9.5	14.3	14.2
Imaging Performance				
• Scale (Mps)	42.0/50.0	42.0/50.0	41.0	50.0
• Convolve (Mps)	3.4/4.7	3.4/4.7	4.8	4.7
• Rotate (Mps)	36.5/46.5	36.5/46.5	46.6	46.5
Standard color monitors supported	17, 19, and 21 inches	17, 19, 21, and 24 inches	17, 19, and 21 inches	17, 19, and 21 inches

### Metrics Defined

- 2-D vectors are 10 pixels long, X11 performance numbers
- 3-D vectors are 10 pixels long, depth-cued, clip tested, perspective projection, solid line through XGL
- 3-D mesh are 25 pixel triangle mesh, one light source
- 3-D quads are 100 pixel, independent quadrilaterals, with one directional light source
- Both 3-D mesh and quads are Gouraud shaded, randomly oriented, transformed, clip tested, with perspective projection and Z-buffered through XGL.
- Configuration with 24-inch monitor use Creator3D in single buffer mode unless otherwise noted
- 3-D quads are 100-pixel 3-D quads, one light—ambient, diffuse, isolated, perspective, Gouraud shaded, Z-buffered with culling (in thousands)
- XIL numbers are in million pixels (megapixels per second) for a single-band image

### Special features

- Accelerated imaging and advanced 3-D graphics with Gouraud shading, line antialiasing, per-pixel depth cueing, subpixel addressing, transparency, stereo viewing with monitor
- Creator Graphics Series 3 and Elite3D Graphics utilize a new connector for stereo viewing synchronization, a 7-pin mini-DIN style of connector. (StereoGraphics Corporations sells a cable adapter for connecting the old and new styles of connectors. It can be ordered from them using the part number ESUN.)

# System Architecture (cont.)

## Sun Ultra 30 System Configuration

	Sun Ultra 30 Model 250	Sun Ultra 30 Model 300
<b>Dimensions and weight</b>	45 cm x 19 cm x 49.8 cm (H x W x D) 17.7 inches x 7.5 inches x 19.6 inches 17.6 kb (38.8 pounds)	
<b>CPU and UPA</b> – Architecture – Clock rate – Processor slots – Cache on chip – External cache – UPA speed	UltraSPARC-II 248 MHz 1 32 KB 1 MB 83.3 MHz	UltraSPARC-II 296 MHz 1 32 KB 2 MB 100 MHz
<b>Memory</b> – Memory type – Number of slots – Capacity – DRAM speed – Bus width – DIMM sizes	ECC 16 128 MB to 2 GB 60 ns 288 bits (dual paths) 32, 64, and 128 MB	
<b>Storage</b> – Maximum internal – Maximum total	Two internal disk capacity, up to 18.2 GB 288.2 GB	
<b>I/O Interfaces</b> – UltraSCSI – Graphics – Serial ports – Parallel port – PCI I/O bus	40 MB/second UltraSCSI (SCSI-3) Two UPA graphics slots support Creator and Creator3D Two RS-232C/RS423 DB25 Centronics compatible (DB25) Four full-size PCI slots (version 2.1): Three at 33 MHz; one at 33 or 66 MHz	
<b>Networking ports</b>	TP Ethernet 100/10BASE-T or MII port	
<b>Backup and distribution</b> – Floppy – CD-ROM – Internal  – External	Optional 3.5-inch floppy SunCD™ 644 MB, SunCD 12x Optional 12–24 GB DDS-2 4-mm, 14 GB 8-mm, up to two 2.1-, 4.2-, or 9.1-GB disk 2.1–9.2 GB Sun™ StorEdge™ UniPack 8.4–54.6 GB Sun StorEdge MultiPack 2.5-GB QIC 20–40 GB, 8-mm 4–8 GB, 4-mm DDS-2 12–24 GB, 4-mm DDS-3 72–144 GB, 4-mm DDS-3 autoloader 140-GB Sun StorEdge L140 20–40 GB DLT4000 35–70 GB DLT7000	

# System Architecture (cont.)

## Sun Ultra 30 System Configuration (cont.)

Product Highlights	Sun Ultra 30 Models 250 and 300 Creator	Sun Ultra 30 Models 250 and 300 Creator 3D	Sun Ultra 30 Models 250 and 300 Elite3D
<b>Operating Environment</b>	Solaris 2.5.1 Hardware: 4/97 (series 2) Solaris 2.5.1 Hardware: 11/97 (Series 3) Solaris 2.6 Hardware: 3/98 (Series 3)		Solaris 2.5.1 Hardware: 11/97 Solaris 2.6 Hardware: 3/98
<b>Monitors</b>			
– 20-inch color	1280 x 1024 at 76 Hz 1152 x 900 at 76 Hz and other programmable resolutions	1280 x 1024 at 76 Hz 1152 x 900 at 76 Hz and other programmable resolutions	1280 x 1024 at 76 Hz 1152 x 900 at 76 Hz and other programmable resolutions
– 24-inch wide-screen color	N/A	High-resolution support: 1920 x 1200 at 70 Hz* 1600 x 1000 at 76 or 66 Hz* 1440 x 900 at 76 Hz* 1280 x 800 at 76 Hz	N/A
<b>Graphics</b>	Two UPA graphics slots		
– Slots	Two UPA graphics slots		
– Graphics	Creator	Creator3D	Elite3D m3 frame buffer or Elite3D m6 frame buffer†
– Color planes and visual capabilities	NTSC/PAL timing 24-bit plus 8-bit overlay Stereo (960 x 680) at 112 Hz		
– Double buffer	8-bit	24-bit	
– Z-buffer	—	28-bit	
– Multimedia features	24-bit true color accelerated video playback		
<b>Graphics market positioning</b>			
– Windowing and 2-D	✓	✓	✓
– 3-D wireframe	✓	✓	✓
– 24-bit and imaging	✓	✓	✓
– 3-D solids		✓	✓
– Multimedia	✓	✓	✓
✓ = Primary Application * = Creator3D in single-buffer mode † = Only one Elite3D m6 frame buffer per Ultra 30 workstation			

# System Management

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## System Administration

### ShowMe™ How™: State of the Art Installation and Maintenance Instruction

ShowMe™ How™ is a new documentation system that presents information in a highly understandable multimedia format. Installation and service tutorials as well as reference information provide users with comprehensive, easy to use instruction. ShowMe How streamlines installation and maintenance to lower service costs and maximize system uptime.

- **Features**

- Distributed on CD-ROM
- Movies of installation and replacement procedures played through ShowMe™ TV™ software packaged with application
- Photo sequences with narrated installation and replacement procedures
- Text-based instructions can be viewed on-line and printed, excerpted from standard Sun documentation
- Photos with active callouts link to more detailed photos and text-based reference information

- **Benefits**

- Included with every system
- Make installation maintenance easy and lower maintenance costs

### SunVTS™

The SunVTS™ system exerciser is a graphically-oriented UNIX® application that permits the continuous exercising of system resources and internal and external peripheral equipment. Used to determine if the system is functioning properly, SunVTS incorporates a multifunctional stress test of the system through operating system level calls, and allows the addition of new tests as they become available.

# System Management (cont.)

## Solaris™ Operating Environment

The Sun™ Ultra™ 30 system is supported by the industry's leading enterprise operating environment, Solaris™. Built on the latest UNIX technology, the Solaris environment delivers unparalleled scalability and performance. With enterprise integration by design, Solaris provides easy access to a wide range of computing environments and network technologies. Solaris delivers a competitive advantage to businesses through networked computing, scalability, and multi-architecture support. Solaris provides an advanced, superior solution for all customer IT needs, both technical and business. Solaris is an industrial-grade solution with the performance, quality, and robustness to deliver business-critical reliability.

For technical desktop users, Solaris delivers unique advantages. Its advanced features and functionality, combined with built-in networking, gives users a high-performance computing environment, enabling faster and higher-quality work. For graphics and performance-intensive computing such as design automation, finance, and data visualization, Solaris provides the power, performance, and innovation that businesses need to be competitive.

Solaris delivers the power of the Sun Ultra systems, with benefits that include enhanced networking capabilities and performance, graphics and imaging, increased standards compliance, and key operating system performance advancements.

The Ultra 30 requires the Solaris operating environment. The version required depends upon the graphics card installed on the system. The table below indicates the requirements.

Graphics Accelerator	Solaris 2.5.1 Hardware: 4/97	Solaris 2.5.1 Hardware: 11/97	Solaris 2.6 Hardware: 3/98
Ultra 30 with Creator Graphics series 2	Y	Y	Y
Ultra 30 with Creator Graphics Series 3	N	Y	Y
Ultra 30 with Elite3D Graphics	N	Y	Y

## Solaris Features and Benefits

### • Features

- Solaris operating environment
- Multithreaded operating environment
- Over 12,000 applications
- Graphics: Foundation-layer libraries
- Common Desktop Environment (CDE)
- Networking: Multinetworking integration
- Object technology

### • Benefits

- Industry-leading enterprise operating system
- High performance and scalability
- Wide range of tuned and tested applications
- Compatible with feature-rich and industry-standard graphics libraries
- Industry-standard, multivendor graphical user interface
- Transparent access to PC and enterprise networking resources
- Supports OMG/CORBA-compliant Solaris NEO™ object environment

# System Management (*cont.*)

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## Solaris Operating Environment (*cont.*)

### Solaris 2.5.1 Strengths

- Solaris offers
  - Optimized support for *Sun4u* architecture, utilizing the UltraSPARC™ processor's extra floating-point registers, Visual Instruction Set (VIS™), accelerated *bcopy* and *bzero* functions, and separate kernel and user address spaces
  - Improvements to the virtual memory system and kernel memory allocation to decrease system memory requirements and boost large system performance
  - Faster pipes and standard I/O to increase application I/O performance
  - NFS™ version 3, for faster network file writes and directory reads; reduces server loading
  - NFS over TCP, for better performance over wide-area networks
  - Improved network file locking (*lockd*), for faster and more reliable distributed file locking
  - Name Service Cache (NSC) providing very fast name service lookups, and increasing access to directory, mail, and http
- Improved Solaris 1 compatibility
  - Support for Solaris 1 binaries that utilize a mixture of static and dynamically linked libraries
  - Additional Solaris 1 commands and library interfaces
- Improved security
  - Access control lists and NIS+ password aging
- Standards supported
  - Posix threads (1003.1c) support
  - Full X/Open® xpg4/xcu4 branding
  - X/Open XFN federated naming, allowing two or more naming services to cooperate
  - Kodak Color Management System™
  - CDE 1.0.2 and ODBC copackaged
- The Solaris environment connects users to the enterprise.
  - Provides connectivity to and/or integration with other enterprise resources
  - Supports the applications, tools, and services to retrieve, process, and manage information
  - Provides a user interface to present information; facilitates communication through a graphical user interface (GUI) and graphics, imaging, and other technology

# System Management (*cont.*)

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## Solaris Operating Environment (*cont.*)

### Solaris 2.6 Strengths

Along with the features available in Solaris 2.5.1, Solaris 2.6 includes several additional features and capabilities:

- Solaris Web Start, a browser-based installer that makes Solaris installation simple
- The new Java™ virtual machine with JIT (just in time) compiler
- HotJava™ Browser
- WebNFS™
- Network/web server and database performance improvements
- AnswerBook™ 2 on-line documentation
- Network management and system administration, such as NTP, SNMP, DMI, DHCP, and VLSP
- Year 2000-compliant with enhancements (contact your Sun Sales representative for enhancement availability)
- Extended language support, including new Unicode locales
- Improved graphics for X11R6 support and XIL™ 1.3, which is MT hot and safe
- Large file support for increased data storage

### What's New in Solaris 2.6?

With Solaris 2.6 (Hardware: 3/98), Sun has taken the industry standard Common Desktop Environment (CDE) and adapted it to the needs of a rapidly growing market: the entry-level workstation market. new Solaris Desktop Extensions is ideal for engineers and analysts with little UNIX experience who want the power, productivity, and reliability of a UNIX workstation. Sun has not removed any of the traditional UNIX capabilities enjoyed by power users, it has just made them easier to access and use.

Sun has made UNIX much easier with Solaris Desktop Extensions, by adding the following capabilities:

- Sun has reorganized the CDE workspace to provide quick and easy access to directories and files, applications, the Internet and local intranet, and system management utilities.
- Sun has created graphical programs and utilities for 54 of the most frequently used and most powerful UNIX commands to make it easy for new users to navigate around a UNIX workstation and be productive immediately.
  - The powerful Find File search command has been integrated into the file manager so that users can find files and directories quickly.
  - Commands that users commonly use to manage and distribute files, such as `compress`, `archive`, and `encrypt`, are just a mouse click away.
  - A new Process Manager has been developed, which wraps a graphical user interface around the UNIX commands that allow users to identify, sort, suspend, and eliminate (kill) processes based upon process attributes such as CPU consumption, the time elapsed, and the process owner.

# System Management *(cont.)*

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## Solaris Operating Environment *(cont.)*

### What's New in Solaris 2.6? *(cont.)*

- Sun has added new desktop information applications.
  - The Personal Information Manager give users a single means to access e-mail, Web, and phone entries even though they may be in a separate database, so that a user can quickly find and contact other people.
  - The post-it note facility allows user to keep track of things to remember instead of using paper.
- A new graphical performance monitor helps the user see how the different system resources (such as CPU, disk, or network access) are running. This new monitor makes it easier to understand how to understand which resources are affecting workstation performance so that the user can tune the performance for the particular applications that are being executed.
- CDE now allows the user to tailor the workspace more easily and extensively to reflect the user's preferences.
  - The user can create a “hot list” of his most frequently used applications, the Web sites that the user prefers to visit, the people with which the user collaborates, and the remote systems that the user logs into.
  - The menus are easy to customize—the user can just drag and drop menu items on to the workspace manager to sequence the menu items in any way.
- Communication and collaboration with PC users has become a necessity in most corporate environments. Users can take advantage of native Windows applications support using SoftWindows 95 (available separately).
- Sun has added several features to Solaris Desktop Extensions to make access to the Web easier.
  - The workspace is now Web aware—the user can click on a URL from within the file manager, address manager, or from within an e-mail message to automatically launch a browser to that site. This feature decreases the need for personal bookmarks on the workspace. A user can store personal bookmarks on the toolbar and then launch a browser or search engine from the toolbar.
  - Sun also provides pre-set links to the Sun support and information Web sites.
  - Sun has also bundled Netscape™ Communicator, one of the industry's most popular browsers, to view Web pages.
  - Many common file formats are recognized within the file manager. Select a file (such as gif, PostScript™, or text) and the relevant application and file will launch automatically.

# System Management *(cont.)*

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## Licensing and Usage

All Sun system and system-board products include a Solaris license. The type of Solaris license(s) shipped with each platform reflects the way in which that system is most commonly used. Additional Solaris licenses are available to allow increased usage of the software.

All Ultra workstations come with a Solaris Desktop License. The Solaris Desktop License is a limited license. It does not provide several of the services provided by the Solaris Server License, such as:

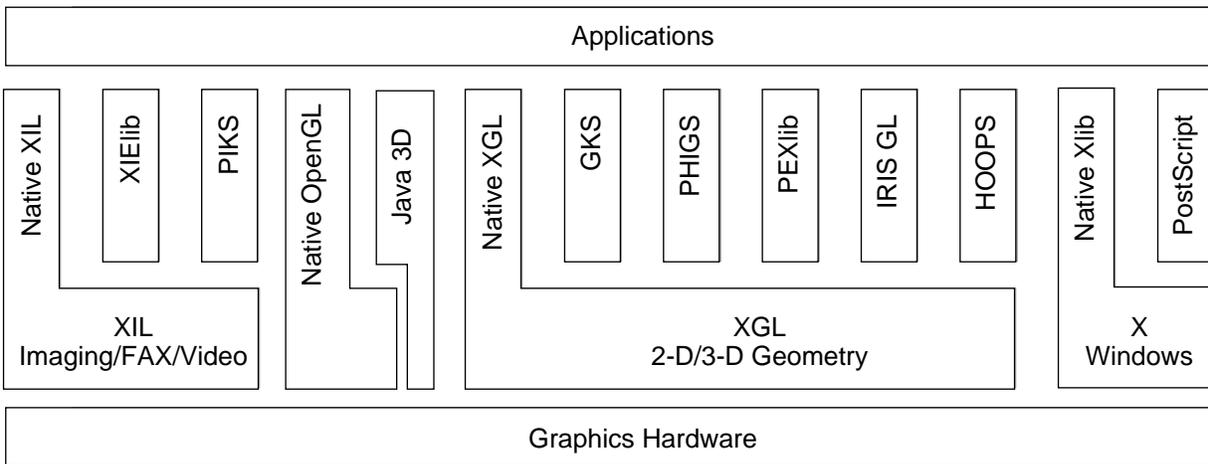
- Allowing more than two users to be directly connected
- Providing database or compute services for more than two continuous users
- Providing swap disk space for any other system
- Providing home directory space for any other system

If a system that is shipped with a Solaris Desktop license will be used as a server (requires services listed above), the system must be upgraded to a Solaris Server license.

# System Management (cont.)

## Graphics Software Interfaces

Sun systems support all Solaris 2.5.1 graphics, 2.6 graphics, and window system APIs, including OpenGL™, XGL™, XIL, and Display PostScript™. A large number of Sun and third-party graphics APIs are also supported, including IRIS GL, OpenGL, GKS, HOOPS, Java 3D™, and PHIGS. Industry-standard X-extension libraries, such as Xlib and PEXlib, are available and are accelerated via the XGL and XIL foundation graphics libraries.



**Figure 1.** Graphics software interfaces

Because Creator Graphics platforms provide windowing, imaging, and geometry acceleration, they enhance the performance of all of the APIs mentioned above.

# System Management (cont.)

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## OpenGL 1.1.1 for Solaris

OpenGL for Solaris software provides a complete solution for developing and deploying interactive 3-D applications across SPARC workstations. It enables mainstream, industry-leading 3-D graphics and visualization applications to be deployed on Sun's Ultra Creator3D and Elite3D graphics workstations at a compelling price-to-performance ratio. OpenGL is an application programming interface (API) that provides 2-D and 3-D graphics functions, including modeling, transformations, color, lighting, and smooth shading, as well as advanced features such as texture mapping, NURBS, fog, alpha blending, and motion blur. OpenGL works in both immediate and non-editable display-list graphics modes.

OpenGL is targeted at developers creating interactive 3-D applications for the enterprise, the intranet, and the Internet. These developers are affiliated with ISVs or VEUs in technical markets or in research labs. Potential users include those in computer-aided design and manufacturing, global information systems, simulation, industrial design and modeling, entertainment, biochemistry, and petroleum exploration market segments.

Widespread multivendor availability of OpenGL allows source code portability of 3-D graphics clients. OpenGL 1.1.1 for Solaris is a compliant implementation of OpenGL 1.1 from the OpenGL Architecture Review Board (ARB) and is, therefore, source code compatible with other conformant OpenGL applications on the market. Most existing OpenGL applications will only need to be recompiled in order to run with OpenGL 1.1.1 for Solaris software.

OpenGL 1.1.1 for Solaris is available for the Creator and Elite3D Graphics product families, where the OpenGL functionality is accelerated in hardware. In addition, it is available on all SPARCstation™ legacy stations equipped with SX, ZX, GX, GXplus, TurboGX™, TurboGXplus™, S24™, TCX or FSV frame buffers, which is made possible through an optimized software rendering pipeline.

## OpenGL 1.1.1 New Features and Benefits

### • Features

- New imaging extensions for color tables, convolution, histograms, pixel transformation, and blending
- Provides native support for new Elite3D and Creator Graphics Series 3 frame buffers
- Multithreaded Safe

### • Benefits

- Allows developers to perform graphics and imaging operation using OpenGL within the same application
- Allow customers to use the power of Sun's most recently released graphics accelerators
- Multithreaded graphics applications can be written on top of OpenGL, resulting in improved application performance and allowing application performance to scale on multiprocessor systems, such as the Ultra 2 or Ultra 60.

# System Management *(cont.)*

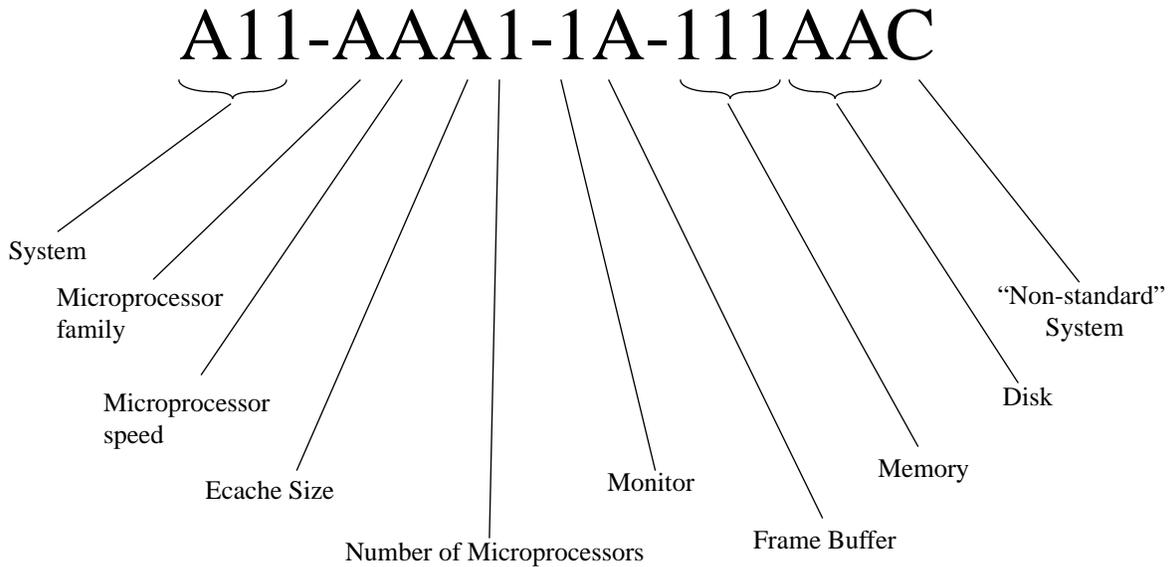
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## OpenGL 1.1.1 Tech Facts

- OpenGL 1.1.1 system requirements:
  - Platforms: Elite3D, Creator3D, Creator, ZX, GX, TCX, SX product families
  - Operating system: Solaris™ 2.5.1 Maintenance Update™ 3, Solaris 2.6 or higher
  - Window system: CDE, OpenWindows™
  - Disk space:
    - For end-user runtimes: 33 MB
    - For developers: 41 MB (runtime binaries and header files)  
51 MB (documents and examples)
  - Memory: 64 MB minimum  
128 MB or more recommended for major applications
  - Other: Network Interface  
Routers  
Media

# Sun™ Ultra™ 30 Ordering Information

The Sun™ Ultra™ systems use a new marketing part number scheme that is designed to provide greater flexibility and expandability. This page explains how to read the new part numbering scheme. “N” means “Not available” or “Not applicable.”



(Note: A = alpha character, 1 = numeric character, C = optional alpha or numeric character)

## Model Key (Subset of Part Number Definitions)

System	Monitor	Frame Buffer	Disk
A16 = Sun Ultra 30	3 = 17-inch color, low cost	K = Creator Series 3	AB = 2.1 GB
	7 = 24-inch color	L = Creator3D Series 3	AC = 4.2 GB
<b>Microprocessor Family</b>	17 = 21-inch color	M = Elite3D m6	CB = 2.1 GB + CD-ROM
U = UltraSPARC™	18 = 21-inch color (Southern Hemisphere)	Q = Elite3D m3	CC = 4.2 GB + CD-ROM
<b>Microprocessor Speed</b>		N = No frame buffer	DB = 2 x 2.1 GB
D = UltraSPARC 250 MHz		<b>Memory</b>	DC = 2 x 4.2 GB
E = UltraSPARC 300 MHz		128 = 128 MB	EC = 2 x 4.2 GB + CD-ROM
<b>Ecache Size</b>		256 = 256 MB	
B = 1 MB		512 = 512 MB	NN = Diskless
C = 2 MB		001 = 1 GB	

# Sun Ultra 30 Ordering Information (cont.)

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## Sun Ultra 30 Model 250

Part Number	System
	250-MHz UltraSPARC-II with 1-MB Ecache, 128-MB memory, 4.1-GB internal UltraSCSI disk
A16UDB1-17K-128AC	– 21-inch color monitor, Creator single-buffer graphics
A16UDB1-17L-128AC	– 21-inch color monitor, Creator3D double-buffer graphics
A16UDB1-7L-128AC	– 24-inch color monitor, Creator3D double-buffer graphics

## Sun Ultra 30 Model 300

Part Number	System
	300-MHz UltraSPARC-II with 2-MB Ecache, 4.1-GB internal UltraSCSI disk
A16UEC1-17K-128AC	– 21-inch color monitor, Creator single-buffer graphics, 128-MB memory
A16UEC1-17L-128AC	– 21-inch color monitor, Creator3D double-buffer graphics, 128-MB memory
A16UEC1-7L-128AC	– 24-inch color monitor, Creator3D double-buffer graphics, 128-MB memory
A16UEC1-17Q-128AC	– 21-inch color monitor, Elite3D m3 graphics, 128-MB memory
A16UEC1-17M-128AC	– 21-inch color monitor, Elite3D m6 graphics, 128-MB memory
A16UEC1-17K-512AC	– 21-inch color monitor, Creator single-buffer graphics, 512-MB memory
A16UEC1-17L-512AC	– 21-inch color monitor, Creator3D double-buffer graphics, 512-MB memory

# Sun Ultra 30 Ordering Information (*cont.*)

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## Ordering Guidelines and Notes

- Memory
  - The Ultra 30 supports 2 GB of main memory. The DIMMs are of the same type as those used in the SPARCstation™ 20, Ultra 1, or Ultra 2 systems. This architecture currently accepts 16-, 32-, 64-, or 128-MB memory modules.
  - The Ultra 30 can accommodate up to 16 DIMM modules in increments of two. DIMM modules within each pair *must* be of the same type. DIMM module pairs or sets of four, may be mixed. However, for maximum performance and throughput, DIMMs should be configured in quads of identical type.
- Graphics
  - The Ultra 30 has two UPA graphics slots that support with Creator, Creator3D, Elite3D m3, and Elite3D m6 accelerators. A customer can mix and match any of these accelerators within the Ultra 30 with one exception: *only one Elite3D m6 board can be supported by the Ultra 30 workstation.*
- Floppy drive (optional)
  - Power cabling is provided for one floppy drive.
- SCSI
  - The internal SCSI host controller operates in Fast-20 mode by default. Installation of non-FAST-20 devices, although allowed, will decrease overall SCSI performance.
  - A maximum of SCSI spec 14 disk drives or 15 devices, one controller seven CD-ROM or tape drives can be addressed by the on-board Fast-20 SCSI controller. Internal cabling is provided for three devices.
  - The total combined SCSI cable and internal SCSI bus length must not exceed three meters for Fast/Wide operation or 1.5 meters for FAST-20 (UltraSCSI) operation.
  - To guarantee Fast-20 speeds on all devices on the bus, it is recommended that:
    - All devices on the SCSI bus should be FAST-20 devices (non-FAST-20 devices—such as MultiPack 6 devices—may cause the internal devices to run at Fast/Wide speeds, but are supported).
- Keyboard
  - Type-4 keyboards are not supported on the Ultra 30. Order Type-5 keyboards, when applicable.

## Sun Ultra 30 Ordering Information (cont.)

Below is a comprehensive list of system expansion, networking, graphics, and multimedia options that are supported by Sun Ultra 30 systems. Many of the options listed below have been retired and can no longer be ordered from Sun, but are shown here for reference purposes. Refer to the Sun Price Book and configuration guides for currently available option listings, configuration notes, and ordering information. When no maximum number is listed, refer to ordering or configuration notes for that option.

Part Number	Option description	Maximum number supported	Comments
<b>Memory</b>			
X7001A	32-MB, 60-ns SIMM memory expansion (2 x 16 MB)	8	These are all pairs of DIMM units
X7002A	64-MB, 60-ns SIMM memory expansion (2 x 32 MB)	8	
X7003A	128-MB, 60-ns SIMM memory expansion (2 x 64 MB)	8	
X7004A	256-MB, 60-ns SIMM memory expansion (2 x 128 MB)	8	
<b>Mass Storage—Internal</b>			
X6520A	2.1-GB, 7200-rpm Fast/Wide UltraSCSI disk	2	
X5214A	4.2-GB, 7200-rpm Fast/Wide UltraSCSI disk	2	
X5251A	9.1-GB, 7200-rpm Fast/Wide UltraSCSI disk	2	
X6153A	SunCD™ 4 CD-ROM	1	
X6161A	SunCD 12 CD-ROM drive with cable (for FlexiPack)	1	
X6004A	3.5-inch 1.44-MB manual eject floppy drive (triple density)	1	
X6106A	4- to 8-GB SLR Tape Drive	1	
X6280A	12- to 24-GB, 4-mm DDS-3 tape drive	1	
X6256A	4-GB, 4-mm DDS Tape Drive	1	
X6203A	14-GB, 8-mm tape drive	1	
X6212A	7- to 14-GB, 8-mm tape drive	1	
X6282A	12- to 24-GB, 4-mm DDS-3 tape drive	1	
X6213A	8705DX, 7-GB	1	
X6160A	4- to 8-GB GB SLR internal tape for Ultra 30 and Ultra 60	1	
<b>Mass Storage—External</b>			
X814A	5.0-GB, 8-mm tape backup drive, desktop storage module	2	
X827A	20-GB, 4-mm tape autoloader, desktop storage module	2	
X580A	535-MB, Fast SCSI-2 desktop disk pack	4	
X545A	1.05-GB, Fast SCSI-2 desktop disk pack	4	
X567A	2.1-GB, Fast SCSI-2 desktop disk pack	4	
X737A	2.1-GB, Fast SCSI-2 desktop disk pack	4	
X579A	SunCD 2Plus™, desktop storage pack	2	
X660A	150-MB QIC tape drive, desktop storage pack	2	
X822A	5.0-GB, 4-mm tape drive, desktop storage pack	2	
X834A	10-GB, 8-mm backup tape drive, desktop storage module	2	
X844A	14.0-GB, 8-mm tape drive, desktop storage pack	2	

## Sun Ultra 30 Ordering Information (cont.)

Part Number	Option description	Maximum number supported	Comments
<b>Mass Storage— UniPack</b>	<i>The following UniPack options come with a 68–68 pin SCSI cable:</i>		
X5101A	1.05-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	4	
X5151A	2.1-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	4	
X5209A	4.2-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	2	
X5253A	9.1-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	2	
X6151A	SunCD 4x CD-ROM UniPack	1	
X6157A	SunCD 12x CD-ROM UniPack	2	
X6101A	2.5-GB QIC tape UniPack	2	
X6201A	14-GB, 8-mm tape UniPack	2	
X6208A	14-GB, 8-mm tape UniPack	2	
X6251A	5-GB, 4-mm tape UniPack	2	
X6261A	4- to 8-GB, GB 4-mm DDS-2 drive	2	
X6280A	12- to 24-GB, 4-mm DDS-3 tape drive	2	
X6230A	20- to 40-GB, 8-mm tape drive	2	
SG-XTAP-4MM-011A	12- to 24-GB, 4-mm DDS-3 tape drive	2	
SG-XTAP-8MM-010A	7- to 14-GB, 8-mm tape Unipack, desktop	2	
SG-XTAP-8MM-020A	20- to 40-GB, 8-mm tape Unipack, desktop	2	
SG-XTAP-SLR-010A	4-GB SLR Tape Drive Unipack	2	
	<i>The following UniPack options come with a 50–68 pin SCSI cable:</i>		
X5102A	1.05-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	4	
X5152A	2.1-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	4	
X5204A	2.1-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	4	
X5213A	4.2-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	2	
X5254A	9.1-GB, 7200-rpm, Fast/Wide SCSI-2 disk UniPack	2	
X6152A	SunCD 4x CD-ROM UniPack	1	
X6102A	2.5-GB QIC tape UniPack	2	
X6202A	14-GB, 8-mm tape UniPack	2	
X6209A	14-GB, 8-mm tape UniPack	2	
X6252A	5-GB, 4-mm tape UniPack	2	
X6158A	SunCD 12x CD-ROM UniPack	2	
X6262A	4- to 8-GB, 4-mm DDS-2 tape drive	2	
X6281A	12- to 24-GB, 4-mm DDS-3 tape drive	2	
X6231A	20- to 40-GB, 8-mm tape drive	2	
			NOTE: 68-pin is required on the Ultra 30; these options supported if the correct cable is substituted

## Sun Ultra 30 Ordering Information (cont.)

Part Number	Option description	Maximum number supported	Comments
<b>Mass Storage—MultiDisk Pack</b>			
X569A	4.2-GB SCSI MultiDisk Pack (2 x 2.1-GB Fast SCSI-2 disk)	2	
X570A	8.4-GB SCSI MultiDisk Pack (4 x 2.1-GB Fast SCSI-2 disk)	1	
X739A	8.4-GB 7200-rpm MultiDisk Pack (4 x 2.1-GB Fast SCSI-2)	1	
X748A	8.4-GB SCSI MultiDisk Pack (2 x 4.2-GB Fast SCSI-2 disk)	2	
X749A	16.8-GB SCSI MultiDisk Pack (4 x 4.2-GB Fast SCSI-2 disk)	1	
X771A	2.1-GB SCSI MultiDisk Pack (2 x 1.05-GB)	2	
X5211A	8.4-GB (2 x 4.2-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	2	
X5212A	16.8-GB (4 x 4.2-GB), 5400-rpm, Fast/Wide SCSI-2 MultiPack	1	
X738A	4.2-GB, 7200-rpm MultiDisk Pack (2 x 2.1-GB)	2	
<b>Mass Storage—FlexiPack</b>			
	<i>The following UniPack options come with a 68–68 pin SCSI cable:</i>		
SG-XTAP-DLT-020A	20- to 40-GB Sun™ StorEdge™ DLT4000 tape, desktop	2	
SG-XTAP-DLT-021A	35- to 70-GB Sun StorEdge DLT7000 tape, desktop	2	
SG-XTAP-4MM-021A	12- to 24-GB, 4-mm DDS-3 tape FlexiPack	2	
SG-XTAP-4MM-031A	72- to 144-GB, 4-mm DDS-3 tape FlexiPack, desktop autoloader	2	
SG-XTAP-8MM-011A	7- to 14-GB, 8-mm tape FlexiPack, desktop	2	
SG-XTAP-8MM-020A	14-GB, 8-mm tape FlexiPack	2	
SG-XTAP-8MM-021A	20- to 40-GB, 8-mm tape FlexiPack, desktop	2	
SG-XTAP-SLR-020A	4-GB SLR Tape Drive Flexipack	2	
X6284A	12- to 24-GB, 4-mm DDS-3 tape FlexiPack	2	
X6264A	4- to 8-GB, 4-mm DDS-3 tape FlexiPack	2	
X6232A	20- to 40-GB, 8-mm tape FlexiPack	2	
X6159A	SunCD 12x CD-ROM FlexiPack	2	
	<i>The following UniPack options come with a 50–68 pin SCSI cable:</i>		
X6058A	DLT4000	2	NOTE: 68-pin is required on the Ultra 30; these options supported if the correct cable is substituted
X6061A	DLT7000	2	
X6291A	72- to 144-GB, 4-mm DDS-3 autoloader tape FlexiPack	2	
X6285A	12- to 24-GB, 4-mm DDS-3 tape FlexiPack	2	
X6265A	4- to 8-GB, 4-mm DDS-3 tape FlexiPack	2	
X6233A	20- to 40-GB, 8-mm tape FlexiPack	2	
X6211A	14-GB 8-mm tape FlexiPack	2	
X6150A	SunCD 12x CD-ROM FlexiPack	2	

## Sun Ultra 30 Ordering Information (cont.)

Part Number	Option description	Maximum number supported	Comments
<b>Mass Storage—MultiPack</b>			
X5511A	4.2-GB (2 x 2.1-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5512A	12.6-GB (6 x 2.1-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5513A	25.2-GB (12 x 2.1-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5514A	8.4-GB (2 x 4.2-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5515A	25.2-GB (6 x 4.2-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5516A	50.4-GB (12 x 4.2-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5501A	8.4-GB (2 x 4.2-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5502A	16.8-GB (4 x 4.2-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5503A	25.2-GB (6 x 4.2-GB), 7200-rpm, Fast/Wide SCSI-2 MultiPack	1	
X5504A	18.2-GB (2 x 9.1-GB), 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5505A	36.4-GB (4 x 9.1-GB), 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5506A	54.6-GB (6 x 9.1-GB), 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X6527A	18.2-GB MultiPack (2 x 9.1-GB), 7200-rpm Ultra SCSI	1	FAST-20 Mode
X6528A	36.4-GB MultiPack (4 x 9.1-GB), 7200-rpm Ultra SCSI	1	FAST-20 Mode
X6529A	18.2-GB MultiPack (6 x 9.1-GB), 7200-rpm Ultra SCSI	1	FAST-20 Mode
<b>Mass Storage</b>			
X6227A	Sun™ StorEdge™ L140, 140-GB 8-mm tower unit	1	
SG-XLIB-8MM1-400G	400-GB Sun StorEdge L400, tower, 2 drives, barcode	1	
SG-XLIB-DLT1-280G	Sun StorEdge L280 Autoloader, desktop	1	
X849A	Sun StorEdge L140, 140-GB, 8-mm stackable unit	1	
X867A	Sun StorEdge L140, 140-GB, 8-mm two drives and barcode reader, tower unit	1	
X869X	Sun StorEdge L140, 140-GB 8-mm, two drives and barcode reader, stackable unit	1	
<b>Input Devices</b>			
X180A	SunButtons™ 32-key function I/O device	1	
X190A	SunDials™ 8-dial interactive graphics I/O device for 3-D	1	
X495A	SunMicrophone™	1	Supplied in system ship kit
SUNX-MICII/G5	SunMicrophone-II	1	

Ordering

## Sun Ultra 30 Ordering Information (cont.)

Part Number	Option description	Maximum number supported	Comments
<b>PCI Expansion Cards</b>			
X1032A	10/100BASE-T Ethernet with SunPCI UltraSCSI	3	
X1033A	10/100BASE-T Ethernet with MII PCI Adapter	3	
X1035A	SunFDDI™ single-attach PCI Adapter (SAS/5.0)	3	
X1036A	SunFDDI dual-attach PCI Adapter (DAS/5.0)	3	
X1039A	SunLink™ Token Ring Interface/PCI Adapter	4	Universal
X1040A	High-speed Serial Interface PCI Adapter (HSI) (1 port)	3	
X1041A	Serial Asynchronous Interface (SAI) PCI adapter	4	Universal
X1086A	SunVideo™ Plus video/audio capture	3	
X6540A	Dual channel, single-ended UltraSCSI controller	3	
X6541A	Dual channel, differential UltraSCSI controller	3	
X3660A	PGX™ 8-bit color graphics PCI Adapter frame buffer and cable	3	
<b>Monitors and Graphics</b>			
X3662A	Creator Series 3, single-buffered graphics	2	UPA
X3663A	Creator3D Series 3, 24-bit color, double-buffered graphics accelerator, vertical board orientation, and cable	2	UPA
X3664A	Elite3D m3 graphics accelerator	2	UPA
X3665A	Elite3D m6 graphics accelerator	1	UPA
X3660A	PGX 8-bit color graphics PCI Adapter frame buffer and cable	3	PCI Card
X7103A	Entry-level 17-inch color monitor		One monitor per graphics accelerator
X328A	17-inch color monitor		
X7119A	19-inch color monitor		
X267A	20-inch color monitor		
X7121A	21-inch color monitor		
X7124A	Wide-screen 24-inch color monitor		
<b>Printers</b>			
CPRN-360	NeWSprinter CL+™ color printer		
SPRN-600	SPARCprinter™ II		
SPRN-600-DUPLEX	SPARCprinter II Duplexer for double-sided printing		
SPRN-600-FEEDER	SPARCprinter II 500-sheet Hi-feeder		
<b>Other Options</b>			
X901A	0.8-meter, wide-to-narrow, 68–68 pin UltraSCSI	1	
X902A	2.0-meter, wide-to-narrow, 68–68 pin UltraSCSI	1	
X903A	1.2-meter, wide-to-narrow, 68–68 pin SCSI adapter cable	1	
X904A	2.0-meter, wide-to-narrow, 68–68 pin SCSI adapter cable	1	
X907A	Optional power cable, CPU-to-monitor, 1.5 meter	1	
X908A	Optional power cable, CPU-to-monitor, 2.5 meter	1	
X467A	MII-AUI Converter	1	

Ordering

## Sun Ultra 30 Ordering Information *(cont.)*

Part Number	Option description	Maximum number supported	Comments
<b>Type-5 Country Kits</b>			
X3500A	North American	1	Kits contain a Type-5c keyboard, opto-mechanical mouse and pad, and a localized power cord
X3550A	North American Universal	1	
X3540A	UNIX <sup>®</sup>	1	
X3551A	UNIX Universal	1	
X3552A	Euro UNIX (Power Cordless)	1	
X3548A	European UNIX	1	
X3578A	European Universal	1	
X3502A	French	1	
X3503A	German	1	
X3504A	Swiss-French	1	
X3505A	Swiss-German	1	
X3506A	Swedish	1	
X3577A	Finnish	1	
X3507A	U.K.	1	
X3547A	U.K. UNIX	1	
X3570A	Norwegian	1	
X3571A	Portuguese	1	
X3572A	Spanish	1	
X3573A	Danish	1	
X3574A	Italian	1	
X3575A	Netherlands	1	
X3544A	Taiwan	1	
X3545A	Korean	1	
X3546A	Japanese	1	
X3542A	Japanese UNIX	1	
X3542A-O	Japanese UNIX Logoless	1	
X3546A-O	Japanese Logoless	1	
X3576A	Australian	1	
X3579A	Canadian Bilingual	1	

# Sun™ Ultra™ 30 Upgrades

Sun upgrades offer customers superior investment protection for their existing Sun™ equipment.

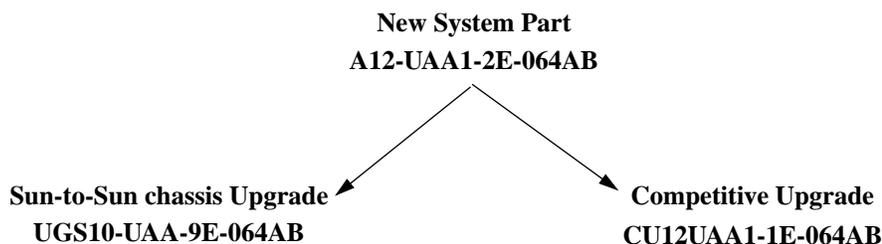
## Key Messages

- Sun offers customers a variety of flexible upgrade paths to the most popular Sun systems
- Choose from chassis-only to full-system upgrades
- Sun upgrades allow as many components as possible to be carried forward, to protect the customer's hardware investment
- Existing investments in non-Sun hardware can be preserved by upgrading to Sun through competitive full-system upgrades
- SPARCstation™ 20 or Ultra™ upgrades offer superior value by allowing the migration of memory to Sun Ultra 30 systems

## Sun Ultra 30 Upgrade Paths

From	Receive	Return
Full system upgrade from Any SPARCstation or Ultra to Ultra 30 Model 250 or 300	Complete Ultra 30 system	Complete SPARCstation or Ultra workstation
Competitive upgrade to Ultra 30 Model 250 or 300	Complete Ultra 30 system	Complete competitive workstation
Module upgrade from Ultra 30 Model 250 to Ultra 30 Model 300	Ultra 300 CPU Module	Ultra 250 CPU Module

## Marketing Upgrade Numbering Scheme



- The differences between the upgrade and new system part numbers lie in the first eight characters; the ten trailing characters carry the same interpretation as new system parts.
- Sun-to-Sun upgrades begin with “U” or “UG”; competitive upgrades begin with “CU.”
- Sun-to-Sun upgrades show the “from” path system in the first three characters that follow the U or UG.
- Character representations following the “from” system have the same interpretation as new system parts, but dashes may be removed from left to right, as necessary, to meet the maximum part number length of 18 characters.



# Sun Ultra 30 Upgrades (cont.)

## Sun Ultra 30 Upgrade to Model 250

Part Number	Description
UGFS6UDB117K-128AC	Full system upgrade from any SPARCstation to Ultra 30 250-MHz UltraSPARC™-II with Creator Graphics Series 3, 128 MB of memory, 4-GB disk, 21-inch color monitor, Solaris™ workstation license
UGFS-6UDB17L-128AC	Full system upgrade from any SPARCstation to Ultra 30 250-MHz UltraSPARC-II with Creator3D Graphics Series 3, 128 MB of memory, 4-GB disk, 24-inch color monitor, Solaris workstation license
UG14-6UDB19K-000NN	Chassis upgrade from Ultra 1 or Ultra 2 systems to Ultra 30, 250-MHz UltraSPARC-II with Creator Graphics Series 3, no memory, no disk, Solaris workstation license
UG14-6UDB19L-000NN	Chassis upgrade from Ultra 1 or Ultra 2 systems to Ultra 30 250-MHz UltraSPARC-II with Creator3D Graphics Series 3, no memory, no disk, Solaris workstation license
UG14-6UDB19K-000AC	Chassis upgrade from UltraSPARC, SPARCstation 20 to Ultra 30, 250-MHz UltraSPARC-II with Creator Graphics Series 3, memory less, 4-GB disk, Solaris workstation license
UG14-6UDB19L-000AC	Chassis upgrade from UltraSPARC, SPARCstation 20 to Ultra 30 250-MHz UltraSPARC-II, Creator3D Graphics Series 3, no memory, 4-GB disk, Solaris workstation license
UG14-6UDB19K-128AC	Chassis upgrade from UltraSPARC, SPARCstation 5, 10, or 20 to Ultra 30 250-MHz UltraSPARC-II, Creator Graphics Series 3, 128 MB of memory, 4-GB disk, Solaris workstation license
CU-6UDB1-17K-128AC	Full system upgrade of competitive systems to Ultra 30 250-MHz UltraSPARC-II, Creator Graphics Series 3, 128 MB of memory, 4-GB disk, 21-inch color monitor, Solaris workstation license

# Sun Ultra 30 Upgrades (cont.)

## Sun Ultra 30 Upgrade to Model 300

Part Number	Model 300
UG-A16-M250-M300	Module upgrade for Ultra 30 from 250 MHz to 300 MHz
UGFS6UEC117K-128AC	Full system upgrade from any SPARCstation to Ultra 30 300-MHz UltraSPARC-II, Creator Graphics Series 3, 128 MB of memory, 4-GB disk, 21-inch color monitor, Solaris workstation license
UGFS6UEC117L-128AC	Full system upgrade from any SPARCstation to Ultra 30 300-MHz UltraSPARC-II, Creator3D Graphics Series 3, 128 MB of memory, 4-GB disk, 21-inch color monitor, Solaris workstation license
UGFS-6UEC17L-128AC	Full system upgrade from any SPARCstation to Ultra 30 300-MHz UltraSPARC-II, Creator3D Graphics Series 3, 128 MB of memory, 4-GB disk, 24-inch color monitor, Solaris workstation license
UGFS6UEC117Q-128AC	Full system upgrade from any SPARCstation to Sun Ultra 30 300-MHz UltraSPARC-II workstation with Elite3D m3 Graphics, 21-inch color monitor, 128 MB of memory, 4-GB disk, Solaris workstation license
UGFS6UEC117M-128AC	Full system upgrade from any SPARCstation to Sun Ultra 30 300-MHz UltraSPARC-II workstation with Elite3D m6 Graphics, 21-inch color monitor, 128 MB of memory, 4-GB disk, Solaris workstation license
UG14-6UEC19K-000NN	Chassis upgrade from Ultra 1 or Ultra 2 system to Ultra 30 300-MHz UltraSPARC-II, Creator Graphics Series 3, no memory, no disk, Solaris workstation license
UG14-6UEC19L-000NN	Chassis upgrade from Ultra 1 or Ultra 2 system to Ultra 30 300-MHz UltraSPARC-II, Creator3D Graphics Series 3, no memory, no disk, Solaris workstation license

# Sun Ultra 30 Upgrades (cont.)

## Sun Ultra 30 Upgrade to Model 300

Part Number	Model 300
UG14-6UEC19K-000AC	Chassis upgrade from UltraSPARC, SPARCstation 20 systems to Ultra 30 300-MHz UltraSPARC-II, Creator Graphics Series 3, no memory, 4-GB disk, Solaris workstation license
UG14-6UEC19L-000AC	Chassis upgrade from UltraSPARC, SPARCstation 20 systems to Ultra 30 300-MHz UltraSPARC-II, Creator3D Graphics Series 3, no memory, 4-GB disk, Solaris workstation license
UG14-6UEC19K-128AC	Chassis upgrade from UltraSPARC, SPARCstation 5, 10, or 20 to Ultra 30 300-MHz UltraSPARC-II workstation with Creator Graphics Series 3, 128 MB of memory, 4-GB disk, Solaris workstation license
UG14-6UEC19Q-512AC	Chassis upgrade from UltraSPARC, SPARCstation 5, 10, or 20 to Ultra 30 300-MHz UltraSPARC-II workstation with Elite3D m3 Graphics, 512 MB of memory, 4-GB disk, Solaris workstation license
UG14-6UEC19M-512AC	Chassis upgrade from UltraSPARC, SPARCstation 5, 10, or 20 to Ultra 30 300-MHz UltraSPARC-II workstation with Elite3D m6 Graphics, 512 MB of memory, 4-GB disk, Solaris workstation license
CU-6UEC1-17L-512AC	Full system upgrade of competitive systems to Ultra 30 300-MHz UltraSPARC-II, Creator3D Graphics Series 3, 512 MB of memory, 4-GB disk, 21-inch color monitor, Solaris workstation license
CU-6UEC1-7L-128AC	Full system upgrade of competitive systems to Ultra 30 300-MHz UltraSPARC-II, Creator3D Graphics Series 3, 128 MB of memory, 4-GB disk, 24-inch color monitor, Solaris workstation license
CU-6UEC1-17Q-128AC	Full system upgrade of competitive systems to Ultra 30 300-MHz UltraSPARC-II, Elite3D m3Graphics, 128 MB of memory, 4-GB disk, 21-inch color monitor, Solaris workstation license
CU-6UEC1-17M-128AC	Full system upgrade of competitive systems to Ultra 30 300-MHz UltraSPARC-II, Elite3D m6 Graphics, 128 MB of memory, 4-GB disk, 21-inch color monitor, Solaris workstation license

# Service and Support

SunSpectrum<sup>SM</sup> is an innovative and flexible service offering that allows customers to choose the level of service best suited to their needs — ranging from mission-critical support for maximum solution availability to backup assistance for self-support customers. SunSpectrum provides a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the Solaris<sup>TM</sup> operating environment software, and telephone support for Sun<sup>TM</sup> software packages. The majority of Sun's customers today take advantage of the SunSpectrum program, underscoring the value it represents. Customers should check with their local Sun Customer Service representative for program/feature variance and availability in their area.

FEATURE	SUNSPECTRUM <sup>SM</sup> PLATINUM <sup>SM</sup> Mission-Critical Support	SUNSPECTRUM <sup>SM</sup> GOLD <sup>SM</sup> Business-Critical Support	SUNSPECTRUM <sup>SM</sup> SILVER <sup>SM</sup> Systems Support	SUNSPECTRUM <sup>SM</sup> BRONZE <sup>SM</sup> Self Support
<b>Systems Features</b>				
Systems approach coverage	Yes	Yes	Yes	Yes
System availability guarantee	Customized	No	No	No
<b>Account Support Features</b>				
Service account management team	Yes	No	No	No
Personal technical account support	Yes	Yes	No	No
Account support plan	Yes	Yes	No	No
Software release planning	Yes	No	No	No
On-site account reviews	Monthly	Semi-annual	No	No
Site activity log	Yes	Yes	No	No
<b>Coverage / Response Time</b>				
Standard telephone coverage hours	7 day/24 hour	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday
Standard on-site coverage hours	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday	N/A
7 day/24 hour telephone coverage	Yes	Yes	Option	No
7 day/24 hour on-site coverage	Yes	Option	Option	N/A
Customer-defined priority setting	Yes	Yes	Yes	No
– Urgent (phone/on-site)	Live transfer/ 2 hour	Live transfer/ 4 hour	Live transfer/ 4 hour	4 hour / N/A
– Serious (phone/on-site)	Live transfer/ 4 hour	2 hour/next day	2 hour/next day	4 hour / N/A
– Not critical (phone/on-site)	Live transfer/ customer convenience	4 hour/ customer convenience	4 hour/ customer convenience	4 hour / N/A
Additional contacts	Option	Option	Option	Option



## Service and Support (cont.)

FEATURE	SUNSPECTRUM PLATINUM Mission-Critical Support	SUNSPECTRUM GOLD Business-Critical Support	SUNSPECTRUM SILVER Systems Support	SUNSPECTRUM BRONZE Self Support
<b>Enhanced Support Features</b>				
Mission-critical support team	Yes	Yes	No	No
Sun Vendor Integration Program (SunVIP™)	Yes	Yes	No	No
Software patch management assistance	Yes	No	No	No
Field change order (FCO) management assistance	Yes	No	No	No
<b>Remote Systems Diagnostics</b>				
Remote dial-in analysis	Yes	Yes	Yes	Yes
Remote systems monitoring	Yes	Yes	No	No
Remote predictive failure reporting	Yes	Yes	No	No
<b>Software Enhancements and Maintenance Releases</b>				
Solaris enhancement releases	Yes	Yes	Yes	Yes
Patches and maintenance releases	Yes	Yes	Yes	Yes
Sun unbundled software enhancements	Option	Option	Option	Option
<b>Internet and CD-ROM Support Tools</b>				
SunSolve™ license	Yes	Yes	Yes	Yes
SunSolve EarlyNotifier <sup>SM</sup> service	Yes	Yes	Yes	Yes

## Service and Support (cont.)

### SunClient<sup>SM</sup>

Now there is a way to reduce hardware and software support costs for JavaStation<sup>TM</sup> network computers and the Ultra<sup>TM</sup> 5 and Ultra 10 workstations. The SunClient<sup>SM</sup> Support program is a new suite of offerings that is separate, yet complementary to the SunSpectrum program. SunClient Support provides:

- A new choice for optimizing low-cost workstation support
- Flexibility to select only the services needed
- Administrative simplicity, saving time and money
- Access to world-class UNIX<sup>®</sup> networking experts

Feature	SunClient Maintenance	SunClient Central Maintenance	SunClient Software Tech Support Option*
Systems approach coverage	*	*	
Solaris and unbundled software technical support			*
9 a.m.–5 p.m., Monday–Friday telephone coverage	*	*	*
8 a.m.–5 p.m., Monday–Friday on-site coverage	*†‡	*†	
Response times (phone/onsite)	4-hour callback/next business day response	4-hour callback/next business day response	4-hour callback
Centralized on-site repair of multiple units		*	N/A
Patches	N/A	N/A	*
SunSolve license	N/A	N/A	*
SunSolve EarlyNotifier	N/A	N/A	*
Software Updates	N/A	N/A	N/A

\* Only sold as an option to SunClient Maintenance or SunClient Central Maintenance.

† Next business day on-site response requires that the request for service be received by 3:00 p.m. If the call is received after 3:00 p.m., service will be provided on the second business day.

‡ Customers located more than 50 miles from an authorized service provider or reseller will be charged an additional fee for service activity.

# Service and Support (cont.)

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## Features and Benefits of the SunClient Program

- **Features**

- Unbundled hardware and software support
- Next business day (SunClient Maintenance) or second business day (SunClient Central Maintenance) on-site response
- Single contract with choice of automatic warranty upgrade
- SunClient Central Maintenance
- Service delivery by Sun experts

- **Benefits**

- *Flexibility.*  
Select the type and amount of coverage needed for desktop systems, so service dollars are targeted where they're needed most.
- *Cost savings.*  
Pay only for the support services needed
- *Cost efficiency.*  
Since Sun can more efficiently manage spare inventory and labor scheduling, the savings can be passed on to the customer.
- *Simplicity.*  
One contract covers a predefined number of systems at one low price. New systems acquired can be upgraded to the SunClient service level.
- *Cost savings.*  
Sun realizes an economy of scale by repairing multiple systems with one visit and leverages existing support infrastructures, so cost efficiency is maximized while duplication of effort is eliminated.
- *Consistency.*  
Selected desktops can be deployed anywhere with assurance of cost-effective, quality service and support.

For more information, visit the SunClient Support Web site at:  
<http://www.sun.com/service/support/sunclient>

# Glossary

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24-bit color	The ability to render objects from a palette of 16.7 million colors. It is often referred to as “true color” and results in much more realistic shading of 3-D objects for enhanced image quality.
3D-RAM	Dual-ported video memory with graphics functionality built into the memory chip.
100BASE-T	<i>See</i> Fast Ethernet.
antialiasing	A graphics technique that greatly enhances the quality of images by eliminating many of the inaccuracies (“jaggies”) inherent to rendering on a raster display. Typically found only in high-end graphics systems.
DIMM	Double Inline Memory Module. A memory unit that can come in a variety of sizes, such as 16, 32, 64, and 128 MB.
Fast Ethernet	IEEE standard for 100-Mb Ethernet.
MII	Media Independent Interface. Used for connecting external transceivers to Fast Ethernet.
NFS™	Sun’s distributed computing file system.
ODBC	Open Database Connectivity.
OpenGL™	The standard software interface for graphics hardware that allows programmers to create interactive 3-D applications. OpenGL provides a full-featured, network-transparent application programming interface.
PCI	Peripheral Component Interconnect. An industry standard for connecting peripherals such as disk drives, tapes drives, and other devices used in the PCs.
PLBwire93	The Picture Level Benchmark for wireframe performance. A benchmark standardized by the National Computer Graphics Associated GPC committee. The value represents the geometric mean performance on several commonly used 3-D wireframe operations.
PLBsurf93	The Picture Level Benchmark for 3-D surface performance. A benchmark standardized by the National Computer Graphics Associated GPC committee. The value represents the geometric mean performance on several commonly used 3-D surface operations.
UPA	Ultra Port Architecture. A high-speed, crossbar-oriented, packet-switched mother board interconnect.
V9	Version 9 of the SPARC™ definition.

## Glossary (cont.)

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- VIS™** Visual Instruction Set. The UltraSPARC™ processor implements a special instruction set that is primarily aimed at image and video processing. Some of the instructions allow the CPU to directly access and operate on image data with a high degree of parallelism. Other instructions provide facilities for formatting and moving data at very high rates of speed both within the CPU, and between the CPU and the other system components.
- XGL™** A foundation geometry-oriented 2-D/3-D graphics library that provides high functionality and performance to geometry applications and application program interfaces (APIs).
- XIL™** A foundation imaging-oriented graphics library providing high functionality and performance to imaging applications.