Sun™ Ultra™ 5

Just the Facts

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Sun™ Ultra™ 5 Systems Positioning

The Sun Ultra 5 Workstation

Figure 1. The Ultra™ 5 workstation

The Sun™ Ultra™ 5 workstation is a new entry-level workstation based upon the new UltraSPARC™-IIi processor running at 270 MHz. 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.

Key Messages

- High performance for an entry price-point workstation
  - A 270-MHz UltraSPARC-IIi processor
  - 256-KB external cache
  - Up to 512 MB of 60-ns, 168-pin EDO JEDEC DRAM with ECC error correction
  - Up to three times faster than its predecessor, the SPARCstation™ 5 Model 170
- Multiple PCI options available
  - Three PCI slots provide access to a variety of Sun and third-party PCI cards
  - High-speed networking such as Gigabit Ethernet, ATM, Token Ring, FDDI, plus many more are ready and available
  - Additional graphics cards, SCSI expansion cards, and audio/video input cards are also available
  - The ability to expand and change is key to today's technical professional, and the availability of PCI options meets this need today and in the future
- Robust internal storage and expansion
  - 4.3-GB EIDE hard disk, 4500 rpm
  - Optional internal 24X-speed Atapi CD-ROM, photo-CD compatible
  - PCMCIA bay provided for third-party PCMCIA options
  - Standard 1.44-MB floppy drive
  - Generous local storage capacity for large files, data and technical applications

Key Messages *(cont.)*

- Advanced networking capabilities
  - FastEthernet, 100BASE-T, auto-sensing, and autoswitching down to 10BASE-T for backward compatibility
  - Simply plug in and turn on; the Ultra 5 will adjust to the customer's network environment
- Built-in accelerated high-resolution graphics
  - On-board 8-bit graphics support for up to 1280 x 1024 resolution at 76-Hz; 2 MB of VRAM
  - Support for 17-inch entry color, 19-inch color, and 21-inch color monitors
  - On-board graphics provide fast acceleration for typical workstation customers and leave the PCI slots open for other uses
- Robust, reliable, scalable, secure, network-centric Solaris™ operating environment
  - Solaris is the technical industry's leading enterprise operating system with over 6,000 applications from which to choose
  - Scalable from the lowest-priced Ultra workstation, the Ultra 5, to the most powerful Sun™ Enterprise™ server, the Enterprise 10000, Solaris provides the ability to scale both up and down as a customer's business needs change
  - The Solaris Desktop Extension™ administration tools provide simple setup, use, and management, facilitating more reliable installations and simpler system maintenance
- World-class SunService offers SunClient℠, a new, inexpensive, customizable service and support plan
  - Allows customers to save costs by choosing only the services needed
  - Easy administration reduces administrative workload and costs
  - Another example of Sun's commitment to reducing the costs and overhead of technical computing for Sun customers

Sun Ultra 5 Systems Positioning *(cont.)*

Product Family Placement

The Ultra 5 is one of the new additions to the current desktop workstation product family. Sun's new desktop product family scales from the lowest entry-priced Sun Ultra 5 workstation up to the two-way multiprocessing Sun Ultra 60 workstation.

Ultra 5	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. Target markets include software and Java development, 2-D content creation, finance, EDA, telecommunications, and embedded systems.
Ultra 10	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. Target markets for this workstation include software and Java development, MCAD, electronic design automation, 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.
Ultra 30	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 capabilities. Ultra 30 systems are aimed at high-performance computing and graphics markets. This includes both technical (MCAD, financial analysis, oil and gas) and commercial users.
Ultra 2	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. 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.
Ultra 60	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 multiprocessing (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. 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 2.5.1 or 2.6 environment, the high performance of the UltraSPARC-II processor(s), dual UPA-based graphics, and superior throughput and bandwidth.

Sun Ultra 5 System Configurations

The Sun Ultra 5 is offered in several system configurations based upon the amount of DRAM and CD-ROM.

- Built-in 8-bit accelerated graphics with 2 MB of VRAM and support for up to 1280 x 1024 resolution at 76-Hz
- 1.44-MB, manual-eject floppy drive standard
- Available in the following DRAM and CD-ROM configurations
  - 64 MB ECC DRAM
  - 128 MB ECC DRAM
  - 128 MB ECC DRAM, 24X-speed CD-ROM
  - 256 MB ECC DRAM, 24X-speed CD-ROM
- Additional graphics options available through PCI expansion cards

Processor speed	270-MHz
Cache size	256 KB
SPECint_95*	9.1
SPECfp_95*	10.0

* SPECint_95 and SPECfp_95 results are preliminary, actual results may change.

Availability

- Sun Ultra 5 is available as of January 13, 1998.

Target Users

Sun Ultra 5 systems are ideal for price-sensitive and volume-purchase customers who do not wish to sacrifice performance. The Ultra 5 is up to three times faster than the SPARCstation 5, based on SPECint_95 and SPECfp_95 benchmark results. Also, due to its slimline design and size the Ultra 5 is optimal for customers who are space-constrained. Embedded systems are an ideal match for the Ultra 5.

Target Markets

The market opportunities for the Sun Ultra 5 are software and Java development, telecommunications, 2-D content creation, EDA, finance and embedded systems.

Industry	Key Features to Highlight
Software and Java Development – ISVs – In-house development at large organizations	• High-performance Solaris environment • Availability of applications
Entertainment/DCC Industry – 2-D content creation	• CPU performance
Electronic Design (EDA) – PC board design and layout – System houses – Telco	• High-performance CPUs • Memory capacity • Availability of applications
Financial – Stock and commodity traders – Banks	• High performance • Ample local storage
Research and Development – In-house development – Research institutions	• Computing performance • Feature-rich Solaris environment
Telecommunications Industry – Front-end for central-office PBX switches	• High-speed serial I/O for PCI bus
OEM Systems – Embedded systems	• Performance, price, small form-factor, PCI expansion

Compatibility

The Ultra 5 runs the following Solaris operating systems:

- Solaris 2.5.1 Hardware 11/97
- Solaris 2.6 Hardware 3/98, or newer

As a result, it can run 32-bit applications unmodified from the Solaris 2.3 and Solaris 2.4 OS; therefore these new systems are totally compatible with previous systems and software.

Key Applications

Sun has worked closely with major software vendors to ensure that their applications are tested and will be available and officially supported soon after the Ultra 5 systems are available. All major applications that are available can be found in Sun Catalyst[SM] catalog of third-party solutions.

Target Market	ISV— Software Applications	
Entertainment, animation, and content creation	Adobe	Photoshop
	ArSciMed	Kinema/Sim
	Electric Image	Electric Image
	Engineering Animation Inc.	Vislab
	Lightwork	Kinetix (rendering tool kit)
	NewTek	Lightwave 3D
	Nichimen	NWorld
	XaosTools	Pandemonium
EDA	Avant!/ISS	DRC/ERC product
	Avant!/Meta Software	HSpice
	Cadence Design	Vampire
		Dracula
	Compass Design	Pathfinder
	K2 Technologies	Mask Compose and QuickView
	Mentor Graphics	Caliber
		ICVerify
		Checkmate
	Mentor/Precedence	Co-Simulation Backplane Simulators
	Silvaco	Atlas
		Athena (FCS mid 1997)
		Spice (FCS Q3CY97)
	SpeedSim	SpeedSim
	Systems Science	Vera
	Viewlogic/Vantage Analysis	SpeedWave MT
	Simplex	Thunder and Lightning
		Fire and Ice
	Silvaco	Virtual Wafer Fab Automation Tools

	For general information see:
	`http://www.sun.com/desktop`
	`http://www.dacafe.com:80/DACafe/CORPORATE/corpeda.html`	

Health care	Cemax	VIP 2.0
	Context Vision	Imaging processing for refining MR data
	Geovision	Vision
	ISG	Silohet
	Virtual Vision Software	

Key Applications *(cont.)*

Target Market	ISV— Software Applications	
MCAE	ANSYS, Inc.	ANSYS
	Computational Dynamics, Inc.	StarCD
	ESI	Pam-Crash
	EXA Corporation	Powerflow
	Fluent, Inc.	Fluent, Fluent UNS, Rampant, Nekton
	Fluid Dynamics, Inc. (FDI)	FIDAP
	Hibbitt, Karlsson & Sorensen, Inc. (HKS)	ABAQUS
	Livermore Software Technology Corporation (LSTC)	LSDyna 3D
	MacNeal-Schwendler (MSC)	PATRAN, NASTRAN
	MARC Analysis Research Corp	Mentat, MARC

	For general information see:
	`http://www.sun.com/desktop`
	`http://roark.corp`	

MCAD	Computervision	CADDS5, Medusa
	Dassault	Catia, Catia Studio
	EDS/ Unigraphics	Unigraphics
	Parametric Technology Corp	Pro Engineer, Pro CDRS, ProFlythrough
	SDRC	I-Deas Master Series

Enabling Technologies

New UltraSPARC™-IIi Processor

The Ultra 5 uses the UltraSPARC™-IIi is a highly integrated 64-bit SPARC™ V9 superscalar processor. Created for the new, entry-level Sun™ Ultra™ 5 and Ultra 10 workstations, the UltraSPARC-IIi is part of a second generation of UltraSPARC-I-based products. In addition to using a new process technology, the UltraSPARC-IIi provides a higher clock frequency, multiple SRAM modes and system-to-processor clock ratios that accommodate varying economics for a range of products. At the same time, it provides software compatibility with existing UltraSPARC-II-based systems.

New PCI Technology

PCI is a high-performance 32-bit local bus that is optimized for high-speed data transfers. It resides on the motherboard and operates at high speeds between highly integrated components such as peripherals, add-on boards, and memory systems. A high-performance bridge ASIC interfaces the UltraSPARC UPA bus to the 33-MHz PCI buses.

In addition to Sun's commitment to expand the capacity and performance of all Sun systems, Sun is continually looking for ways to increase the openness and standards compliance of Sun systems. Sun has chosen to support PCI on the Ultra 5, Ultra 10, Ultra 30, and Ultra 60, as well as on future systems, for the following reasons:

- PCI is an open, architecture-independent bus

  Because PCI is open and shipping in volume, it has been adopted quickly by both customers and producers of computer hardware. As a result, the potential exists for a large number of platform-independent peripherals to be supported.

- PCI is fast

  The PCI bus architecture is designed to provide high performance, with its I/O performance a key differentiator from other bus architectures. Running at 33 MHz, PCI offers configurations that meet a variety of developer and user needs.

- PCI is standardized

  PCI is a standard bus architecture that has been adopted by the volume personal-computer industry. Because of its wide acceptance, PCI promises that compliant adapter cards will be available from more sources than ever before.

The PCI bus is based on the industry-standard PCI specification version 2.1. Unlike most standards, the PCI specification is very broad. It covers everything from multiple form factors and voltages to connector types.

Product Architecture

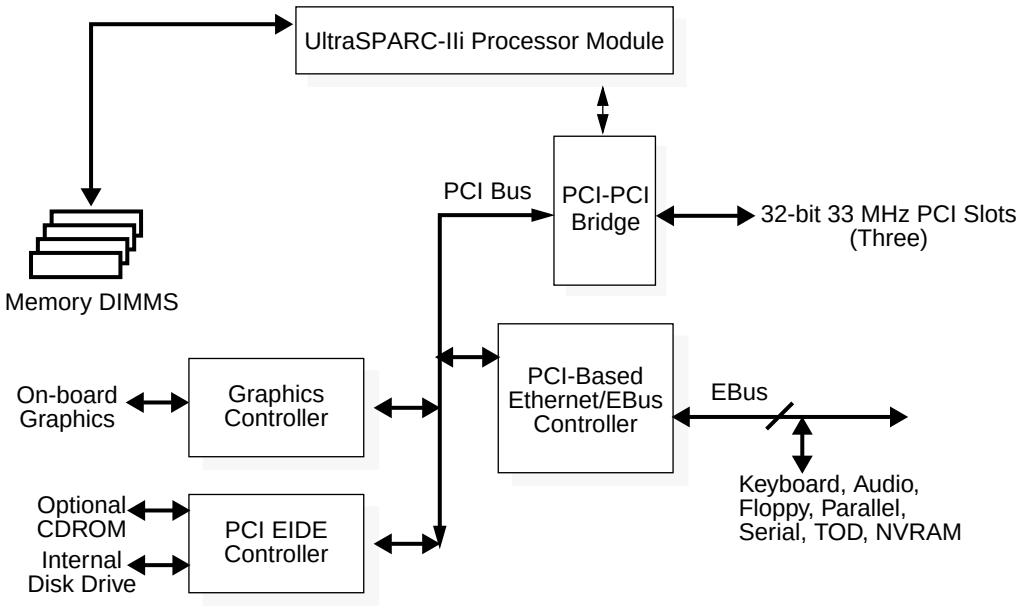


Figure 1. Ultra 5 system block diagram

The Ultra™ 5 system is designed to provide high performance, scalability, and flexibility at low cost. The use of high-volume components and application-specific integrated circuits (ASICs) have resulted in a greatly reduced part count, high reliability, and low cost without compromising access to a full complement of expansion options through standardized high-performance interfaces.

Product Architecture *(cont.)*

On the Ultra 5, a single LPX-sized motherboard is used. Features integrated into or supported by the motherboard include:

- Modular processor card with 256 KB of external cache
- Four 60-ns, 168-pin EDO JEDEC DRAM DIMM sockets with ECC error correction
- Riser card connector to support three (two long, one short), 32-bit, 33-MHz, 5-volt PCI slots
- 10BASE-T/100BASE-T Fast Ethernet, self-sensing
- Two 16.7-MB/second EIDE connectors for hard disk and CD-ROM
- Two serial ports
  - Asynchronous/synchronous RS423A / RS232A, DB25 connector
  - Asynchronous RS423A, DB9 connector
- Centronics-compatible parallel-port interface, IEEE 1284 bidirectional, DB25 connector
- Sun5 keyboard and mouse support
- CD-quality, EBus-based audio
- ATI RAGEII+DVD onboard graphics, 8-bit support up to 1280 x 1024 resolution, DB15 connector
  - 2 MB VRAM
  - Supports 17-inch entry color, 19-inch color, and 21-inch color monitors
- Time-of-day NVRAM for clock and ID functions

See the *Ultra 5 and Ultra 10 Architecture* white paper (see Materials Abstract section) for more detailed information about the product architecture.

UltraSPARC™-IIi Processor

The Ultra 5 is a high-performance system built around the UltraSPARC™-IIi microprocessor. The UltraSPARC-IIi is Sun's latest release of the SPARC™ II processor family and the second generation of 64-bit UltraSPARC processors. It utilizes the latest 0.35-micron technology. This process technology is the key to the UltraSPARC-IIi processor's higher clock rates and increased performance. This process technology also enables the UltraSPARC-IIi to operate at a core voltage of 2.5 volts, rather than the UltraSPARC-I processor'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.

The UltraSPARC-IIi supports both 2-D and 3-D graphics as well as image processing, video compression and decompression, and video effects through the sophisticated VIS™ instruction set. VIS provides high levels of multimedia performance, including real-time H.261 video compression and decompression and two streams of MPEG-2 decompression at full broadcast quality with no additional hardware support.

The UltraSPARC-IIi interfaces have been optimized to the "sweet spot" of typical uniprocessor system requirements. This provides a balanced price-performance solution delivering the power and features that the majority of high-end applications need, optimizes power utilization and supports manufacturability and ease-of-use.

- **Features**
  - Integrated VIS instruction set
  - Utilizes the latest 0.35-micron process technology which greatly decreases the die size
  - CPU is mounted on field-installable module card with associated UPA data buffers and 256 KB of external cache
- **Benefits**
  - Ready for increased performance on multimedia and networking operations
  - Results in a significant increase in performance and a decrease in power consumption (due to a lower core voltage of 2.5 volts)
  - Facilitates easy system service

Memory

The Ultra 5 supports up to 512 MB of 60-ns, 168-pin EDO JEDEC DRAM with ECC error correction. The four double in-line memory modules (DIMMs) used by the Ultra 5 are the same as those used in the Ultra 10, but are not compatible with DRAM modules used in any other Sun workstations. The Ultra 5 supports 32-, 64-, and 128-MB DIMM modules.

DRAM DIMMs must be installed in pairs of identical size. Adding DIMMs in a set of four results in the best memory-system performance.

- **Features**
  - Lower-cost, industry-standard memory modules
  - ECC memory
- **Benefits**
  - Less expensive, allowing customers to move up to higher levels of memory at lower cost
  - Superior error correction and system reliability, superior to parity error correction

System I/O—High-Performance PCI Technology

System I/O for the Ultra 5 is provided by the industry-standard Peripheral Component Interconnect (PCI) data bus. The PCI bus in the Ultra 5 complies with the 2.1 revision of the PCI specification, released in March 1995.

To provide maximum expandability, the Ultra 5 workstations feature three (two long, one short) 32-bit, 33-MHz, 5-volt PCI slots.

Sun supports a variety of PCI-based adaptor cards, including Ethernet, Token Ring, ATM, and FDDI networking cards, video and audio input, SCSI adapters, and high-speed serial and parallel interfaces. In addition, Sun is working with a host of third-party partners to develop PCI hardware and software that is certified for operation on Sun's entire line of workstations, including the Ultra 5. The following cards are under development or are currently available:

- Fast Ethernet/SCSI
- Quad Fast Ethernet
- ISDN—basic rate
- ISDN—primary rate
- Hard bus
- "TGX+-like"
- RAID arrays
- IEEE-488
- DR11W
- T1/E1
- 8/16/32 Port MUX
- Imaging and cameras
- Parallel
- Audio
- SBus Expansion
- PCMCIA
- Ultra/Diff/SCSI
- 10/100 Ethernet
- Gigabit Ethernet
- Token ring (TRI/S)
- High-speed serial
- VDC/MPEG
- Video teleconference
- HIPPI
- 1394
- PCI Bus expansion
- SCSI
- SS7
- Pentium co-CPU
- Fax
- Fibre Channel
- 1553
- ATM 155 single and multi
- ATM 155/622 (PCI 66)
- ATM 25 MB
- FDDI single attach
- FDDI dual attach
- Serial-parallel controller
- 2K x 2K frame buffers
- Video frame grabber
- X.25
- ESCON
- Telephony
- A/D and enablers
- Voice/speech
- SCI
- DR-11W

See `http://www.sun.com/pci/pci.solutions.html` for a list of tested PCI cards.

Storage

Internal data storage for the Ultra 5 is provided by a high-capacity, internal, 4.3-GB, 3.5-inch enhanced IDE hard disk running at 4500 rpm.

The Ultra 5 includes a 1.6-inch CD-ROM bay for the optional 24X-speed Atapi CD-ROM drive.

A 1.44-MB, 3.5-inch, manual-eject floppy drive is standard.

- **Features**
  - 4.3-GB Enhanced IDE internal disk drive
  - Photo-CD compatible internal 24X-speed CD-ROM drive
- **Benefits**
  - Capacity for storing large files and applications
  - Provides access to large multimedia and data files

The Ultra 5 low-profile enclosure features the following device bays:

- One half-height 5.25-inch front-accessible bay (for CD-ROM)
- One 3.5-inch internal hard-drive mount (for primary hard disk)
- One 3.5-inch floppy-drive bay
- One PCMCIA-ready front-access bay with flip-up access door

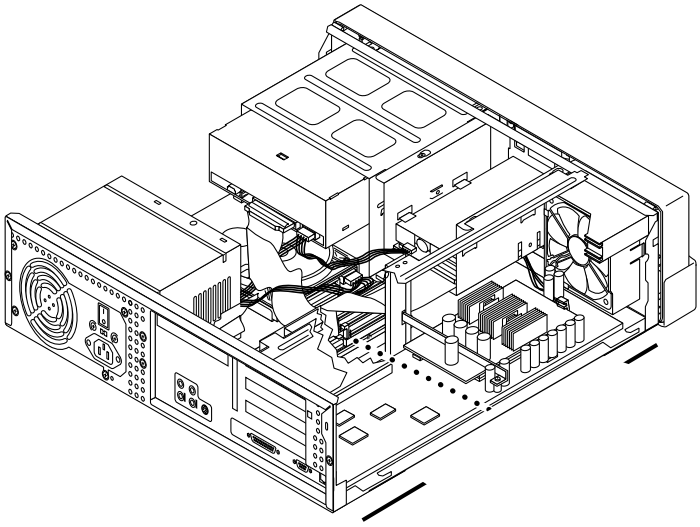


Figure 2. Ultra 5 chassis with access panel removed, providing full access to internal options

Sun Ultra 5 System Configuration

	Sun Ultra 5
Dimensions	
– Height	– 112 mm (4.4-inches)
– Width	– 436 mm (17.1-inches)
– Depth	– 430 mm (16.9-inches)
CPU	
– Architecture	– UltraSPARC-IIi
– Clock rate	– 270-MHz
– External cache	– 256 KB
Memory	
– Memory type	– 168-pin EDO JEDEC, ECC error correction
– Number of slots	– 4
– Capacity	– 64 MB to 512 MB
– DRAM speed	– 60-ns
– DIMM sizes	– 32, 64, and 128 MB (installed in pairs)
Storage	
– Maximum internal	– 4.3-GB EIDE hard disk
I/O Interfaces	
– Graphics	– On-board 8-bit frame buffer with accelerated text, windowing, 2-D and 3-D wireframe, 1280 x 1024 resolution at 76 Hz; support for color monitors up to 21-inch
– Serial ports	– One D-Sub 25-pin, asynch/synch RS423A/RS232A – One D-Sub 9-pin, asynch RS423A
– Parallel port	– One D-Sub 25-pin, IEEE 1284 Bidirectional
– PCI I/O bus	– Three PCI slots (two long, one short), 33-MHz (version 2.1)
– PCMCIA bay	– One front-access bay with flip-up access door
Networking ports	– 10BASE-T/100BASE-T Fast Ethernet, self-sensing
Backup and distribution	
– Floppy	– 1.44-MB, 3.5-inch, manual-eject floppy
– CD-ROM	– 24X-speed Atapi, photo-CD compatible
Operating system	– Solaris™ 2.5.1 Hardware 11/97 – Solaris 2.6 Hardware 3/98, or later

System Management

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	• Benefits
– Distributed on CD-ROM	– Included with every system
– Movies of installation and replacement procedures played through ShowMe™ TV™ software packaged with application	– Make installation maintenance easy and help lower maintenance costs
– Photo sequences with narrated installation and replacement procedures	– Easy to follow along and understand
– Text-based instructions can be viewed on-line and printed, excerpted from standard Sun documentation	– Facilitates distribution of latest, most up-to-date information
– Photos with active callouts link to more detailed photos and text-based reference information	– Allows customers to “drill down” to the level of detail they require

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.

Solaris™ Operating Environment

The Sun™ Ultra™ 5 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 mission-critical reliability.

For technical desktop users, Solaris delivers unique advantages. Its advanced features and functionality, combined with built-in networking, give 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 5 systems with benefits that include enhanced networking capabilities and performance, graphics and imaging, increased standards compliance, and key operating-system performance advancements.

Solaris 2.5.1 Hardware 11/97 or Solaris 2.6 Hardware 3/98, or later are Solaris versions that support Sun Ultra 5 systems. Solaris optimizes the UltraSPARC™-IIi processor and provides a reliable and stable platform for mission-critical applications.

Solaris Features and Benefits

• **Features**	• **Benefits**
– Solaris operating environment	– Industry-leading enterprise operating system
– Multithreaded operating environment	– High performance and scalability
– Over 12,000 applications	– Wide range of tuned and tested applications
– Graphics: foundation-layer libraries	– Compatible with feature-rich and industry-standard graphics libraries
– Common Desktop Environment (CDE)	– Industry-standard, multivendor graphical user interface
– Networking: multinetworking integration	– Transparent access to PC and enterprise networking resources
– Object technology	– Supports OMG/CORBA-compliant Solaris NEO™ object environment

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, 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

Solaris™ Operating Environment *(cont.)*

Solaris 2.6 Strengths

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

- WebStart™, 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
- AnswerBook2™ on-line documentation
- Network management and system administration, such as NTP, SNMP, DMI, DHCP, and VLSM
- Year-2000 ready
- 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 CDE (Common Desktop Environment) and adapted it to the needs of a rapidly growing market: the entry-level workstation market. The 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:

- Beginning in April 1998, Sun will preinstall Solaris 2.6 with Solaris Desktop Extensions on the new Ultra 5 and Ultra 10 workstations, so that they are ready to use right out of the box.
- 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.

Solaris™ Operating Environment *(cont.)*

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

- Sun has added new desktop information applications.
  - The Personal Information Manager gives users a single means to access e-mail, Web, and phone entries even though they may be in separate databases, so that a user can quickly find and contact other people.
- 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 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.
  - Users can create a "hot list" of their most frequently used applications, the Web sites that they prefer to visit, the people with whom they collaborate, and the remote systems they often log into.
  - The menus are easy to customize—the user can just drag and drop menu items onto 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 or NTRIGUE™ (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 Navigator™, the industry's most popular browser, to view Web pages.
  - Many common file formats are recognized within the file manager. Select a file (such as GIF, Postscript™, text) and the relevant application and file will launch automatically.

Solaris™ Operating Environment *(cont.)*

Plug-and-play new Ultra 5 and Ultra 10 systems - (Available April 1998)

Solaris 2.6 Desktop Edition with Solaris Desktop Extensions will be preinstalled on all new Ultra 5 and Ultra 10 workstations beginning in April 1998. This new plug-and-play feature provides users with a ready-to-use workstation right out of the box which is up and running within minutes.

- What is preinstalled on Ultra 5 and Ultra 10 workstations:
  - Solaris 2.6 Hardware 3/98
  - Solaris Desktop Extensions™
  - OpenGL 1.1 runtime and OpenGL 1.1.1 SDK
  - XIL 1.3 runtime and SDK
  - JDK™ 1.1.3
  - JVM™ 1.1.3
  - Netscape Navigator
  - ODBC Manager 2.11
  - Developer Tool—Try and Buys:
    - Java™ Workshop™ 2.0
    - Java™ Studio™ 1.0
    - Sun™ Visual Workshop™ C++ 3.0
    - Sun™ Workshop Professional™ C 3.0
    - Sun™ Workshop™ Compilers C/C++ 4.2
    - Sun Workshop Compilers Fortran 4.2
    - Sun™ Performance Workshop™ Fortran 3.0
  - AnswerBook2
    - User Collection
    - System Administration Collection, Volume 1 and Volume 2
    - Software Developer Collection, Volume 1
    - Software Developer AnswerBook, Volume 2
    - Solaris on Sun Hardware AnswerBook
    - Ultra 5 and Ultra 10 Hardware AnswerBook

Solaris™ Operating Environment *(cont.)*

Plug-and-play new Ultra 5 and Ultra 10 systems - (Available April 1998) *(cont.)*

- What languages will be pre-installed:
  - Solaris 2.6 preinstalled software comes with the following languages:
    - English
    - French
    - German
    - Italian
    - Spanish
    - Swedish
    - Traditional Chinese
    - Simplified Chinese
    - Korean
    - Japanese

After users select which language they want, that language will be installed and all other languages will be removed.

- Solaris 2.6 preinstalled operating system or reinstall another operating system:

With its easy to use step-by-step menu, users can choose to accept the preinstalled version of Solaris 2.6 or choose to reinstall another version using JumpStart.

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.

Ultra 5 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.

Graphics Software Interfaces

Sun systems support all Solaris 2.5.1 graphics, Solaris 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.

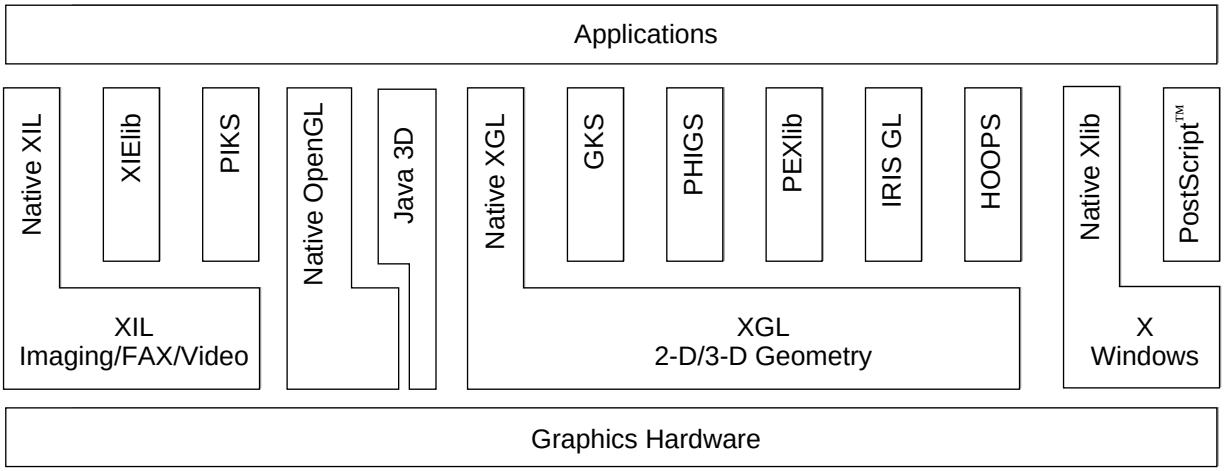
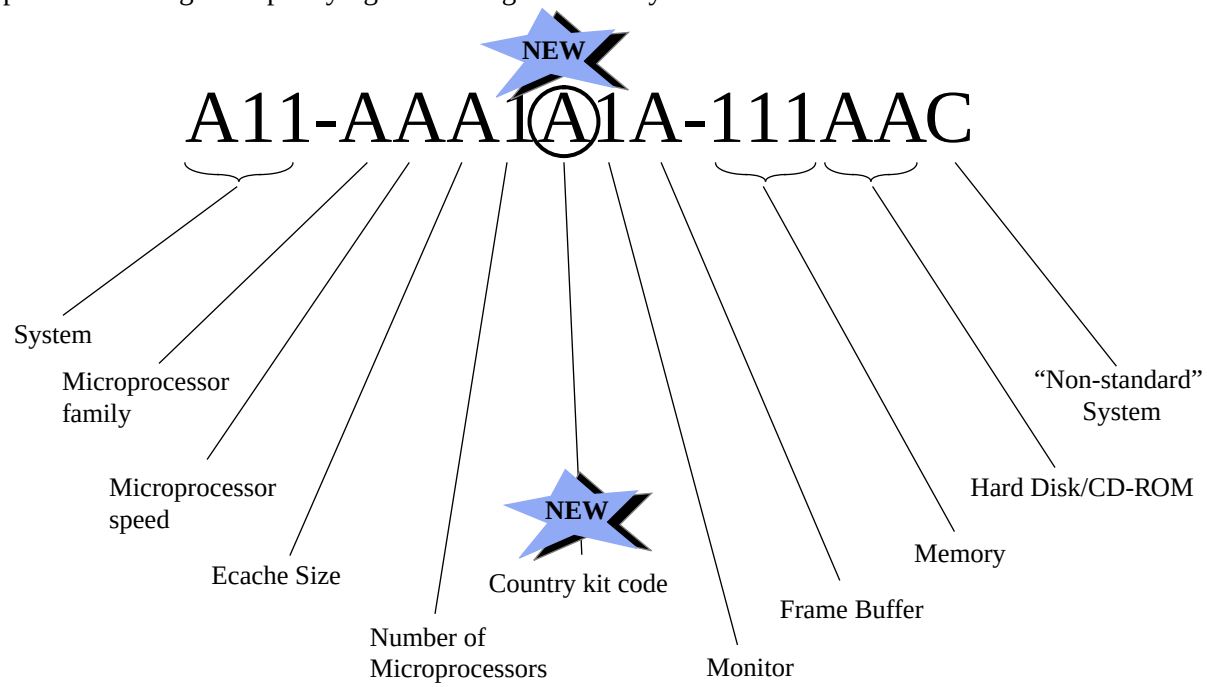


Figure 1. Graphics software interfaces

Sun™ Ultra™ 5 Ordering Information

The Ultra 5 utilizes a new Marketing Part-Number scheme that includes the choice of Country Kit in the Marketing Part Number. This page explains how to read the new part number scheme, and the next section explains the changes in specifying or ordering the Country Kit.



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

Model Key (Subset of Part Number Definitions)

System A21 = Sun Ultra 5 **Microprocessor Family** U = UltraSPARC™ IIi **Microprocessor Speed** F = UltraSPARC 270-MHz **Ecache Size** E = 256 KB **Number of Processors** 1 = Single processor	NEW **Country Kit** A = North America UNIX B = Japanese Language C = Japanese Logoless D = German Language E = United Kingdom F = French Language G = Swedish Language Y = Universal UNIX Z = No Ship Kit	**Monitor** 9 = No monitor **Frame Buffer** J = Onboard 8-bit **Memory** 64 = 64 MB 128 = 128 MB 256 = 256 MB	**Hard Disk/CD-ROM** AG = 4.3 GB CG = 4.3 GB, 24X CD-ROM

Model Key (Subset of Part Number Definitions) *(cont.)*

Choice of Country Kit

Unlike traditional Sun systems, the Ultra 5 has the Country Kit physically included within the System Ship Kit. The choice of Country Kit is specified by adding an additional character to the Ultra 5 Marketing Part Number. The ninth character of the Ultra 5 Marketing Part Number (previously a dash) specifies the choice of Country Kit. The single-character Country Kit Codes are listed in the table below.

Code	Country Kit
A	North America UNIX
B	Japanese Language
C	Japanese Logoless
D	German Language
E	United Kingdom
F	French Language
G	Swedish Language
Y	Universal UNIX
Z	No Country Kit

To order a Country Kit that is not shown on the table, specify the Country Kit Code “Z” and order the Country Kit as a separate line item. Ultra 5 systems ordered with the “Z” code will be shipped to the customer in a separate box—in other words, the customer receives the CPU system in one box and the Country Kit in a separate box. Customers who order Country Kit codes: A, B, C, D, E, F, G and Y receives the CPU system and Country Kit in a single box.

Three examples using the same base Ultra 5 configuration (64-MB RAM, 4.3-GB hard drive) are:

1. North American UNIX with 17-inch entry color monitor

   – A21-UFE1A9J-64AG Note that the ninth character is “A” for North American UNIX
   – X7103A Marketing Number for 17-inch Entry color monitor

2. Japanese Language with 21-inch color monitor:

   – A21-UFE1B9J-64AG Note that the ninth character is “B” for Japanese Language
   – X7121A Marketing Number for 21-inch color monitor
   – X470A Marketing Number for required 13W3 to HD15 Video Adapter Cable

3. No Country Kit with 21-inch color monitor and Italian Country Kit:

   – A21-UFE1Z9J-64AG Note that the ninth character is “Z” for No Country Kit
   – X3574A Marketing Number for separate Italian Country Kit
   – X7121A Marketing Number for 21-inch color monitor
   – X470A Marketing Number for required 13W3 to HD15 Video Adapter Cable

Sun Ultra 5 Ordering Information *(cont.)*

Sun Ultra 5 Workstation

To simplify this list, only the North American UNIX configuration is show below. There are nine part numbers for each configuration of the Ultra 5—one part number for each of the nine Country Kits.

Part Number	System
A21-UFE1A9J-64AG	Ultra 5 workstation with • 270-MHz UltraSPARC-IIi processor • North American UNIX Country Kit (included) • 64-MB ECC DRAM • 4.3-GB hard disk • On-board 8-bit graphics
A21-UFE1A9J-128AG	Ultra 5 workstation with • 270-MHz UltraSPARC-IIi processor • North American UNIX Country Kit (included) • 128-MB ECC DRAM • 4.3-GB hard disk • On-board 8-bit graphics
A21-UFE1A9J-128CG	Ultra 5 workstation with • 270-MHz UltraSPARC-IIi processor • North American UNIX Country Kit (included) • 128-MB ECC DRAM • 4.3-GB hard disk • 24X-speed CD-ROM • On-board 8-bit graphics
A21-UFE1A9J-256CG	Ultra 5 workstation with • 270-MHz UltraSPARC-IIi processor • North American UNIX Country Kit (included) • 256-MB ECC DRAM • 4.3-GB hard disk • 24X-speed CD-ROM • On-board 8-bit graphics

Ordering Guidelines and Notes

- **Memory**
  - The Ultra 5 supports up to 512 MB of 60-ns, 168-pin EDO JEDEC DRAM with ECC error correction. The DIMMs are the same as those used in the Ultra 10 systems but are not compatible with other Sun workstations. The Ultra 5 supports 32-, 64-, and 128-MB DIMM modules.
  - The Ultra 5 can accommodate up to four DIMM modules which must be installed in pairs. Adding DIMMs in a set of four results in the best memory system performance.

Memory Expansion Options	Part Number
64-MB ECC DRAM Expansion Kit (two 32-MB DIMMs)	X7030A
128-MB ECC DRAM Expansion Kit (two 64-MB DIMMs)	X7031A
256-MB ECC DRAM Expansion Kit (two 128-MB DIMMs)	X7032A

- **Keyboard**
  - The Type 5 keyboard is included in all Ultra 5 configurations, except for configurations which have been ordered with the “Z” Country Kit Code.
- **Internal storage devices**
  - The CD-ROM drive is unique to the Ultra 5 and Ultra 10 and is not compatible with other Sun workstation systems. In addition, all other internal hard disks, CD-ROM drives, and other storage devices are not compatible with the Ultra 5 and Ultra 10.

Internal Storage Device	Part Number
Internal 24X-speed Atapi CD-ROM	X6170A

- **External and internal SCSI devices**
  - A PCI SCSI Adapter card is required to attach any external SCSI device since SCSI is not a feature of the Ultra 5. In addition, all internal SCSI options are not compatible with the Ultra 5.
- **Monitors**

  The choice of monitors is not reflected in the Ultra 5 Marketing Part Number. A monitor is required and is ordered as a separate line item. The Ultra 5 supports the monitors listed below. For some monitor and frame-buffer combinations, a video adapter cable may be required; consult the table below.

Supported Monitors	Video Adapter Required for Onboard 8-bit
17-inch Entry color (X7103A)	none
19-inch color (X7119A)	none
21-inch color (X7121A)	X470A

Expansion Options

Below is a comprehensive list of system expansion, networking, graphics, and multimedia options that are supported by Sun Ultra 5 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
Memory			
X7030A	64-MB ECC DRAM Expansion Kit (two 32-MB DIMMs)	2	These are all
X7031A	128-MB ECC DRAM Expansion Kit (two 64-MB DIMMs)	2	DIMM pairs
X7032A	256-MB ECC DRAM Expansion Kit (two 128-MB DIMMs)	2	
X7033A	512-MB ECC DRAM Expansion Kit (two 256-MB DIMMs)	2	Ultra 10 only
Mass Storage—Internal			
X5227A	Internal 4.3-GB EIDE hard disk, 4500 rpm	1	Ultra 10 only
X6170A	Internal 24X-speed Atapi CD-ROM	1	Ultra 5 and Ultra 10 only
Mass Storage—External			
X814A	5.0-GB, 8-mm tape backup drive, desktop storage module	2	A PCI SCSI
X827A	20-GB, 4-mm tape autoloader, desktop storage module	2	Adapter card is required to
X545A	1.05-GB Fast SCSI-2 desktop disk pack	4	attach any
X567A	2.1-GB Fast SCSI-2 desktop disk pack	4	external SCSI
X737A	2.1-GB Fast SCSI-2 desktop disk pack	4	device to the
X579A	SunCD 2Plus™, desktop storage pack	2	Ultra 5 and
X660A	150-MB QIC tape drive, desktop storage pack	2	Ultra 10
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	

Expansion Options *(cont.)*

Part Number	Option description	Maximum number supported	Comments
Mass Storage—UniPack	*The following UniPack options come with a 68–68 pin SCSI cable:*		
X5101A	1.05-GB, 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	A PCI SCSI Adapter card is required to attach any external SCSI device to the Ultra 5 and Ultra 10
X5103A	2.1-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 (68–68 pin)	2	
X5253A	9.1-GB, 7200-rpm Fast/Wide SCSI-2 disk UniPack (68–68 pin)	2	
X6151A	SunCD™ 4x CD-ROM UniPack	1	
X6201A	14-GB, 8-mm tape UniPack	2	
X6208A	14-GB, 8-mm tape UniPack	2	
X6251A	5-GB, 4-mm tape UniPack	2	
X6157A	SunCD 12x CD-ROM UniPack	2	
X6261A	4–8-GB, 4-mm DDS-2 drive	2	
X6280A	12–24-GB, 4-mm DDS-3 tape drive	2	
X6230A	20–40-GB, 8-mm tape drive	2	
	The following UniPack options come with a 50–68 pin SCSI cable:		
X5102A	1.05-GB, 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	A PCI SCSI Adapter card is required to attach any external SCSI device to the Ultra 5 and Ultra 10
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	4–8-GB, 4-mm DDS-2 tape drive	2	
X6281A	12–24-GB, 4-mm DDS-3 tape drive	2	
X6231A	20–40-GB, 8-mm tape drive	2	
Mass Storage—MultiDisk Pack			
X569A	4.2-GB SCSI MultiDisk Pack (2 x 2.1-GB Fast SCSI-2 disk)	2	A PCI SCSI Adapter card is required to attach any external SCSI device to the Ultra 5 and Ultra 10
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 disk)	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	

Expansion Options *(cont.)*

Part Number	Option description	Maximum number supported	Comments
Mass Storage—FlexiPack	*The following UniPack options come with a 68–68 pin SCSI cable:*		
X6057A	DLT 4000	2	A PCI SCSI Adapter card is required to attach any external SCSI device to the Ultra 5 and Ultra 10
X6060A	DLT 7000	2	
X6290A	72–144-GB, 4-mm DDS3 autoloader tape FlexiPack	2	
X6284A	12–24-GB, 4-mm DDS3 tape FlexiPack	2	
X6264A	4–8-GB, 4-mm DDS3 tape FlexiPack	2	
X6232A	20–40-GB, 8-mm tape FlexiPack	2	
X6210A	14-GB, 8-mm tape FlexiPack	2	
X6159A	SunCD 12x CD-ROM FlexiPack	2	
	The following UniPack options come with a 50–68 pin SCSI cable:		
X6058A	DLT 4000	2	A PCI SCSI Adapter card is required to attach any external SCSI device to the Ultra 5 and Ultra 10
X6061A	DLT 7000	2	
X6291A	72–144-GB, 4-mm DDS3 autoloader tape FlexiPack	2	
X6285A	12–24-GB, 4-mm DDS3 tape FlexiPack	2	
X6265A	4–8-GB, 4-mm DDS3 tape FlexiPack	2	
X6233A	20–40-GB, 8-mm tape FlexiPack	2	
X6211A	14-GB, 8-mm tape FlexiPack	2	
X6150A	SunCD 12x CD-ROM FlexiPack	2	
Mass Storage—MultiPack			
X5511A	4.2-GB (2 x 2.1-GB), 7200-rpm Fast/Wide SCSI-2 MultiPack	1	A PCI SCSI Adapter card is required to attach any external SCSI device to the Ultra 5 and Ultra 10
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	

Expansion Options *(cont.)*

Part Number	Option description	Maximum number supported	Comments
Mass Storage—SPARCstorage			
X6227A	SPARCstorage™ Library Model 8/140, 140-GB, 8-mm tower unit	1	A PCI SCSI Adapter card is required to attach any external SCSI device to the Ultra 5 and Ultra 10
X849A	SPARCstorage Library Model 8/140, 140-GB, 8-mm stackable unit	1	
X867A	SPARCstorage Library Model 8/140, 140-GB, 8-mm two drives and barcode reader, tower unit	1	
X869X	SPARCstorage Library Model 8/140, 140-GB, 8-mm two drives and barcode reader, stackable unit	1	
Input Devices			
X180A	SunButtons™ 32-key function I/O device	1	
X190A	SunDials™ 8-dial interactive graphics I/O device for 3-D	1	
SUNX-MICII/G5	SunMicrophone™ II		
PCI Expansion Cards			
X1032A	SunPCI UltraSCSI and 10/100-Mbit buffered Ethernet card (Fresh Choice)	3	
X1033A	10/100 BASE-T with MII PCI Adapter (Fresh Choice Light)	3	
X1034A	PCI Quad Fast Ethernet Controller PCI Adapter	3	
X1039A	SunLink™ Token Ring Interface/PCI Adapter	3	Universal
X1040A	High-speed Serial Interface PCI Adapter (HSI) (1 port)	3	
X1041A	Serial Asynchronous Interface (SAI) PCI adapter (8 ports)	3	Universal
X1035A	SunFDDI™ single-attach PCI Adapter (SAS/5.0)	3	
X1036A	SunFDDI dual-attach PCI Adapter (DAS/5.0)	3	
X1044A	Gigabit Ethernet Controller PCI Adapter	3	
Monitors and Graphics			
X3660A	PGX 8-bit color graphics PCI Adapter frame buffer and cable	3	PCI Card
X7103A	17-inch Entry color monitor		One monitor per graphics accelerator
X7119A	19-inch color monitor		
X7121A	21-inch color monitor		
X7124A	24-inch wide-screen color monitor		
X470A	13W3F to HD15M Video Adapter cable		One per monitor as needed
X3872A	HD15F to 13W3M Video Adapter cable		

Expansion Options *(cont.)*

Part Number	Option description	Maximum number supported	Comments
Other Options			
X901A	0.8-meter Wide-to-Narrow 68–68-pin UltraSCSI	1	A PCI SCSI
X902A	2.0-meter Wide-to-Narrow 68–68-pin UltraSCSI	1	Adapter card
X903A	1.2-meter Wide-to-Narrow 68–68-pin SCSI adapter cable	1	is required to
X904A	2.0-meter Wide-to-Narrow 68–68-pin SCSI adapter cable	1	attach any
X907A	Optional power cable, CPU to monitor, 1.5 meter	1	external
X908A	Optional power cable, CPU to monitor, 2.5 meter	1	SCSI device to the Ultra 5
X467A	MII-AUI Converter	1	and Ultra 10
Type 5 Country Kits			
X3500A	North American	1	Except for
X3550A	North American Universal	1	"Z" Country
X3540A	UNIX®	1	Kit Codes, the
X3551A	UNIX Universal	1	Country Kit
X3552A	Euro UNIX (Power Cordless)	1	contents are
X3502A	French	1	included with
X3503A	German	1	every Ultra 5
X3504A	Swiss-French	1	and Ultra 10
X3505A	Swiss-German	1	configuration.
X3506A	Swedish	1	Refer to the
X3577A	Finnish	1	"Choice of
X3507A	U.K.	1	Country Kit"
X3547A	U.K. UNIX	1	sub-section
X3570A	Norwegian	1	(above) for
X3571A	Portuguese	1	ordering
X3572A	Spanish	1	details.
X3573A	Danish	1	
X3574A	Italian	1	
X3575A	Netherlands	1	
X3544A	Taiwan	1	
X3545A	Korean	1	
X3546A	Japanese	1	
X3542A	Japanese UNIX	1	
X3576A	Australian	1	
X3579A	Canadian Bilingual	1	

Sun™ Ultra™ 5 Upgrades

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

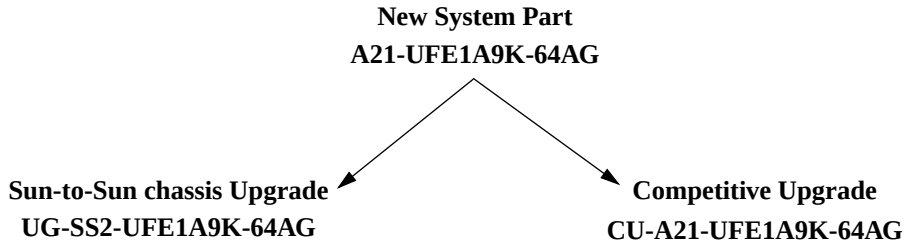
Key Messages

- Sun offers customers a variety of flexible upgrade paths to the most popular Sun systems
- Choose from full array of chassis upgrades
- Existing investments in non-Sun hardware can be preserved by upgrading to Sun through competitive full-system upgrades

Sun Ultra 5 Upgrade Paths

From	Receive	Return
Chassis upgrade from Any SLC, ELC, IPC, 1/1+, SPARCclassic, LX, IPX, or SPARCstation 2 to Ultra 5	Sun Ultra 5 System	Workstation chassis, including CPU board, primary memory, and internal disk
Chassis upgrade from SPARCstation 4 or 5 to Ultra 5	Sun Ultra 5 system	Workstation chassis, including CPU board, primary memory, and internal disk
Competitive upgrade to Ultra 5	Sun Ultra 5 system	Workstation, including CPU board, primary memory, and internal disk

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 5 Upgrades from Previous Sun Workstations

Part Number	Description
UG-SS2-UFE1A9J64AG	Upgrade from any low-end Sun™ workstation (such as SLC™, ELC™, IPC™, 1/1+, SPARCclassic™, LX, IPX™, SPARCstation™ 2) to Ultra 5 270-MHz UltraSPARC™-IIi workstation with 256 K of cache, 64-MB DRAM, 4.3-GB hard drive (with North American UNIX Country Kit)
UG-S5-UFE1Z9J-64AG	Upgrade from SPARCstation 4 or 5 workstation to Ultra 5 270-MHz UltraSPARC-IIi workstation with 256 K of cache, 64-MB DRAM, 4.3-GB hard drive (no Country Kit)

Part Number	Description
UG-SS2-UFE1A9J256CG	Upgrade from any low-end Sun workstation (such as SLC, ELC, IPC, 1/1+, SPARCclassic, LX, IPX, SPARCstation 2) to Ultra 5 270-MHz UltraSPARC-IIi workstation with 256 K of cache, 256-MB DRAM, 4.3-GB hard drive, 24X CD-ROM (with North American UNIX Country Kit)
UG-S5-UFE1Z9J256CG	Upgrade from SPARCstation 4 or 5 workstation to Ultra 5 270-MHz UltraSPARC-IIi workstation with 256 K of cache, 256-MB DRAM, 4.3-GB hard drive, 24x CD-ROM (no Country Kit)

Sun Ultra 5 Competitive Upgrades

Part Number	Description
CU-A21-UFE1A9J64AG	Upgrade from competitive system to Ultra 5 270-MHz UltraSPARC-IIi workstation with 256 K of cache, 64-MB DRAM, 4.3-GB hard drive, 24x CD-ROM (North American UNIX Country Kit)

Ordering Notes:

- Type 4 keyboard not supported. If customer has a type 4 keyboard, please order appropriate Country Kit.
- N1 (Sony GDM 17E10), N2 (Sony GDM 20E20, GDM 17E20), P4 (Sony GDM20D10) are supported monitors on Ultra 5 and 10. Customer may migrate any of these monitors. However, an adapter is required for operation.
- If monitor is migrated from another platform, customer may need to purchase monitor adapter X470A. This video adapter is required for Sun's standard 13W3-pin monitors to use with workstation platforms that have a HD15-pin video output connector. The video adapter 13W3F to HD15M is required when plugging a 13W3 monitor to Ultra 5's on-board HD15-pin graphics.
- Upgrades from SPARCstation 4, SPARCstation 5, SPARCstation 20, and Ultra 1 do not have include Country Kits (keyboard and localized manuals). These platforms are very likely to have type 5 keyboards and can be migrated to the Ultra 5 and Ultra 10. In the event that the customer does not have a type 5 keyboard, please order the X-option Country Kit to obtain the appropriate keyboard.

Service and Support

SunSpectrum[SM] 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[™] operating system software, and telephone support for Sun[™] 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 SunService[SM] representative for program/feature variance and availability in their area.

FEATURE	SUNSPECTRUM[SM] PLATINUM[SM] Mission-Critical Support	SUNSPECTRUM[SM] GOLD[SM] Business-Critical Support	SUNSPECTRUM[SM] SILVER[SM] Systems Support	SUNSPECTRUM[SM] BRONZE[SM] Self Support
Systems Features				
Systems approach coverage	Yes	Yes	Yes	Yes
System availability guarantee	Customized	No	No	No
Account Support Features				
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
Coverage / Response Time				
Standard telephone coverage hours	7 day/24 hour	7 day/24 hour	8 AM–8 PM, Monday–Friday	8 AM–5 PM, Monday–Friday
Standard on-site coverage hours	7 day/24 hour	8 AM–8 PM, Monday–Friday	8 AM–5 PM, 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
Enhanced Support Features				
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
Remote Systems Diagnostics				
Remote dial-in analysis	Yes	Yes	Yes	Yes
Remote systems monitoring	Yes	Yes	No	No
Remote predictive failure reporting	Yes	Yes	No	No
Software Enhancements and Maintenance Releases				
Solaris enhancement releases	Yes	Yes	Yes	Yes
Patches and maintenance releases	Yes	Yes	Yes	Yes
Sun unbundled software enhancements	Option	Option	Option	Option
Internet and CD-ROM Support Tools				
SunSolve™ license	Yes	Yes	Yes	Yes
SunSolve EarlyNotifier℠ Service	Yes	Yes	Yes	Yes

SunService Offerings

SunService now provides two service offerings: SunClient℠ for low-level, low-cost support and SunSpectrum℠ for high-level support and mission-critical response. Both support programs are available to service Ultra 5 workstations.

SunClient

Now there is a way to reduce hardware and software support costs for JavaStation network computers and the Ultra 5 and Ultra 10 workstations. The SunClient 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 networking experts

FEATURE	SunClient Maintenance	SunClient Central Maintenance	SunClient SW Tech Support Option*
Systems approach coverage	*	*	
Solaris and unbundled SW technical support			*
9a.m.-5p.m., M-F telephone coverage	*	*	*
8a.m.-5p.m., M-F on-site coverage	*†‡	*‡	
Response times (phone/onsite)	4 hr. callback/next business day response	4 hr. callback/second business day response	4 hr. callback
Centralized on-site repair of multiple units		*	Not Applicable
Patches	Not Applicable	Not Applicable	*
SunSolve™ license	Not Applicable	Not Applicable	*
SunSolve EarlyNotifier℠ Service	Not Applicable	Not Applicable	*
SW Updates	Not Applicable	Not Applicable	Not Applicable

* Can only be 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.

Features and Benefits of the SunClient Program

• Features	• Benefits
– Unbundled hardware and software support	– **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
– Next business day (SunClient Maintenance) or second business day (SunClient Central Maintenance) on-site response	– **Cost efficiency**: Since Sun can more efficiently manage spare inventory and labor scheduling, the savings can be passed on to the customer.
– Single contract with choice of automatic warranty upgrade	– **Simplicity**: One contract covers a predefined number of systems at one low price. New systems acquired can be upgraded to the SunClient service level.
– SunClient Central Maintenance	– **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.
– Service delivery by Sun experts	– **Consistency**: Selected desktops can be deployed anywhere with assurance of cost-effective, quality service and support.

For more information, visit the SunClient Support (external) Web site at:
`http://www.sun.com/service/support/sunclient`

Glossary

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	See 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 MBs.
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 *de facto* 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 standardize 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, packet-switched mother board interconnect.
V9	Version 9 of the SPARC™ definition.

Glossary *(cont.)*

VIS™	Visual Instruction Set. The UltraSPARC™ processor implements a special instruction set that is aimed primarily 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.