UltraSPARC® IIIi Processor

Design Engineered for the Demands of up to 4-way Volume Servers and Performance Workstations.

Key Highlights

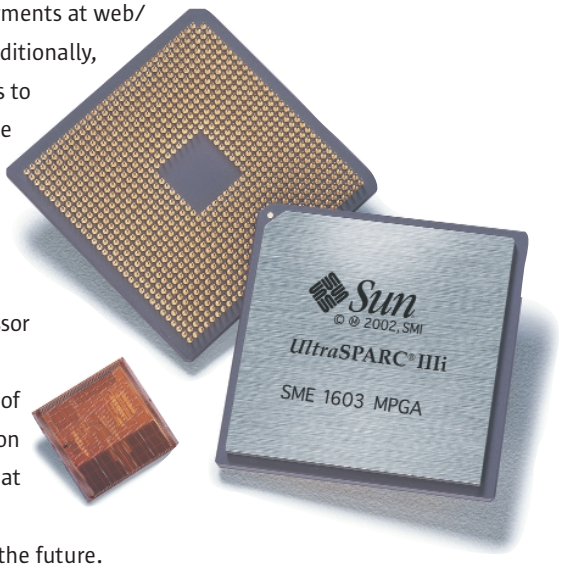
- Newest member of the i-Series UltraSPARC® processor family
- 64-bit open standards-based SPARC® V9 with VIS™ Instruction Set
- 4-way superscalar
- 14-stage non-stalling pipeline
- Seamless support for up to 4 processors
- L1 Cache: on-chip 64 KB (data), 32 KB (instruction)
- L2 Cache: on-chip 1 MB (4-way, set-associative)
- System Bus: new cache coherent JBus interface operating up to 200 MHz
- Integrated 266 MHz DDR-1 system memory interface
- 16 GB of addressable memory per CPU
- 4.2 GB/s per processor off-chip memory bandwidth
- Implemented in a 7LM Cu 0.13µ process
- Low power consumption (59W at 1 GHz)
- Robust RAS features
- Solaris™ Operating Environment support
- 15 years of binary compatibility
- Clock Frequency: up to 1.28 GHz

Who Said One Size Fits All?

In today's world of enterprise computing, microprocessors are constantly driven to provide the optimal balance of performance, scalability, reliability, cost and power consumption for its intended range of target applications. Sun's customer-focused design methodology and its tradition to innovate for real-world solutions has led to the development of a family of high-performance, 64-bit microprocessors that are conceived at multiple design points to address the challenging and unique workloads of the various tiers of enterprise computing. For high-performance microprocessors, one size never fits all.

As the latest member of the i-Series UltraSPARC® processor family, the UltraSPARC IIIi microprocessor powers systems used in applications such as web servers, application servers, CAD/CAM and high performance technical computing. While our flagship s-Series UltraSPARC III processor was designed to meet the needs of large SMP (symmetric multiprocessing)-based datacenter servers, the UltraSPARC IIIi processor was developed with a clear objective: to provide the real-world application performance, improved cost efficiency and robust RAS features mandated by volume servers and performance workstations.

The UltraSPARC IIIi processor leverages the core technologies from the UltraSPARC III processor, and further optimizes the microprocessor to exceed customer requirements. Features such as the 1 MB on-chip L2 cache, a high-speed JBus SMP system interface, 16 GB of main memory capacity and an integrated 266 MHz DDR-1 memory controller, provide the necessary application performance required for customer deployments at web/application servers and on the desktop. Additionally, the use of asynchronous design techniques to counter clock skew in the memory interface represents one of the several new design innovations in this microprocessor.



Designed and optimized in concert with the Solaris™ Operating Environment and Sun systems, the UltraSPARC IIIi processor offers impressive price/performance in its targeted tiers of applications. With 15 years of binary compatibility, and Sun's determination to maintain it, customers should expect that their investments in the SPARC and Solaris platform can continue to pay dividends in the future.

UltraSPARC® IIIi Processor Technical Information

UltraSPARC IIIi Processor Features

L1 Cache: 64 KB (4-way) Data, 32 KB (4-way) Instruction, 2 KB Prefetch, 2 KB Write

L2 cache: on-chip 1 MB (4-way, set-associative)

System Bus: new cache coherent JBus interface operating up to 200 MHz

Integrated DDR1 SDRAM memory controller

Clock frequency control for dynamically dropping frequency for low power modes (1/2 to 1/32 modes)

VIS SIMD Instruction Set

CPU Core Design

14-stage non-stalling pipeline

16,000 entry branch prediction table

New byte mask and shuffle VIS instructions for media applications

Jump target registration instruction to accelerate interpreted code like Java™ technology

Instruction Execution Features

Sustainable 4-way Superscalar

Six execution pipelines (2 integer, 2 FP/VIS, 1 load/store, 1 branch)

Multiple outstanding block stores

JBUS Features

183-bit, 150-200 MHz clock frequency

System bus optimized for up to 4-way

MOESI Coherency protocol

Fully pipelined snooping protocol

Scalable System Performance

Optimized system interface with peak bandwidth of 3.2 GB/s

Processor memory bandwidth scales with number of processors

Distributed Main Memory

Distributed memory control (at each CPU)

Memory Interface: 266 MHz DDR-1

Memory Size: 16 GB per CPU

Main memory bus bandwidth: 4.25 GB/s (peak)

Industry-leading RAS Features Include:

L1 caches and tags are parity protected

L2 data array ECC protected

Memory bus is ECC protected

JBus is parity protected

Enhanced Support from Solaris

Multiprocessor (MP) support provided by Solaris OE

System models for tightly coupled, shared memory and for large multi-processor clustered architectures (snoop and directory-based)

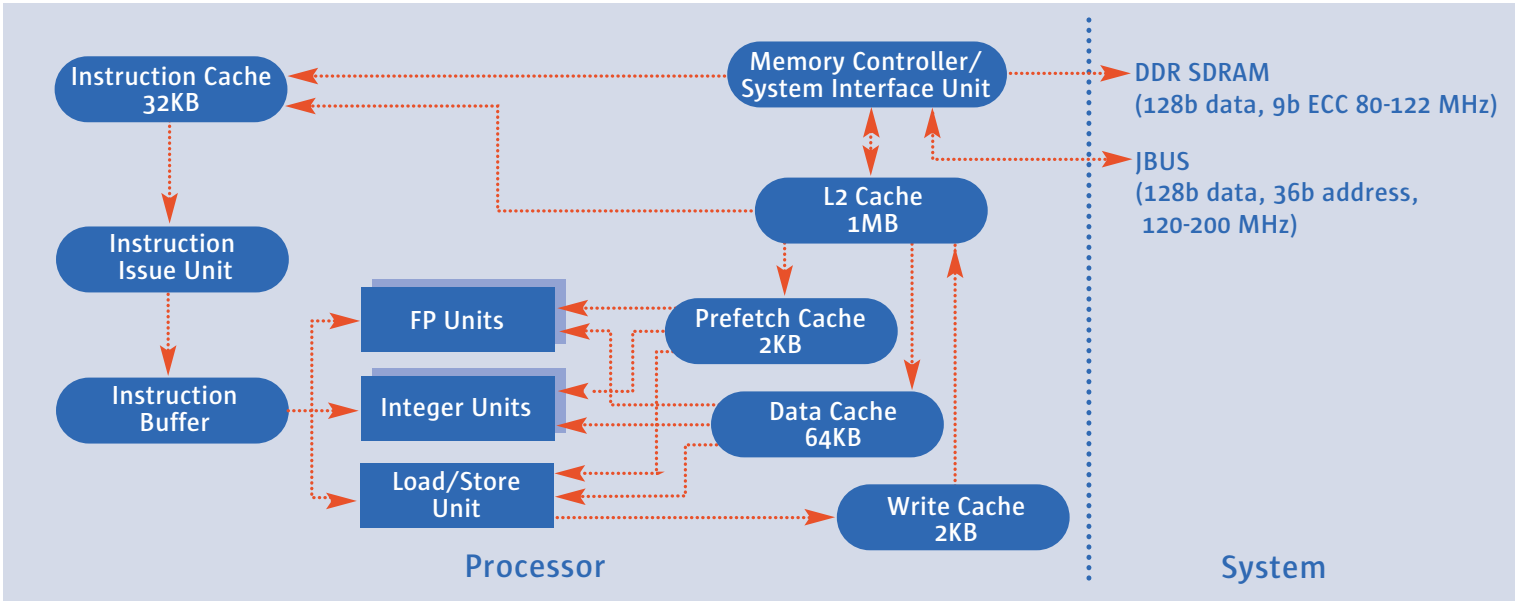
Physical Characteristics of UltraSPARC IIIi 1 GHz

959 pin ceramic Micro Pin Grid Array (µPGA)

Transistor Count: 87.5 million

Maximum Power Dissipation: 52 W @1.28 GHz

CMOS process: 0.13µ, 7-layer copper



Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 USA **Phone** 1-800-555-9SUN or 1-650-960-1300 **Web** www.sun.com/ultrasparc

We make the net work.

Sun Worldwide Sales Offices: Argentina +5411-4317-5600 Australia +61-2-9844-5000, Austria +43-1-60563-0, Belgium +32-2-704-8000, Brazil +55-11-5187-2100, Canada +905-477-6745, Chile +56-2-3724500, Colombia +571-629-2323, Commonwealth of Independent States +7-502-935-8411, Czech Republic +420-2-3300-9311, Denmark +45 4556 5000, Egypt +202-570-9442, Estonia +372-6-308-900, Finland +358-9-525-561, France +33-134-03-00-00, Germany +49-89-46008-0, Greece +30-1-618-8111, Hungary +36-1-489-8900, Iceland +354-563-3010, India-Bangalore +91-80-2298989/2295454; New Delhi +91-11-6106000; Mumbai +91-22-697-8111, Ireland +353-1-8055-666, Israel +972-9-9710500, Italy +39-02-641511, Japan +81-3-5717-5000, Kazakhstan +7-3272-466774, Korea +822-2193-5114, Latvia +371-750-3700, Lithuania +370-729-8468, Luxembourg +352-49 11 33 1, Malaysia +603-21161888, Mexico +52-5-258-6100, The Netherlands +00-31-33-45-15-000, New Zealand-Auckland +64-9-976-6800; Wellington +64-4-462-0780, Norway +47 23 36 96 00, People's Republic of China-Beijing +86-10-6803-5588; Chengdu +86-28-619-9333; Guangzhou +86-20-8755-5900; Shanghai +86-21-6466-1228; Hong Kong +852-2202-6688, Poland +48-22-8747800, Portugal +351-21-4134000, Russia +7-502-935-8411, Saudi Arabia +9661 273 4567, Singapore +65-6438-1888, Slovak Republic +421-2-4342-94-85, South Africa +27 11 256-6300, Spain +34-91-596-9900, Sweden +46-8-631-10-00, Switzerland-German 41-1-908-90-00; French 41-22-999-0444, Taiwan +886-2-8732-9933, Thailand +662-344-6888, Turkey +90-212-335-22-00, United Arab Emirates +9714-3366333, United Kingdom +44-1-276-20444, United States +1-800-555-9SUN OR +1-650-960-1300, Venezuela +58-2-905-3800, Or Online at sun.com/store

SUN™ THE NETWORK IS THE COMPUTER © 2003 Sun Microsystems, Inc. All rights reserved. Sun, Sun Microsystems, the Sun logo, VIS, Solaris, Java, and The Network Is The Computer are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the United States and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.

Part # DS002.03USIIIi1203 Datasheet