SGI® RASC™ RC100 Blade

Dramatic Application Speed-up with Next Generation Reconfigurable Compute Technology

System Highlights

- Orders of magnitude application acceleration from the leading supplier of high-end computing solutions
- Advanced application acceleration technology with peer attached, high bandwidth FPGA computing elements
- Industry-leading levels of scalability, with low overhead configurations up to 128 FPGA nodes
- Price/performance boost with lower cost, lower power consumption and a smaller form factor
- Complete software solution stack to help simplify development and improve programmer efficiency

True Parallel Processing for Dramatic Application Speed-up

The SGI® RASC™ RC100 blade contains dual Xilinx Virtex 4 LX200 FPGAs which utilize gate array technology that can be reconfigured for a specific algorithm. Unlike traditional processors, which are serial in nature, FPGAs are inherently parallel, allowing multiple simultaneous computations. Users whose applications spend a majority of their run time working on a set of specific algorithms can custom configure the RASC RC100 blade and dramatically reduce their application run time.

Improved FPGA Performance and Industry Leading Levels of Scalability

The RASC RC100 blade is directly connected into system memory fabric through the SGI® NUMAlink™ 4 interconnect—the industry's fastest at 6.4GB per second bandwidth. High speed access to a large globally shared system memory means that there is no need to load and unload data when reprogramming the FPGA—resulting in faster system level FPGA reprogramming. Direct access to globally shared system memory also means that SGI RASC technology has industry leading levels of scalability, with configurations up to 128 FPGA nodes.

Price/Performance Boost with Dramatically Decreased Cost of Ownership

SGI RASC technology increases application performance by orders of magnitude over conventional servers – without the added expense of additional compute nodes or processors. The result is a dramatic price/performance improvement. The RASC RC100 blade consumes significantly less power per gigaflop than a traditional server and with its small footprint, saves valuable rack-space. The RASC RC100 blade provides the same performance as a supercomputer cluster, with lower cost, lower power consumption, and a much smaller form factor.

Seamless Operation with SGI® Altix® Servers

Direct connection of I/O into the NUMAlink memory fabric enables the RASC RC100 blade to seamlessly operate with SGI Altix 4700, 450, 3700 Bx2 and 350 servers. Processing can be moved from a server or a cluster of servers onto a RASC blade without physically changing the memory structure. The direct connection also enables the use of a hybrid implementation, where part of an application can be run on the RASC RC100 blade and the other part can be run on a high performance server or cluster.

RASC Solution Stack Simplifies Development and Improves Programmer Efficiency

Building on SGI's history of software environment expertise, partnerships with key providers in the configurable computing marketplace enable SGI to provide a complete software solution stack to help simplify development. The RASC software solution stack includes an FPGA-aware version of the GNU Debugger (GDB), a RASC Abstraction Layer (RASCLib) and a RASC API and core services library. SGI also supports Verilog and VHDL modules, several HLL development tools (including Celoxica Handel-C, Celoxica DK Design Suite and Mitrionics Mitrion C) as well as Synplicity Synplify Pro, and Xilinx Synthesis Technology (XST) synthesis tools.

SGI® RASC™ RC100 Blade

Technical Specifications
- Dual SGI NUMAlink (4 ports)
- Dual Xilinx Virtex 4 LX200 FPGAs
- 200,000 Logic Cells per FPGA
- 80MB QDR SRAM

Supported Systems
- SGI® Altix® 4700 server
- SGI Altix 450 server
- SGI Altix 3700 Bx2 sever*
- SGI Altix 350 server*
  - *May require an upgrade for RASC installation*

Advanced Features
- 12.8 GB/s peak bi-directional system NUMAlink-4 bandwidth (with simultaneous Read/Write operations across 2 NL-4 ports)
- 32.0 GB/s per second on-board QDR SRAM peak bandwidth
- SGI RASC library and core services

Dimensions
Blade Form Factor
- 1U Altix 4000 IRU
- Up to 10 blades per IRU
Rack-mountable Form Factor
- 2 blade slot chassis
- EIA slide-mountable
- 3U (5.25"H x 19"W x 26"D)

Software
Operating Systems (On Host Server)
- SGI® ProPack™ 4 on SUSE® Linux Enterprise Server 9
RASC Solution Stack
- GNU Debugger (GDB)
  An FPGA-aware version built on the current GDB command set, allowing simultaneous debugging of both the application and the FPGA
- RASC Abstraction Layer (RASCLib)
  Enables serial or parallel FPGA scaling
- RASC API and Core Services Library
  Provides tools to develop reconfigurable computing elements in a multi-user, multi-processing environment
- Verilog / VHDL Module Support
  Debugger for an integrated, high performance environment
- High Level Language Vendor Support
  Fully integrated third-party HLL development tools for advanced incremental design and modular design methodologies:
  - Celoxica Handel-C and DK Design Suite
  - Mitrionics Mitrion-C
  - Synplicity Synplify Pro Synthesis
  - Xilinx, Foundation SW and XST Synthesis

Environmental (Operating)
Temperature
- +5˚C to +35˚C, altitude 5,000 MSL
- +5˚C to +30˚C, altitude 10,000 MSL
Humidity
- 10% to 85% non-condensing

Environmental (Non Operating)
Temperature
- -40˚C to +60˚C
Humidity
- 10% to 95% non-condensing
Other
- Complies with the EU RoHS regulation for elimination of toxic substances
Altitude
- 40,000 MSL
Power Requirements (max)
- 150 Watts

Ordering Information
- RASC-C2V4LX — SGI RASC Technology
- SC5-RASC-2.0 — RASC Software Bundle
- RASC-QDRMEM-8MB — Memory

Support and Services
SGI provides full support for SGI RASC Technology and software. SGI Professional Services also offers services to implement and integrate RASC into your environment. For more information, please contact your SGI representative.