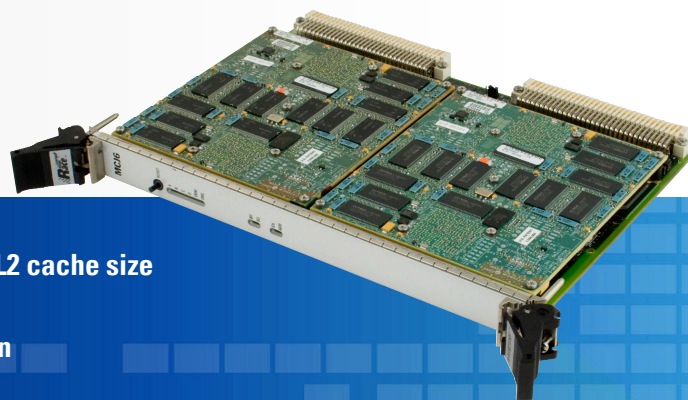


RACE++[®] Series

PowerPC 7448 Multicomputer

High-Performance Product Upgrade



- 1.06 GHz and 1.26GHz 7448 PowerPC options with double the L2 cache size over 800 MHz 7447A previous generation
- Optional double-size main DDR DRAM vs. previous generation
- Increases application performance by 20-30%
- Ruggedized versions available
- Easy upgrade path with drop-in replacement and no application software changes needed

The RACE++[®] Series PowerPC[®] 7448 Multicomputer from Mercury Systems is a high-performance drop-in product upgrade that adds significant improvements in processor speed, L2 cache size, memory available per processor, and application performance over the PowerPC MPC7447A. By maintaining commonality with previous RACE++ Series PowerPC products, Mercury provides an easy upgrade path for existing system designs.

MPC7448 PowerPC Processors with AltiVec

The PowerPC 7448 Multicomputer is available in 6U and 9U form factors:

- The 6U PowerPC 7448 Multicomputer consists of an MCJ6 motherboard and two daughtercards. Each daughtercard has either two 1.06-GHz MPC7448 processors or two 1.267-GHz processors with AltiVec[™] technology. These processors combine a modern superscalar RISC architecture with an AltiVec parallel vector execution unit. MCJ6 configurations with one PowerPC 7448 daughtercard and one RINOJ-F-2.5 are also available.
- 9U MCJ9 configurations with up to seven PowerPC-7448 daughtercards and one RINOJ-F-2.5 are also available.

RACE++ Series PowerPC 7448 daughtercards combine 1.06-GHz or 1.267-GHz CPU with Double Data-Rate (DDR) SDRAM with 512 MB or 1024 MB per MPC7448 on a standard Mercury Type J daughtercard for RACE++ VME systems. Targeted specifically for today's memory-bound applications, these daughtercards interface directly with the RACE++ switch fabric to form the optimal balance in processing, memory, and data communications attainable for embedded multicomputing applications.

Compute Node Architecture

The computational power of RACE++ Series systems is built from Compute Nodes (CNs) comprised of processors, memory, and interfaces to the RACE++ interconnect. PowerPC 7448 daughtercards contain two compute nodes, each consisting of an MPC7448 processor with AltiVec technology, a 1-MB fast on-chip Level 2 (L2) cache, DDR SDRAM, and a Mercury-designed CN interface chip.

The CN interface chip facilitates concurrency between arithmetic and I/O operations. Each PowerPC 7448 CN includes a fully pipelined on-chip L2 cache that delivers 32 bytes per clock cycle to the L1 caches.

Mercury Systems is a best-of-breed provider of commercially developed, open sensor and Big Data processing systems, software and services for critical commercial, defense and intelligence applications.



ACQUIRE



DIGITIZE



PROCESS



STORAGE



EXPLOIT



DISSEMINATE

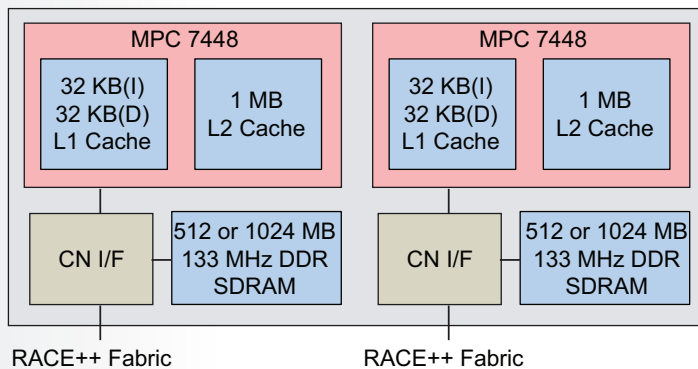


Figure 1. RACE++ Series PowerPC 7448 daughtercard compute node block diagram

High-Performance Memory System

Like the MPC7447A, the MPX processor bus used on the PowerPC 7448 daughtercards delivers key memory access and sustained throughput enhancements over the 60x bus used on earlier daughtercards. Mercury's high-performance memory subsystem allows the memory to approach the theoretical limits of its performance capability with:

- DDR-266 133-MHz double data-rate DRAM for additional bandwidth
- Virtual mapping registers for finer granularity of address mapping
- FIFO buffers that efficiently overlap access to SDRAM from the local processor and the RACEway® interconnect
- Error-checking circuitry for improved data integrity

RACE++ Switch Fabric Interconnect

The PowerPC 7448 daughtercard is fully compatible with the RACE++ interconnect, the second generation of the RACEway switch fabric interconnect. Like its predecessor, the MPC7447A, the PowerPC CN FPGA connects the processor and memory directly to the 66.66-MHz RACEway interconnect. The RACE++ interconnect represents the most cost-effective approach to utilizing the computational power of the newer PowerPC processors, providing unmatched scalability, high communication speed, more richly connected topologies, and augmented adaptive routing.

Software

Mercury provides programming tools that simplify development and testing of real-time applications. The RACE++ Series MULTI® Integrated Development Environment (IDE) enables programmers to use familiar, mainstream tools to develop real-time processing routines:

- The MULTI IDE's integrated debug, program build, profiling, and version control facilities streamline development of complex multiprocessor software.
- Scientific Algorithm Library (SAL) provides the industry's easiest method of accessing the full power of the AltiVec vector unit. The SAL contains hundreds of image and signal processing functions optimized for AltiVec execution.
- Parallel Acceleration System (PAS™) supports the DRI industry-standard data reorganization interface for a wide variety of efficient and scalable multiprocessor communication patterns using high-level library calls.
- Trace Analysis Tool and Library (TATL™) is a minimally intrusive software logic analyzer that allows developers to visualize multiprocessor interactions. Using TATL, developers can spot bottlenecks, such as contention for shared resources or load imbalances.

Environmental		Environmental Qualification Levels		
		Air-cooled		Conduction-cooled
		Commercial L0	Rugged L1	Rugged L3
Ruggedness		•	••	•••
Moisture/dust protection		•	••	•••
Typical cooling performance		~140W*	~140W*	~150W**
Temperature	Operating*	0°C to +40°C	-25°C to +55°C	-40°C to +71°C
Operating temperature maximum rate of change		N/A	5°C/min	10°C/min
Temperature	Storage	-40°C to +85°C	-55°C to +85°C	-55°C to +125°C
Humidity	Operating*	10-90%, non-condensing	5-95%, non-condensing	5-95%, non-condensing 100% condensing
	Storage	10-90%, non-condensing	5-95%, non-condensing	5-95%, non-condensing 100% condensing
Altitude	Operating*	0-10,000ft	0-30,000ft	0-70,000ft
	Storage	0-30,000ft	0-50,000ft	0-70,000ft
Vibration	Random	0.003 g ² /Hz; 20-2000 Hz, 1 hr/axis	0.04 g ² /Hz; 20-2000 Hz, 1 hr/axis	0.1 g ² /Hz; 5-2000 Hz, 1 hr/axis
	Sine	N/A	N/A	10G peak; 5-2000 Hz, 1 hr/axis
	Shock	z-axis: 20g; x and y-axes: 32g; (11ms 1/2-sine pulse, 3 positive, 3 negative)	z-axis: 50g; x and y-axes: 80g; (11ms 1/2-sine pulse, 3 positive, 3 negative)	z-axis: 50g; x and y-axes: 80g; (11ms 1/2-sine pulse, 3 positive, 3 negative)
Salt/Fog		N/A	Contact Factory	10% NaCl
VITA 47		Contact Factory		

* Customer must maintain required cfm level. Consult factory for the required flow rates.

** Card edge should be maintained below 71°C

Storage Temperature is defined per MIL-STD-810F, Method 502.4, para 4.5.2, where the product under non-operational test is brought to an initial high temperature cycle to remove moisture. Then the unit under non-operational test will be brought to the low storage temperature. The low temperature test is maintained for 2 hours. The product is then brought to the high storage temperature and is maintained for 2 hours. The product is then brought back to ambient temperature. All temperature transitions are at a maximum rate of 10°C/min. One cold/hot cycle constitutes the complete non-operational storage temperature test. This assumes that the board level products are individually packaged in accordance with ASTM-D-3951 approved storage containers. These tests are not performed in Mercury shipping containers, but in an unrestrained condition. Please consult the factory if you would like additional test details.

All products manufactured by Mercury meet elements of the following specifications: MIL-STD-454, MIL-STD-883, MIL-HDBK-217F, and MIL-I-46058 or IPC-CC-830, and various IPC standards. Mercury's inspection system has been certified in accordance with MIL-I-45208A.

Additional Services			
Optional Environmental Screening and Analysis Services		Standard Module, Optional Services	
<ul style="list-style-type: none"> • Cold Start Testing • Cold Soak Testing • Custom Vibration • CFD Thermal Analysis • Finite Element Analysis 	<ul style="list-style-type: none"> • Safety Margin Analysis • Temperature Cycling • Power Cycling • Environmental Stress Screening 	<ul style="list-style-type: none"> • Engineering Change Order (ECO) Notification • ECO Control • Custom Certificate of Conformity (CofC) • Custom UID Labeling 	<ul style="list-style-type: none"> • Alternate Mean Time Between Failure (MTBF) Calculations • Hazmat Analysis • Diminished Manufacturing Sources (DMS) Management • Longevity of Supply (LOS) • Longevity of Repair (LOR)
Contact factory for additional information			

Some of Mercury's products are subject to the jurisdiction of the U. S. International Traffic in Arms Regulations (ITAR). Please contact your Mercury sales representative for more information.

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