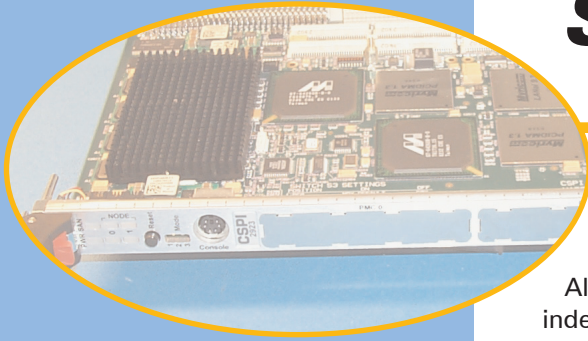


StarGate Model 2923



Combining high performance computing and I/O streaming capability on a single 6U board, the *StarGate 2923* features the computational power of the Motorola PowerPC 7457 with AltiVec™ operating at 1 GHz. The *StarGate* architecture implements two independent processing nodes. Each processing node supports two fast PCI buses (64 bit/64 MHz) enabling concurrent I/O and data processing to the SDRAM memory. One PCI bus is reserved to handle Myrinet™ data transfers, at the full duplex speed of 250 MB/s in each direction, from the LANai network processor to the VME P0 connector on the backplane. The other PCI bus supports a single PMC slot for high speed data streaming operations.

Powerful MultiComputers are easily integrated with the *StarGate* using Backplane Overlay Switch Modules, Chassis Switch Modules, and Serial Line Cards to scale the Myrinet cluster interconnect system to meet application requirements. MultiComputer applications demanding extreme compute power density and high performance I/O streams can be configured with a combination of *StarGate* and quad MultiComputer boards (four processing nodes in a 6U form factor). When compute density can be reduced to two processors per 6U slot, *StarGate* boards, with or without PMC's, are the best choice to handle I/O and processing requirements using a single board type.

Dual PowerPC per 6U Slot

PowerPC 7457 with AltiVec @ 1 GHz
 1K Complex FFT 11 Microseconds
 L2 Cache @ 1 GHz (512 KB)
 L3 Cache @ 333 MHz Data Rate (2 MB)

Two PMC Slots 64-Bit/66 MHz

Myrinet On VME (ANSI/VITA 26-1998)

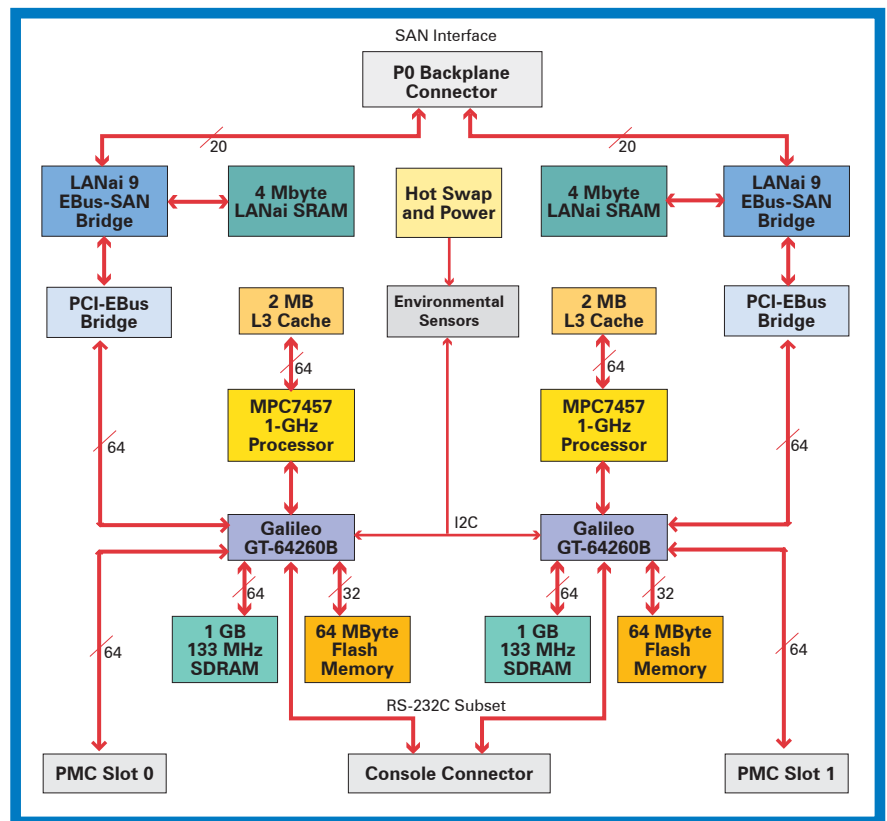
Linux & VxWorks/Tornado Development Environment

Fast Boot & Live Insertion

Power On Self Test

6U VME64 Extension (ANSI/VITA 1.1-1997)

Designed to UL, CSA, TUV, CE & FCC Class B, part 15 Regulatory Standards



MultiComputer Division

StarGate Specifications

StarGate

Model 2923

PCI Industry Standard Interface

PCI Bus	64-bit Wide @ 66 MHz
PCI Bus Bandwidth	528 MB/sec
PMC Expansion Slots	Dual IEEE P1386.1 Compliant 32/64-bit

Front Panel I/O Connectors

Serial Console

VME Bus

Power Only

COMPUTE PROCESSOR

Processor

# of Processor Elements/Nodes	2/2
1K Complex FFT	11 Microseconds per processor
Processing Model	Message Passing Between Nodes
Processor Model	MPC7457 W/AltiVec™
Internal Processor Clock	1 GHz
System Clock	133 MHz

L1 Cache

32 KB Instruction/32 KB Data

L2 Cache

on-chip 512 KB @ 1 GHz

L3 Cache

2 MB (64-bit @ 333 MHz)

SDRAM (ECC)

Memory Size	up to 1 GB per processor
Data Transfer Rate	64 bits @ 133 MHz

FLASH

Memory Size	up to 64 MB per processor
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NETWORK COMMUNICATIONS

Network Standard

Myrinet on VME (ANSI/VITA 26-1998)

Network Interface Controller

NIC Model	Myrinet LANai9
RISC Memory	2 @ 4 MB SRAM (64 bit)
RISC Clock Rate	132 MHz, Processor @ 264 MIPS
Myrinet on P0	2 SAN Ports, 500 MB/s per port (250 MB/s in, 250 MB/s out)

ELECTRICAL/MECHANICAL

Electrical Power

5.0 Volts	20.1 Watts typical
3.0 Volts	19.0 Watts typical

Packaging Standard

6U VME64 Extension (ANSI/VITA 1.1-1997)

PMC Expansion Connector

3.3 Volt Signaling @ 33/66 MHz

Board Size

Height x Depth x Width	233.4 mm (9.2 in) x 160.0 mm (6.3 in) x 19.8 mm (0.8 in)
Weight	1.17 lbs.

StarGate Software

Choice of Operating System Software

StarGate Model 2923 with VxWorks provides a total system software solution so users may quickly develop and run complex real-time applications. The foundation for this software is the industry standard VxWorks™ Real-Time Operating System (RTOS). This efficient RTOS incorporates such features as a scalable run-time kernel to conserve code space and support for many different Application Programming Interfaces (API's). Integrated communication routines support data transmission over the Myrinet fabric. TCP/IP is supported throughout the Myrinet network. This protocol permits standard services across heterogeneous processors.

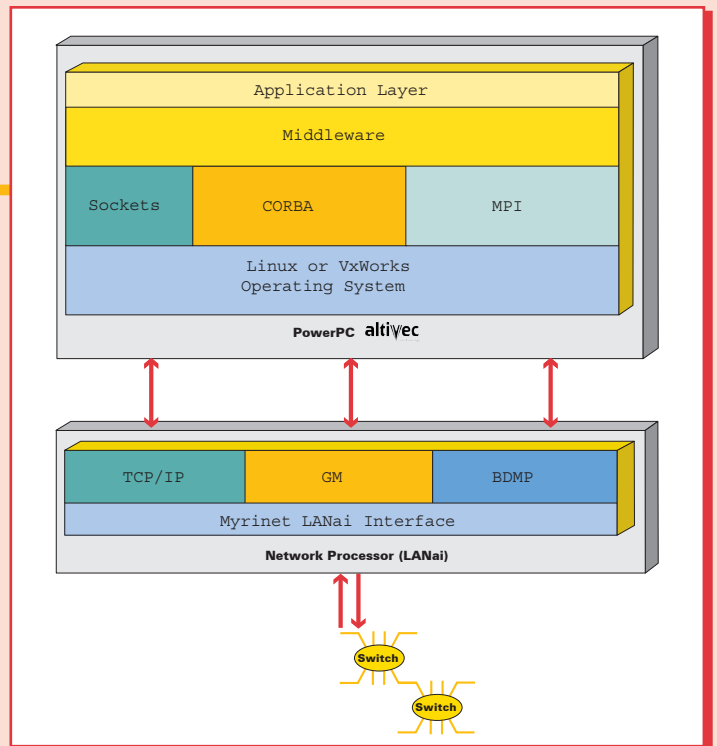
StarGate Model 2923L with Linux provides an open source UNIX like operating system environment with a POSIX implementation including true multitasking, virtual memory, shared libraries, demand loading, work load balancing, and support for TCP/IP networking. The Linux operating system is easily integrated with clustering software such as MPI and includes a full suite of GNU compiler tools to facilitate development.

MPI Development Environment

Message Passing Interface (MPI) is a standard for multicomputer and cluster message passing. The MPI parallel programming library provides multiprocessor control. The MPI library offers an easy way for the programmer to associate specific data with specific processes. The MPI library facilitates the creation of dynamically scalable applications. An application may be written for a few processing nodes for simplicity, and then easily expanded to invoke additional nodes for faster execution.

ISSPL & VSIPL Lite Signal Processing Libraries

The Industry Standard Signal Processing Library (ISSPL-ALT) is a library of approximately 250 functions for signal and image processing applications that is highly optimized for use on the Altivec. Compute-intensive functions are hand-coded to speed up execution time. The remainder of the functions use C compiled code optimized for speed. The ISSPL-ALT reduces programming complexity by providing a single calling function for complex mathematical and signal processing routines. Both development and execution times are significantly



improved. The ISSPL-ALT provides a full complement of routines to take advantage of the floating-point arithmetic capabilities of the Altivec. All routines are callable from C and C++ compiled programs to achieve rapid and efficient program development.

The Vector Signal and Image Processing Library (VSIPL) is the result of a DARPA sponsored effort to define an open, industry standard API for vector, signal, and image processing primitives targeted at embedded real-time signal processing systems.

Implemented according to the "Core Lite" profile, VSIPL is a library of 125 functions for vector-based signal processing applications. The function calls are organized into four primary categories: support functions, basic scalar operations, basic vector operations and signal processing. Support functions facilitate object creation and interaction as well as memory management. The scalar and vector operations allow the programmer to perform numerical computation on dense rectangular arrays. Signal processing functions include FFT operations, filtering, correlation and convolution.

The object-oriented design of the VSIPL API employs the concept of blocks and views to provide a level of abstraction from the memory and processor architecture of the underlying machine. A block is a contiguous area of memory used for data storage. Views are a method for classifying the data as vectors or matrices. Blocks and views are created, accessed and destroyed via library functions. Manipulating blocks and views via library functions assists the application programmer in writing code that is truly portable and compatible.

Fault Management

High availability features are implemented in all members of the product family to meet mission critical needs of scientific and commercial applications as well as the requirements of DoD applications. These features are specially designed to increase product availability, maintainability and to provide very fast recovery from component faults.

Each processing node has built-in self-test facilities to support instant start-up capabilities using local FLASH memory. This feature allows booting in a few seconds even on large scale systems.

Live insertion enables the replacement of failed processing modules without powering down the other nodes, local interconnect or the global network.

Protection from over temperature and over current conditions further enhance the ability of the StarGate products to deliver increased system availability.

Environmental (Operating) Conditions

Environmental Parameter	Level I (Standard)	Level II (Extended Temp)
Temperature Range	0° C to 40° C @ 12 cfm	0° C to 55° C @ 12 cfm
Relative Humidity	5% to 95% (non condensing)	5% to 95% (non condensing)
Maximum Altitude	10,000 ft *	10,000 ft *
Shock	15 gs @ 11 ms, half sine	15 gs @ 11 ms, half sine
Vibration (random)	0.002 g ² /Hz 10-2000 Hz	0.002 g ² /Hz 10-2000 Hz
Vibration (sinusoidal)	2 g 5-500 Hz swept sine	2 g 5-500 Hz swept sine
Storage Temperature	-40° C to 85° C	-40° C to 85° C

*Ambient Temperature, Airflow, Altitude parameters can be traded off among each other. Consult factory for information.



MultiComputer Division

(800) 325-3110 | www.CSPI.com | Email: info@cspi.com

Product Reliability

CSPI maintains its reputation as a leader in the development and manufacture of quality MultiComputers and signal processing equipment. Our products operate reliably in diverse environments such as truck-mounted systems in the Alaskan wilderness and the Saudi Arabian desert, and in mission critical aircraft carriers and submarine systems.

The high reliability of CSPI products results from dedicated work in six critical areas: ISO certification, adherence to standards, manufacturing procedures that meet the guidelines of IPC-A-600, testing to a wide range of environmental acceptance criteria, maintaining a life history database and performing operational burn-in.

Warranty, Maintenance, & Customer Service

CSPI manufactured hardware products are covered by a return-to-factory warranty for one year from the date of shipment. If an item is found to be defective, it will be replaced or repaired. An optional extended warranty can be purchased to increase the warranty period to two years from the date of shipment. Out of warranty service is available on a time and materials cost basis.

CSPI software products are covered by a 90 day warranty from the date of shipment. Software support includes technical hot-line support, patches, bug fixes and version upgrades. An optional extended warranty can be purchased to increase the warranty period to one year from the date of shipment. Out of warranty service is available on a time and materials cost basis.

For more information on the warranty programs contact your local Sales Manager or call CSPI MultiComputer at **1-800-325-3100**.