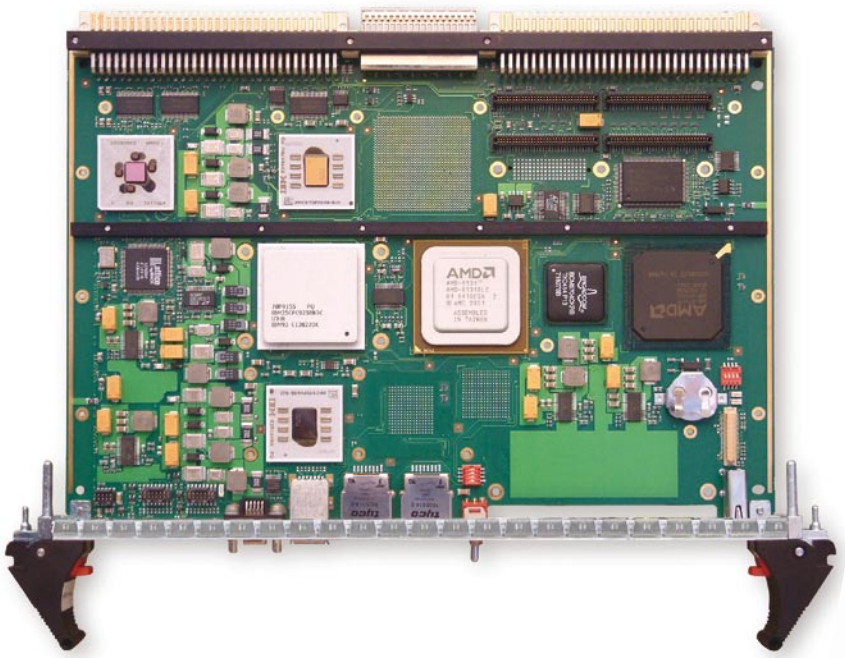
PowerNode5

First VME PowerPC 970 Rugged Blade Computer





- Dual PowerPC 970FX at 1.6 GHz
- Outstanding Memory Bandwidth (6.4 GB/s)
- Onboard Serial RapidIO Switch Fabric (400 MB/s per link)
- Air Cooled and Conduction Cooled Versions
- Linux 2.6.9 SMP and VxWorks 6.2 Support
- Binary Compatible with IBM JS20 Blade
- Enhanced Software Productivity

Product Overview

The PowerNode5 is a major leap forward in Kontron's technological excellence. As the PowerPC™ experts, we continue to lead the evolution of PowerPC technology by providing the next level of high performance computing based on IBM PowerPC 970FX technology. The PowerNode5 is a rugged 6U VME version of IBM JS20 blade design. This new product provides an extremely high level of performance and full binary compatibility with IBM JS20 blades servers, in a form factor fully adapted to any of today's embedded system requirements.

PowerNode5: Outstanding Performance for Demanding Signal Processing Applications

The PowerNode5 features the latest PowerPC 970FX from IBM, delivering 1.6 GHz performance with less than 20W of power dissipation. Manufactured using IBM Silicon-On-Insulator (SOI) process technology, this new PowerPC 970FX features an AltiVec™ compatible SIMD vector unit preserving the legacy software investments of G4 PowerPC users.

Leading Edge Architecture

In addition to its two PowerPC 970 processors, the PowerNode5 is powered by a brand new architectural concept, based on low latency, high data bandwidth Hypertransport and Elastic Interface buses. This breakthrough architecture allows the PowerNode5 to maximize system throughput performance.

Designed for Harsh Environments

The PowerNode5 is available in both commercial Standard Air cooled grade (SA version, 0° to 55°C) and Rugged Conduction-cooled grade (RC version, -40° to +85°C). The rugged RC version is a COTS product for harsh environments based on the SA version and offers BSP binary compatibility thus reducing both project cost and time to market.

U3H High-Performance Host Bridge

The U3H north bridge is a server class host bridge interconnecting the 2 processors with the memory and the I/O subsystem. The elastic interface provides each processor with a 32 bit bidirectional data path running at 800 MHz. The DDR memory is 128 bits wide with ECC and operates at 333 MHz. The I/O subsystem is structured around a 16-bit high speed hypertransport interface, feeding 2 independent PCI/PCI-X buses, including a PMC site, a dual gigabit Ethernet controller, a VME bridge, a RapidIO bridge, and a south bridge.

Onboard RapidIO Switch Fabric

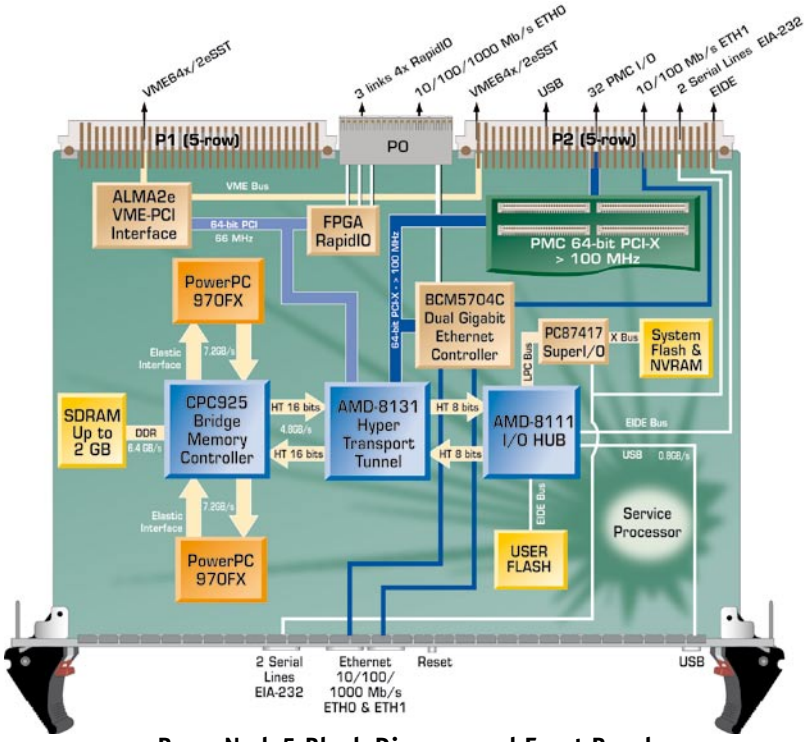
A serial RapidIO interface is provided onboard. It allows multiple PowerNode5 to be interconnected to other CPU cards, building powerful multiprocessor systems. Each node boasts its own distributed switch fabric preventing single system points of failure. Three 4x links, through P0, are available with a maximum peak bandwidth of 400 MB/s.

Software Offering/ Productivity

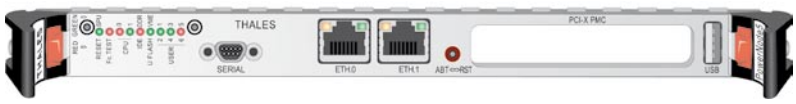
The PowerNode5 is designed for symmetric multiprocessing applications. Dual independent frontside buses allow each processor to handle its own tasks at maximum speed with minimal interruption. With its Linux SMP BSP, both CPUs are seen from the application standpoint as a single, powerful processor enabling the developer to manage complex multiprocessor technical challenges. In addition to Linux BSP, a VxWorks BSP is also available, providing the right solution to any tricky real time situation.
Finally, in order to improve our end-user software productivity, the PowerNode5 is also running Gedae workbench tools. Gedae development environment provides all the capability required to develop application graphs and validate their functionality.

Single-Source Customer Service

Leveraging more than 20 years of product development and customer support in embedded computering, Kontron offers a wide range of integration and maintenance services, from the delivery of fully tested, integrated systems to extended warranties and Long Terms Support. Kontron offers one-stop-shop delivery of all your system, SBC, chassis and PMC needs.



PowerNode5 Block Diagram and Front Panel



Technical Information

PowerPC 970FX Processor
- PowerPC Processor
- Two superscalar PowerPC 970FX processors operating at 1.6 GHz (even for conduction cooled version)
- 64 KB direct-mapped instruction cache 32 KB 2-way set associative data cache
- 512 KB L2 cache clocked at full CPU speed
- AltiVec vector unit
- Two floating point unit

DDR Memory
- 512 MB or 1 GB DDR memory clocked at 333 MHz with ECC

Flash Memory
- User Flash: 128 MB of contiguous directly-accessible, 32-bit wide Flash memory for OS and application code
- System Flash: 8 MB Flash device

Service Processor
- 32-bit integrated service processor
- Board power up sequence
- Monitoring services (thermal, voltages, backplane, chassis)

PCI Interface
- One PCI-X interface (master/slave with burs capability). This PCI bus is designed for connecting PMCs and provides a high bandwidth 64b/100 MHz interface.

Serial Lines
- Two simplified asynchronous serial lines (Rx, Tx) are implemented and available on the front panel and P2 connector.

USB Ports
- Two USB 1.0 ports (one on front panel and one on P2) are available.

ALMA2e VME Interface

Programmable 2eSST support:
- A32/64 - D64 2eSST
- A32/64 - D64 broadcast 2eSST

modes available at 150 MB/s throughput. ALMA2e enables SST160, SST267 and SST320 up to 320 MB/s peak. The PowerNode5 current implementation results in a PCI 64 peak rate of 180 MB/s (150 MB/s sustained)
- Managed by the ALMA PCI-to-VME bridge component, a highly integrated low-power, single-chip solution
- VME64 ANSI/VITA-1 1994 compliant
- VMEbus system controller
- VMEbus requester (Level 1-4)
- VMEbus interrupter and interrupt handler (IRQ1-7)
- VMEbus master/slave A32, A24, A16 : D32, D16, D8, UAT
- VMEbus master/slave A32, A24 : D32BLT, D64MBLT
- Programmable VME slave image base address and size (8 VME slave channels)
- PCI-to-VME access conversion with 8 MB granularity mapping table
- Transmit/Receive FIFOs
- Programmable posted write, prefetch read, coupled mode
- Programmable BB2BLT mode: mapping of multiple single PCI accesses to a VMEbus BLT/MBLT cycle
- Semaphore registers
- VME/PCI 2 channels DMA controller
- Hardware watchdog feature

Ethernet

Two 10/100/1000BASE-T Ethernet ports are implemented. Both ports are available on the front panel or on the P0/P2 depending on the selected manufacturing option.

Onboard RapidIO

Three 4x serial RapidIO links through P0 connector are implemented. This fabric features an onboard distributed switch that allows system designers to build low latency, high bandwidth network with a maximum aggregate throughput of 1.6 GB/s.

Board Support Packages

BSPs are available for both the VxWorks RTOS 6.2 release which supports one kernel by processor and is compatible with development environment Workbench 2.4, and SMP Linux kernel 2.6.9.

Product Warranty and Services
- All of Kontron´s hardware products are covered by a two-year return-to-factory warranty.
- Several service programs are available, including hardware and software update services, product repair and exchange services, and either on-site or remote technical assistance. In addition to its standard support services, Kontron offers customized consultation to system integrators.
- ISO 9001: Kontron´s ISO 9001 certification is just another way for us to back our commitment to quality products and customer service.

Miscellaneous
- Board size: 6U: 233.3 mm x 160 mm
- Conduction-cooled version is IEEE 1101.2-1992 compliant and is a single VME slot solution.
- Electromagnetic compatibility:
  NF EN 55022 Class B
  NF EN 50082-2
- All Kontron boards are EC-compliant.

CPU	
Processor	Two PowerPC 970FX
Clock Frequency	1.6 GHz (for both SA and RC versions)
MIPS	12 GFlops per processor
Memory	
Global Memory	512 MB or 1 GB (DDR at 333 MHz)
ECC	Standard
ROM Memory	8 MB System Flash Memory
	128 MB User Flash

VME Interface

- ALMA2e V64 and **2eSST** VME/PCI bridge with semaphore registers
- 5-row connectors

PCI Interface (PMC 1)

- PCI-X compliant (64 bits)
- 1 PMC slot
- 100 MHz frequency

Miscellaneous

- EIDE feature through P2 connector
- Three 4x RapidIO links through P0
- 2 EIA-232 on P2 and front panel
- 2 10/100/1000 Ethernet Ports
- NVRAM/RTC
- 2 USB 1.0 Ports (one on front panel and one on P2)

Power Requirements

Typical: 75W (requires 3.3V supply from backplane) Maximum: 85W

Environmental Specifications	SA Standard Commercial	RC Rugged Conduction-Cooled
Conformal Coating	Optional	Standard
Airflow	2.5 m/s	NA
Temperature	VITA 47-Class AC1	VITA 47-Class CC4
Cooling Method	Convection	Conduction
Operating	0° to +55°C	-40° to +85°C
Storage	-45° to +85°C	-45° to +100°C
Vibration Sine (Operating)	20/500 Hz: 2g	20/2,000 Hz: 5g
Random	VITA 47-Class V1	VITA 47-Class V3
Shock (Operating)	20g/11 ms Half Sine	40g/20 ms Half Sine
Altitude (Operating)	-1,640 to 15,000 ft	-1,640 to 50,000 ft
Relative Humidity	90% without condensation	95% without condensation

Ordering Information

		PN5 SA	PN5 RC								0	
Environnement Class	Standard (Air)	X		SA								
	Rugged Conduction-Cooled		X	RC								
SDRAM	512 MB	X	X		0							
	1 GB	X	X		1							
Onboard RapidIO	NO	X	X			0						
	YES	X	X			1						
Ethernet	2 GigaETH on front panel	X					0					
	1 GigaETH front + 1 10/100 ETH on P2	X					1					
	1 GigaETH P0	X	X				2					
	2 10/100 ETH on P2	X	X				3					
	1 GigaETH on P0 + 1 10/100 ETH on P2		X				4					
I/O Routing	EIDE on P2	X	X					0				
	PMCs I/O on P2	X	X					1				
Overall Dimension	2 VME Slots SA/ 1 VME Slot RC	X	X						0			
	1 VME Slot SA	*							1			
Max. Operating Temperature	SA: 55°C/ RC: 85°C	X	X							0		
(RC Boards only)	71°C		X							1		
											0	
Coating		X	X									V

Add code V only when not default

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