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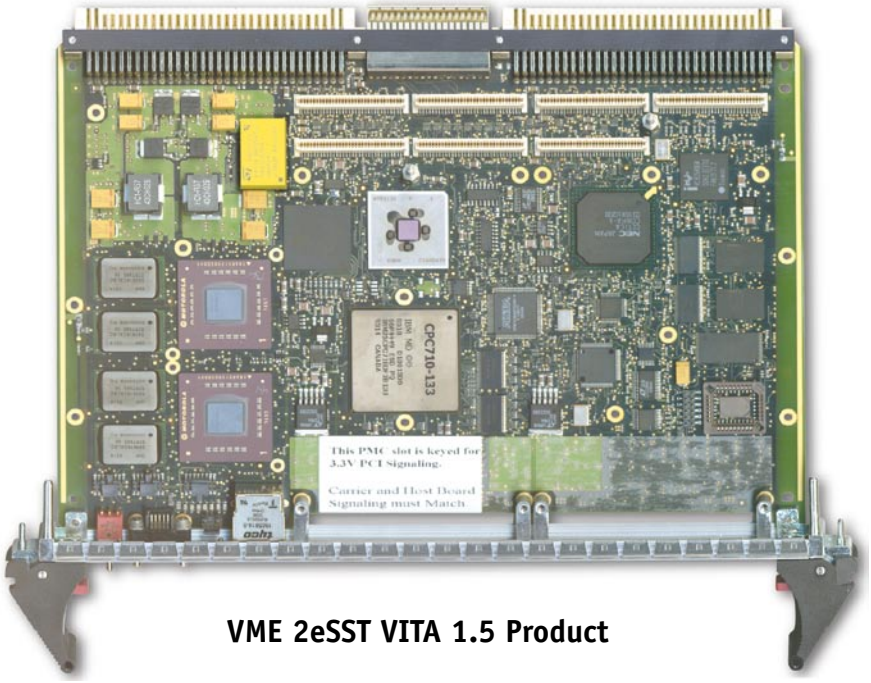
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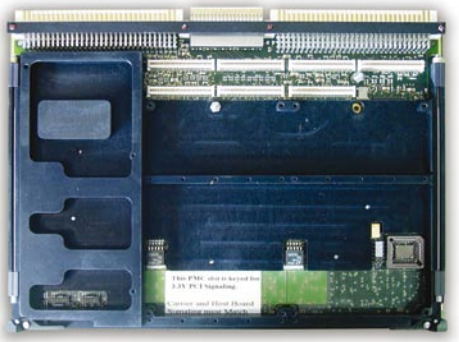
Find the *Kontron / Thales PowerNode 3* at our website: ***Click HERE***

PowerNode3

Low Power Dual 1 GHz G4+ VME Board



VME 2eSST VITA 1.5 Product



- Outstanding Computing Performance and Improved Connectivity
- Two PCI Mezzanine Card Sites
- 512 KB Internal L2 Cache Clocked at Processor Frequency
- 2 MB Onboard L3 Cache per Processor + 2 MB private SRAM
- VME 2eSST (150 MB/s) Capability
- Rugged Version available for Harsh Environment Applications
- Optional SCSI PMC for Improved Connectivity
- Optional Serial RapidIO PMC Switch Fabric

Product Overview

The PowerNode3 is a major leap forward in Kontron´s technological excellence. As the PowerPC™ experts, we continue to track the evolution of PowerPC technology, and we provide a high-performance Computing Node based on the latest PowerPC G4+ technology, breaking the 1 GHz barrier.
With its AltiVec vector processing unit, the PowerPC 7457 (G4+) is ideally suited for Signal Processing functions and leading-edge computing. It combines outstanding and unprecedented performance level with low power dissipation. Compared to any 7455 solutions, the 7457 processor allows a dual 1 GHz application to fit into severe embedded VME thermal constraints. In addition, the PowerNode3 meets Kontron´s technology insertion policy which offers customers a clear performance upgrade path while protecting long-term investments in application software.

PowerPC G4+ 7457: Outstanding Performance for Demanding Signal Processing Application

The PowerNode3 features the latest PowerPC G4+ 7457 from Motorola, delivering 1 GHz performance with less than 8W.
Manufactured using Motorola's Silicon-On-Insulator (SOI) process technology, the new MPC7457 represents an optimal high-performance choice for power dissipation-sensitive applications. The processor is designed to reach speeds up to 1.3 GHz with a core voltage of 1.3V and includes 512 KB of onchip L2 cache (a 2x increase over the MPC7455's L2 cache) with support for up to 2 MB of backside L3 cache and 2 MB of private SRAM.

ASIC Innovation for Better Performance, Seamless Software Upgrade and Long-Term Support

To maintain an innovative edge, Kontron aligns itself with key organizations and industry leaders. Our close development partnership with IBM has given Kontron early access to the latest chip designs and has resulted in jointly-designed ASICs for optimizing onboard resource access.

AVIGNON High-Performance Host Bridge

AVIGNON, the host bridge (part number CPC710), benefits from the accumulated experience of both partners since the beginning of the PowerPC. It performs as a crossbar between the processors, the main memory, and the PCI busses. This crossbar function is a key to implementing a high-performance computing node.

ALMA2e Low Power VME Bridge

ALMA2e is the PCI/VMEbus bridge that interfaces the PCI bus of Avignon with the VME 2eSST and/or VME64 bus with an outstanding sustained performance of 150 MB/s. Furthermore, due to its small die size, ALMA2e surpasses the competition for low power designs.

COBRA Real-Time Board Controller

COBRA is dedicated to the control of interrupts and other real-time functions. The interrupt controller features an OpenPIC compliant device including multiprocessor support.

Leading Edge Architecture

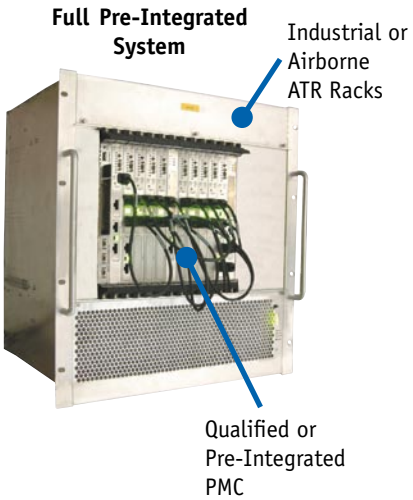
Memory: The PowerNode3 features a unique memory architecture with the highest available bandwidth. In a dual G4+ architecture, the highest possible bandwidth from the memory sub-system is needed to constantly and efficiently feed the multiple Altivec engines in every PowerPC G4+.
The symmetrical topology of the PowerNode3 memory subsystem offers the highest bandwidth and latency capabilities required when processing large amounts of data simultaneously from both G4+s. Acquisition can be performed directly into a shareable area of the main memory, and each G4+ can immediately start to work concurrently on the data set without any unnecessary buffer copies. This is by far the lowest possible latency for critical complex algorithms such as distributed and collaborative signal processing applications (e.g. beam forming).
I/O: Two PCI busses allow Avignon to manage two data flows concurrently. Combined with high-performance networking PMCs, it allows versatile configurations to meet the various requirements of complex data-flow architectures.

Software Offering

With the increased computing power and the versatility of the PowerPC G4+, it is now possible to use COTS hardware and software to build innovative solutions to handle signal processing applications such as sonar, radar and medical imaging. But brute force number crunching is not enough to deliver a complete working system with dozens of VME G4+ boards and associated PMC I/O links. To lower the time-to-market for such complex systems, Kontron designed PowerLine, a set of tools that covers key areas: low-level message passing with DDlink VI and a full machine supervisor in the system.

Single-Source Customer Service

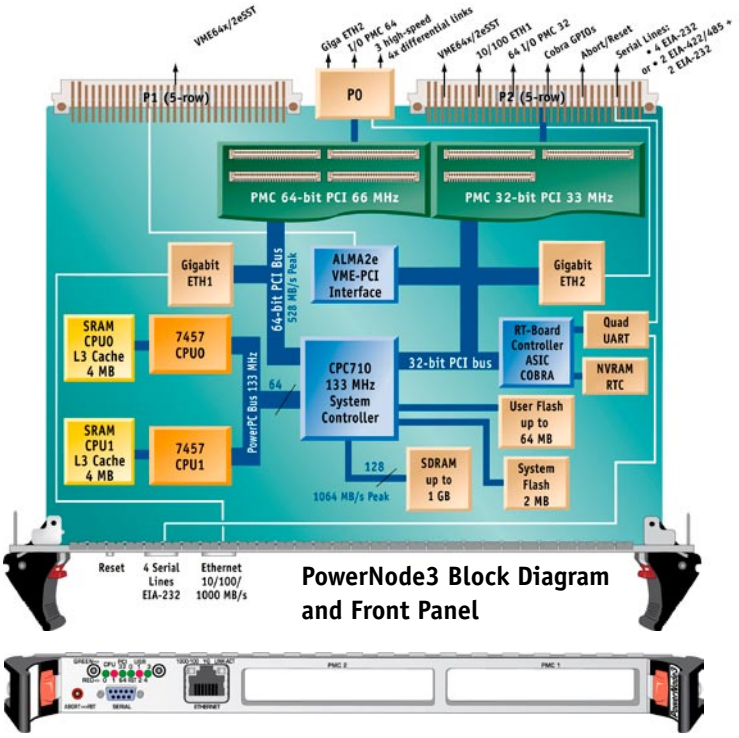
Leveraging more than 15 years of new product development and customer support in embedded and rugged computers, Kontron offers a wide range of integration and maintenance services, from product warranty and start-up assistance to the delivery of fully tested preintegrated systems and one-stop-shop delivery of qualified racks and PMCs.



Technical Information

PowerPC Processor

- PowerPC processor
- One or two superscalar PowerPC 7457 processors operating at 1 GHz
- L1: 32 KB instruction cache and 32 KB data cache per processor
- L2: 512 KB clocked at full CPU speed
- Four instructions per clock cycle
- Dynamic branch prediction
- Multiple integer units
- Memory Management Unit (MMU)
- 64-bit data bus
- JTAG interface for ICE tools
- Low power implementation
- AltiVec™ vector unit



PowerNode3 Block Diagram and Front Panel

Cache Memory

L3 2 MB cache memory per processor supports high-performance transfers on the dedicated L3 Bus-1.8 GB/s + 2 MB of private SRAM.

SDRAM Memory

- 128, 256, 512 MB or 1 GB of onboard SDRAM with ECC
- Double bank memory management handled by the IBM CPC710 host bridge

Flash Memory

- User Flash: Up to 64 MB of contiguous directly-accessible, 32-bit wide Flash memory for OS and application code
- System Flash: 2 MB Flash device

PCI Interface

Two PCI interfaces (master/slave with burst capability) are implemented on the PowerNode3:

- The first PCI bus provides a high-speed backbone for local interconnect (Host Bridge, VME Bridge, PMC slot) and is fully compliant to the PCI Specs- Rev.2 (32-bit/33 MHz, option 44 MHz).
- The second PCI bus is designed for connecting PMCs and provides a Rev. 2 standard 64-bit PCI interface that can operate at 33 or 66 MHz.

The PowerNode3 can maintain concurrent bus operations on two PCI busses using the uniquely optimized IBM CPC710 host bridge. This crossbar allows applications using PCI to operate efficiently in parallel, doubling available throughput.

Kontron Dedicated Real-Time I/O Controller: COBRA

The COBRA chip brings a highly integrated single chip solution to control interrupts by providing up to 32 I/O device interrupt inputs and 4 interprocessor interrupts. Kontron´s COBRA technology is also optimized for real-time applications and offers:

- Connection to PCI bus Rev. 2 (slave mode)
- ISA-like interface for serial ports
- Large non-volatile memory interface (NVRAM, Flash, etc.)
- Optimized message passing with four high-density FIFOs
- General purpose I/Os (four on VME P2)
- Four highly programmable 32-bit global timers

Serial Lines

Four simplified (Rx,Tx) EIA-232 ports are implemented using the TL16C754 component.
As an option (enabled by firmware) two simplifed (Rx,Tx) EIA-422/EIA-485 lines are also available on P2 connector.

Debug

Extra connectors interface ICE/JTAG tools to any of the two processors. A specific cable can be used in development for easy connection to standard cables.

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 PowerNode3 current implementation results in a PCI 32 peak speed 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 through 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

High-Speed Differential Links

Three differential 4x high-speed links are routed to P0 backplane, following PICMG 2.17/2.18, enabling the PowerNode3 to be interconnected to switch fabric technologies based on LVDS standard at a sustained throughput up to 622 MB/s.

Ethernet

Two 10/100/1000BASE-T Ethernet ports are implemented. One is routed to the front panel (RJ-45) or P2 (selected as a manufacturing option) and the other is routed to P0.

Firm Plug System

Dedicated rigid bars enable a firm connection and increase reliability.

Serial RapidIO PMC

An optional serial RapidIO switch fabric PMC allows the end user to build high performance, scalable and non blocking multriprocessor calculators. This RapidIO PMC features four front panel ports and three P0 links (for rugged applications) providing up to an outstanding 400 MB/s throughput per link.

SCSI PMC

This computing node product benefits from a powerful and reliable storage feature by adding this dedicated SCSI PMC. This PMC both features a front and a rear connection, up to 40 MB/s throughput.

PBIT, IBIT

Automatically triggered at power up, PBIT executes several simple checks of main board functions before launching the debug monitor.
IBIT can then be executed, on demand, by using the "auto" firmware command. IBIT executes a comprehensive suite of functional tests and leaves results in the main DRAM of the board. These IBIT tests cover more than 95% of the board's functional nodes. These test results can be read back by the board's operating system or collected by the rack supervision board.

Board Support Packages

BSPs are available now for both LynxOS and VxWorks RTOS. Kontron provides real-time OS extensions for the PowerNode3 that facilitate development of high-end realtime data and signal processing applications on multiprocessor clusters (see PowerLine data sheet).

VSIPL Signal Processing Library

The VSIPL Signal Processing Library is becoming the de facto standard library allowing portability across different brands of platforms.
Kontron has optimized such a library, called VSI/Pro®, on the PowerPC 7410 and 7457 processors. VSI/Pro® enables developers to easily map complex algorithms onto multiprocessor architectures and fully optimize the AltiVec vector unit of the PowerPC 7457.

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 update services, hotline access, product repair and exchange services, technical assistance, on-site or remote technical assistance.
- ISO 9001: Kontron´s ISO 9001 certification is just another way for us to back our commitment to quality products and customer service.

Finally, in addition to its standard support services, Kontron offers customized consultation to system integrators.

Miscellaneous

- Board size: VME double Eurocard (6U: 233.3 x 160 mm)
- Single VME slot
- Convection-cooled version carries the Ruggedizer but keeps the front panel I/O.
- 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.

Technical Information

CPU	
Processor	One or two PowerPC 7457 (G4+)
Clock Frequency	1 GHz
MIPS	7.4 GFlops per processor
Memory	
Global Memory	128, 256, 512 MB, or 1 GB onboard
ECC	Standard
Cache Memory	2 MB per processor + optional 2 MB private SRAM (on dedicated bus)
ROM Memory	2 MB System Flash Memory Up to 64 MB User Flash

VME Interface

- ALMA2e V64 and 2eSST VME/PCI bridge with semaphore registers
- A32/A24/A16 master slave
- D64 (MBLT)/D32 (BLT)/D16/D08 master/slave
- 5-row connectors

PCI Interface (PMC 1)

- PCI R2 compliant (32 bits) 5V and 3.3V signaling
- 1 PMC slot
- 33 MHz frequency (44 MHz option available)
- DMA Engine: DRAM <=> PCI

PCI Interface (PMC 2)

- PCI R2 compliant (32/64 bits) 3.3V signaling
- 1 PMC slot (up to 3 with carriere card)
- 33 or 66 MHz selectable PCI frequency
- DMA Engine: DRAM <=> PCI

Miscellaneous

- 4 asynchronous EIA-232 serial lines on front panel
- 2 EIA-422/485 (optional) on P2 (no modem signals)
- 2 10/100/1000 Ethernet Ports
- NVRAM/RTC

Typical Power Requirements*

	Single (23W)	Dual (35W)
+ 5V (+5%, -2.5%)	1.8A	3.7A
+ 3.3V (+5%, -2.5%) (requires 3.3V supply from backplane)	4.2A	4.2A

* Maximum power requirements: 45.5W for Dual and 29.5W for Single

Environmental Specifications				
	SA Standard Commercial	**WA** Extended Temperature	**RA** Rugged Air-Cooled	**RC** Rugged Conduction-Cooled
Temperature				
Airflow	1.2 m/s	1.5 m/s	1.8 m/s	NA
Operating	0° to +55°C	-20° to +65°C	-40° to +75°C	-40° to +85°C
Storage	-45° to +85°C	-45° to +85°C	-45° to +100°C	-45° to +100°C
Conformal Coating	Optional	Standard	Standard	Standard
Relative Humidity	no condensation 90%	95% 10 cycles 240 hours	95% 10 cycles 240 hours	95% 10 cycles 240 hours
Mechanical				
Vibration Sine	5-200 Hz - 2g Peak	5-200 Hz - 2g Peak	5-2000 Hz - 2.5g Peak	5-2000 Hz - 5g Peak
Vibration Random	0.01 g^2/Hz 10-40 Hz 0.0007 g^2/Hz 100-200 Hz 0.00005 g^2/Hz 2000 Hz		0.04 g^2/Hz with a flat response to 1,000 Hz 6 dB/Oct roll-off from 1 KHz-2 KHz	0.1 g^2/Hz
Shock	10g Peak 16 ms Half Sine Pulse		40g Peak 20 ms Half Sine Pulse	
Bumps			40g Peak 6 ms Half Sine Pulse 3 bumps/sec and 1,000 bumps/direction	
Altitude	-1,000 to 15,000 ft	-1,000 to 33,000 ft	-1,000 to 33,000 ft	-1,000 to 50,000 ft

Ordering Information

		VEGA-																
		SA	WA	RA	RC				0							00		
Processors	Single	X	X	X	X	1												
	Dual	X	X	X	X	2												
Environnement Class	Standard (Air)	X					SA											
	Extended Temperature (Air)		*				WA											
	Rugged Convection-Cooled (Air)			*			RA											
	Rugged Conduction-Cooled				X		RC											
Clock Speed CPU Bus	1000 MHz / 100 MHz	X	X	X	X			8										
	1000 MHz / 133 MHz	X						A										
									0									
SDRAM	128 MB	X	X	X	X					1								
	256 MB	X	X	X	X					2								
	512 MB	X	X	X	X					3								
	1024 MB	X	X	X	X					4								
Flash	No Flash	X	X	X	X						0							
	32 MB	X	X	X	X						1							
	64 MB	X	X	X	X						2							
PMC 32 slot VIO Key	5V	Default										0						
(PCI signaling voltage)	3.3V	X	X	X	X							1						
First Ethernet link (ETH1)	Front Panel	Default											0					
	Ethernet routed to backplane	X	X	X	Default								1					
L3 cache (+ static RAM)	L3 2 MB	Default												0				
	Private SRAM 2 MB (4 MB total)	X	X	X	X									1				
																00		
Coating		X	Default														V	

Add code V only when not default

* Contact Kontron

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