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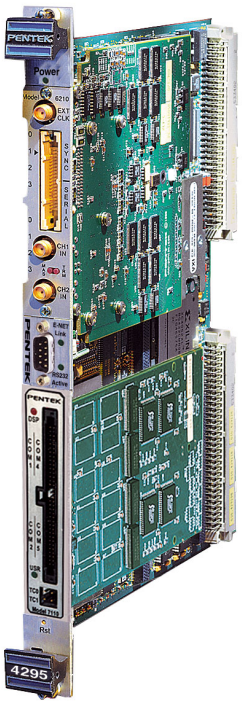
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Model 4295

Quad MPC7410 PowerPC Processor PMC/VIM - VME



General Information

The Model 4295 Quad G4 PowerPC targets embedded applications requiring high-performance interfaces. Featuring four Freescale MPC7410's, the Model 4295 supports numerous high-speed interfaces including VIM, PMC, RACEway, VME64 and Ethernet.

MPC7410 AltiVec Processor

As one of the G4 RISC processors in the PowerPC family, the Freescale MPC7410 utilizes the AltiVec vector engine to perform parallel processing of multiple data elements (SIMD) with 128-bit operations. The AltiVec processor executes both fixed- and floating-point instructions, augmenting the separate integer and floating-point units on the chip.

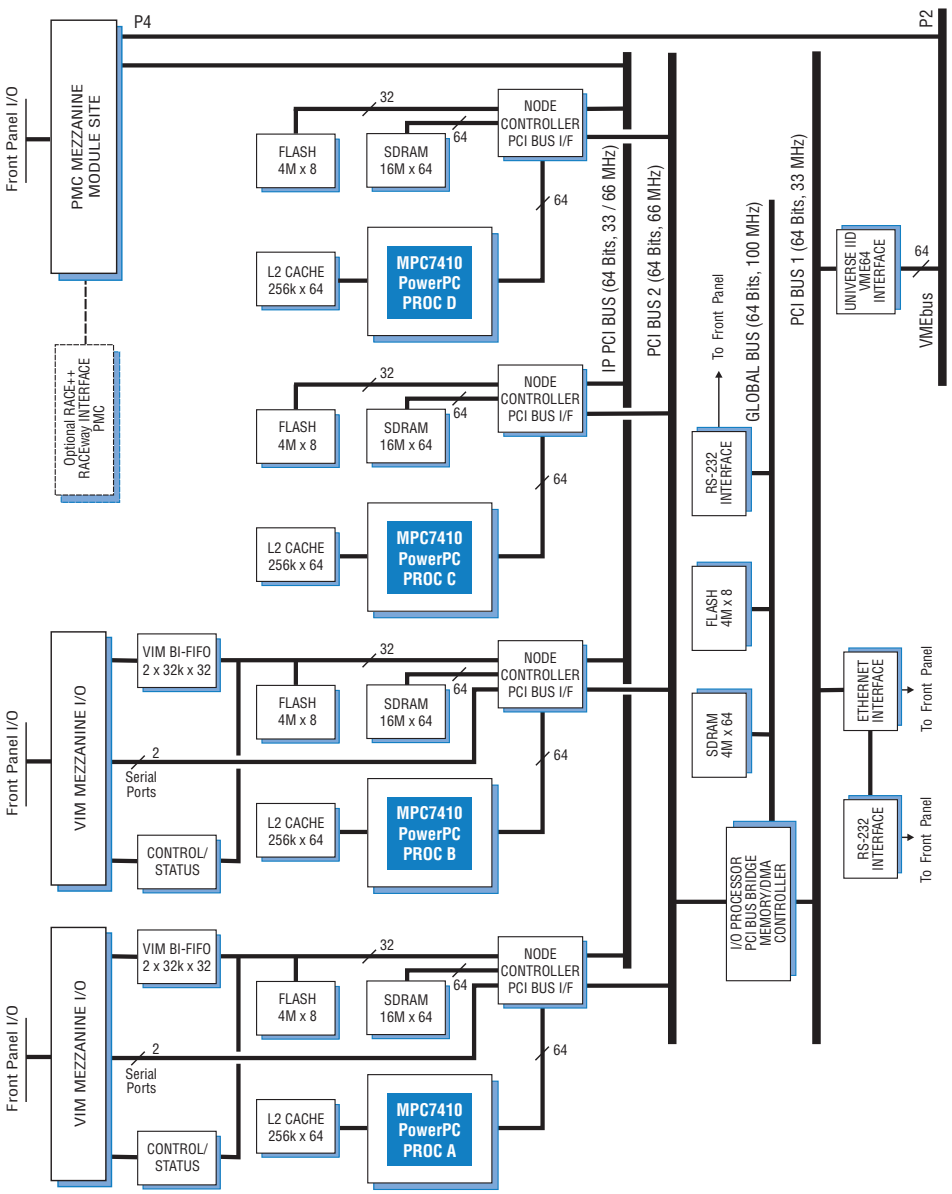
Overall Circuit Description

Four processor nodes contain interface and memory resources ideally matching the raw processing power of the MPC7410 to the I/O demands of high-performance system components.

Each of the four nodes includes local memory and access to shared global resources and interfaces.

VIM Mezzanine

Two processors are equipped with their own VIM (Velocity Interface Mezzanine) connector, providing a private high-speed synchronous bidirectional FIFO (BI-FIFO) which buffers 32-bit parallel data transfers between the mezzanine module and the MPC7410. The VIM architecture allows ➤



Features

- Four Freescale MPC7410 G4 PowerPC processors
- Floating-point AltiVec vector processing engine
- 400/500 MHz clock speed
- Four 2 MB L2 cache memories
- Four 32 MB or 128 MB SDRAMs
- High-performance PMC and VIM mezzanine module sites
- PMC module site
- Triple 64-bit PCI bus
- VME64 master/slave interface
- Optional 267 MB/sec RACE++ interface

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Support Software

Pentek **VxWorks BSPs and Drivers** provides software developers with a complete library of hardware initialization, control and application functions. Used in conjunction with Wind River's **Tornado II** software development environment, it speeds application development.

MPI Software Technology's **VSI/Pro** is an implementation of VSIPL scientific and engineering functions optimized for the PowerPC.

TimeSys Linux RTOS, aimed specifically at embedded applications, delivers the flexibility of a royalty-free commercial Linux distribution, a true single-kernel Linux RTOS, "Ready to Run" delivery, and a complementary, integrated family of development tools, including the TimeSys **TimeStorm** Integrated Development Environment (IDE) and **TimeTrace** diagnostic tool for determining solutions to system problems.

Ordering Information

Model	Description
4295	Quad MPC7410 PowerPC Processor PMC/VIM - VME
Options:	
-005	RACE++ Interface
-300	400 MHz Processor Clock
-304	500 MHz Processor Clock
-320	16 kB VIM BI-FIFO
-321	32 kB VIM BI-FIFO
-340	128 MB local SDRAM (32 MB std.)

➤ simultaneous I/O data transfers to both processors with no contention for shared resources. Control and status registers on the VIM modules can be read and written to as memory mapped resources of the MPC7410. Dual serial ports provide an additional data streaming connection between each processor node and its associated VIM module.

PMC Site

In addition to accommodating Pentek's broad range of VIM I/O peripherals, Model 4295 incorporates a PCI Mezzanine Card (PMC) module site, which accepts industry-standard modules for a wide variety of interface and communication functions. The PMC module is accessible from all four MPC7410's and from the VMEbus.

Local Memory

Three types of local memory resources are provided for each MPC7410: a fast 2 MB level 2 cache, a large 32 MB SDRAM (128 MB optional), and a nonvolatile 4 MB FLASH memory for initialization, self-test and boot code.

PCI Bridge and Memory Controller

The Model 4295 architecture includes a PCI bridge and SDRAM memory controller that also includes a powerful DMA engine useful for moving data between resources on the board. Two of the three 64-bit PCI buses on the 4295 are connected to this device. One PCI bus provides access from each of the four processor node controllers to global SDRAM, global FLASH memory, an RS-232 serial port and other global resources located on the second PCI bus. This bus features interfaces for VMEbus, Ethernet, a second RS-232 port and RACEway.

Interprocessor PCI Bus

An additional 64-bit PCI bus provides dedicated interprocessor communication as well as a path to the PMC site. This creates a path between processors or processors and a PMC module, allowing data transfers of up to 528 MB/sec, independent of all other board resources.

PCI Master Interface

Each MPC7410 can master both PCI buses for read/write access to each SDRAM memory in all four processor nodes, Ethernet, RS-232, RACEway, and VMEbus.

VME64 Interface

All four MPC7410s can master the VMEbus using the industry standard Universe II VME64 interface chip. As a VMEbus slave, the Model 4295 presents all four processor node SDRAM memories for convenient read/write access from any VMEbus master.

Optional RACE++ PMC

Delivering up to 267 MB/sec between VME boards, the optional RACE++ PMC occupies the PMC site and allows all four processors to send and receive RACEway packets. The RACE++ option maintains the board's one VMEbus slot configuration while accommodating a VIM-2 module.

Specifications

Processor Node Resources: 4 total
- **Processor:** Freescale MPC7410
- **Processor clock:** 400/500 MHz
- **Level 2 cache:** 256k x 64
- **SDRAM:** 4M x 64; 16M x 64 optional
- **FLASH:** 4M x 8
- **Mezzanine (Nodes A & B):** VIM site
- **VIM BI-FIFO (Nodes A & B):** 2 x 1k x 32; 2 x 16k x 32 optional; 2 x 32k x 32 optional max.

PCI Bus 1:
- **Width:** 64 bits
- **Speed:** 33 MHz

PCI Bus 2:
- **Width:** 64 bits
- **Speed:** 66 MHz

Interprocessor (IP) PCI Bus:
- **Width:** 64 bits
- **Speed:** 33/66 MHz

Global Resources:
- **Global SDRAM:** 4M x 64
- **VME64 Interface:** Tundra Universe II master/slave, slot 1 controller
- **Serial I/O:** RS-232 front panel port
- **PMC Module Site:** 64 bit, 33/66 MHz, 3.3/5 V
- **Ethernet:** 10/100 BaseT front panel port

Size: standard 6U VMEbus board, single slot; board 160 mm (6.3 in.) x 233.5 mm (9.2 in.), panel 0.8 in. wide

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