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Enhanced Pentium Processor-Based VMEbus CPU

- Pentium® processor-based CPU – 133 and 166 MHz versions, 200 and 233 MHz Pentium processors with MMX™
- External (L2) cache – 512 Kbyte synchronous burst SRAM
- Up to 256 Mbyte DRAM with or without parity using 72-pin SIMMs
- 64-bit PCI SVGA controller with 2 Mbyte video DRAM
- On-board Fast Ethernet controller with options for 10BaseT, 10Base2, and 100BaseTX interfaces
- PCI fast/wide SCSI-2 controller with front panel interface
- On-board enhanced IDE hard drive and floppy drive controllers
- Two high-performance 16550-compatible serial ports
- Enhanced parallel port with ECP/EPP modes supported
- PS/2-style keyboard and mouse ports on front panel
- Real-time clock and miniature speaker included
- PMC (PCI mezzanine card expansion site: IEEE-P1386 common mezzanine card standard, 5 V signaling)
- VMEbus data transfers up to 58 Mbyte/s
- VME64 modes supported: A32/A24/D64/D32/D16/D08 (EO)/MBLT64/BLT32
- VMEbus interrupt handler, interrupter, and system controller
- Includes byte-swapping hardware for little-endian and big-endian data interfacing
- VMISFT-9420 IOWorks Access™ and other IOWorks® family software

APPLICATIONS

- Simulation
- Instrumentation
- Industrial control
- Process control and monitoring
- Factory automation
- Intelligent networked PLC controllers
- Automated test
- Data acquisition

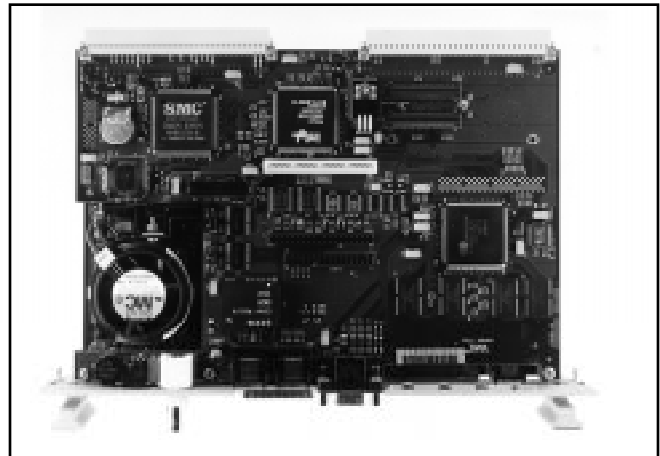
MICROPROCESSOR — The VMIVME-7588 brings Intel® Pentium processor power to VMEbus, offering processor speeds from 133 to 233 MHz. The Pentium processor has 32-bit addressing and a 64-bit data bus. Its superscalar architecture includes two pipelined integer units and a pipelined floating-point unit, allowing two instructions to be executed per clock cycle. A dynamic branch prediction unit and separate instruction and data caches also increase the Pentium processor's performance.

EXTERNAL (L2) CACHE MEMORY — The VMIVME-7588 complements the Pentium processor with 512 Kbyte of external cache memory. Near-zero wait state operation of the Pentium processor is ensured by the use of synchronous burst static RAM with the Intel Triton II chipset.

DRAM MEMORY — The VMIVME-7588 accepts two 72-pin SIMM DRAM modules with or without parity for a maximum memory capacity of 256 Mbyte. The on-board DRAM is dual ported to the VMEbus.

BIOS — System BIOS, video BIOS, and SCSI BIOS are provided in reprogrammable flash memory. BIOS loader software is also provided.

SUPER VGA CONTROLLER — High-resolution graphics and multimedia-quality video are supported on the VMIVME-7588 by the Cirrus Logic CL-GD5436 PCI graphics adapter. The CL-GD5436 is complemented by 2 Mbyte display memory with a high-bandwidth 64-bit data interface. Screen resolutions up to 1,280 x 1,024 x 256 colors, 1,024 x 768 x 64 K colors, and 800 x 600 x 64 K colors



Ordering Options							
April 21, 2000 800-007588-000 M	A	B	C	-	D	E	F
VMIVME-7588	-			-			
<p>A = Processor 0 = Not Used 1 = Reserved 2 = Reserved 3 = Reserved 4 = 200 MHz Pentium Processor with MMX 5 = 133 MHz Pentium Processor 6 = Reserved 7 = Reserved 8 = Reserved 9 = 233 MHz Pentium Processor with MMX</p> <p>B = DRAM Memory 0 = Reserved 1 = 8 Mbyte with Parity 2 = 16 Mbyte with Parity 3 = 32 Mbyte with Parity 4 = 64 Mbyte with Parity 5 = Reserved 6 = 8 Mbyte, No Parity 7 = 16 Mbyte, No Parity 8 = 32 Mbyte, No Parity 9 = 64 Mbyte, No Parity J = 128 Mbyte with Parity K = 256 Mbyte with Parity L = 128 Mbyte, No Parity M = 256 Mbyte, No Parity</p> <p>C = Interface 0 = VMEbus, with Universe, 10Base2 1 = VMEbus, with Universe, 10Base2, 10BaseT/100BaseTX 2 = Reserved 3 = No VMEbus, 10Base2 4 = No VMEbus, 10Base2, 10BaseT/100Base TX 5 = Reserved 6 = VMEbus, with Universe II, 10Base2 7 = VMEbus, with Universe II, 10Base2, 10BaseT/100BaseTX</p>							
<p>For Ordering Information, Call: 1-800-322-3616 or 1-256-880-0444 • FAX (256) 882-0859 E-mail: info@vmic.com Web Address: www.vmic.com Copyright © July 1996 by VMIC Specifications subject to change without notice.</p>							



(noninterlaced) are supported by the CL-GD5436 graphics adapter.

ETHERNET CONTROLLER — The VMIVME-7588 supports Ethernet LANs with the Intel 21142 PCI Ethernet controller. A 10Base2 BNC connection is always provided, as well as an RJ-45 connector. 10BaseT and 100BaseTX options are provided.

PCI SCSI-2 CONTROLLER — Peripheral connections to SCSI-2 hard drives, tape backup, and CD-ROM drives are facilitated by the on-board Adaptec 7880 PCI SCSI-2 controller, which provides 8- or 16-bit operation at up to 40 Mbyte/s.

SERIAL PORTS — Two 16550-compatible serial ports are featured on the VMIVME-7588 front panel. Each serial channel has an independent 16-byte FIFO to support baud rates up to 56 kHz.

ENHANCED PARALLEL PORT — Also accessible on the VMIVME-7588 front panel is a Centronics-compatible, fully bidirectional parallel port meeting all IEEE-1284 standards (Compatibility, Nibble, EPP, and ECP). The parallel port contains a 16-byte FIFO to allow data rates up to 2 Mbyte/s in ECP mode.

KEYBOARD AND PS/2 MOUSE PORTS — The VMIVME-7588 has two 6-pin mini-DIN connectors for PS/2-style keyboard and mouse connections. A 5-pin DIN to 6-pin mini-DIN converter cable is supplied with the VMIVME-7588 for use with PC/AT-compatible keyboards.

RESET SWITCH AND ANNUNCIATORS — A small push-button switch on the front panel will reset the VMIVME-7588. If the System Controller is enabled, a SYSRESET* will also be generated on the VMEbus. Five LEDs are visible on the front panel: +5 V power, status of VMEbus SYSFAIL, IDE activity, LAN activity, and LAN Mode (10 or 100 MHz mode). A small speaker is also included on the VMIVME-7588 to provide PC/AT sound output.

PMC EXPANSION SITE — The VMIVME-7588 supports IEEE-P1386 common mezzanine card specification with a 5 V PCI mezzanine card expansion site. This expansion capability allows third-party devices to be used with the VMIVME-7588, as shown in Figure 1.

The following is a partial list of commercially available PMC modules:

- Analog and digital I/O
- High-speed serial and parallel I/O
- Networking adapters: FDDI, ATM, 100BaseTX Ethernet, Fast Ethernet
- Video graphics accelerators
- PMC-to-PC Card adapter

- MIL-STD-1553 bus interface
- SRAM
- Flash
- Solid-state disk
- Data acquisition cards
- SCSI-2 adapter
- Parallel links
- Octal DSP
- Quad SIO
- Auxiliary SVGA controller (add-in PMC video disables on-board SVGA controller)
- GPIB
- FAX/modem
- Second Ethernet
- PMC-to-PMC expanders

Contact VMIC for more information concerning third-party PMC modules and compatibility.

VMEbus INTERFACE — The VMIVME-7588 VMEbus interface is based on the Universe high-performance PCI-to-VME interface from Newbridge/Tundra.

SYSTEM CONTROLLER — The on-board VMEbus system controller allows the board to work as slot 1, or it may be disabled when another board is acting as the system controller. The system controller may be programmed to provide the following modes of arbitration:

- Round Robin (RRS)
- Single Level (SGL)
- Priority (PRI)

The system controller provides a SYSCLK driver, IACK* daisy-chain driver, and a VMEbus access timeout timer. The system controller also provides an arbitration timeout if BBSY* is not seen within a specified period after a BGOUT* signal is issued. This period is programmable for 16 or 256 μ s.

VMEbus REQUESTER — The microprocessor can request and gain control of the bus using any of the VMEbus request lines (BR3*-BR0*) under software control. The requester can be programmed to operate in any of the following modes:

- Release-On-Request (ROR)
- Release-When-Done (RWD)
- VMEbus Capture and Hold (BCAP)

MAILBOXES — The VMEbus Interface provides four 1-bit mailboxes, which are accessible from both the microprocessor and the VMEbus providing interprocessor communication. The mailboxes have the ability to interrupt the microprocessor when accessed by VMEbus. Access to

mailbox registers is provided using A16/D8(O) VMEbus accesses only.

INTERRUPT HANDLER — The interrupt handler monitors, and can be programmed to respond to any or all VMEbus IRQ* lines. All normal-process VMEbus-related interrupts can be mapped to PCI INTA# or SERR# interrupts. These include:

- Mailbox interrupts
- VMEbus interrupts
- VMEbus interrupter IACK cycle (acknowledgment of VMIVME-7588 VMEbus-issued interrupts)

All error processing VMEbus-related interrupts can be mapped to PCI INTA# or SERR#. Note: PCI SERR# initiates a CPU NMI. These include:

- ACFAIL* interrupt
- BERR* interrupt
- SYSFAIL* interrupt

The interrupt handler has a corresponding Status/ID register for each IRQ* interrupt. Once the handler receives an IRQ*, it requests the VMEbus and, once granted, it performs an IACK cycle for that level. Once the IACK cycle is complete and the Status/ID is stored in the corresponding ID register, an appropriate interrupt status bit is set in an internal status register, and a PCI interrupt is generated. The PCI interrupt can be mapped to PCI INTA# or SERR#.

INTERRUPTER — Interrupts can be issued under software control on any or all of the seven VMEbus interrupt lines (IRQ7* to IRQ1*). A common ID register is associated with all interrupt lines. During the interrupt acknowledge cycle, the interrupter issues the ID to the interrupt handler.

The interrupter can be programmed to generate a PCI INTA# or SERR# interrupt when a VMEbus interrupt handler acknowledges a software-generated VMEbus interrupt.

BYTE SWAPPING — The Intel 80x86 family of processors use little-endian format. To accommodate other VMEbus modules which transfer data in big-endian format such as the 680x0 processor family, the VMIVME-7588 incorporates byte-swapping hardware. This provides independent byte swapping for both the Master and Slave interfaces. Both Master and Slave interface byte swapping are under software control.

MASTER INTERFACE — MA32:MBLT32:MBLT64 (A32:A24:A16:D32:D16:D8 (EO):BLT32)

The VMEbus master interface provides five separate memory windows into VMEbus resources. Each window has separate configuration registers for mapping PCI transfers to the VMEbus (that is, PCI base address, window size, VMEbus base address, VMEbus access type, VMEbus

address/data size, etc.). The maximum/minimum window sizes for the five windows are as follows:

Window	Minimum Size	Maximum Size
0	4 Kbyte	4 Gbyte
1-3	64 Kbyte	4 Gbyte
4	64 Mbyte	64 Mbyte

SLAVE INTERFACE — Memory Access
SAD032:SD32:SBLT32:SBLT64
(A32:A24:A16:D32:D16:D8 (EO): BLT32)

The VMEbus slave interface provides four separate memory windows into PCI resources. Each window has separate configuration registers for mapping VMEbus transfers to the PCI bus (that is, VMEbus base address, window size, PCI base address, VMEbus access type, VMEbus address/data size, etc.). The maximum/minimum window sizes for the four windows are as follows:

Window	Minimum Size	Maximum Size
0	4 Kbyte	4 Gbyte
1-3	64 Kbyte	4 Gbyte

In addition, each window can be programmed to operate in coupled or decoupled mode. In decoupled mode, the window utilizes a write-posting FIFO and/or a read prefetching FIFO for increased system performance. In coupled mode, the FIFOs are bypassed and VMEbus transactions are directly coupled to the PCI bus (that is, transfers on VMEbus are not completed until they are completed on the PCI bus).

GENERAL SOFTWARE — The VMIVME-7588 is 100 percent PC/AT compatible. VMIC supplies support software for Windows®, Windows NT® OS, VxWorks, and LynxOS operating systems.

OPERATING SYSTEM AND SOFTWARE SUPPORT — VMIC has a wide range of software products designed to run on Intel processor-based CPUs such as the VMIVME-7588. These products are aimed at developers who are incorporating VMIC CPUs, I/O boards, and workstations into systems. Windows NT OS, VxWorks, and LynxOS are the most common operating systems supported.

Windows NT

The IOWorks software family is a set of software components that can work together or separately to provide a total development environment for any application in a Windows NT OS.



VMISFT-9420, IOWorks Access - Libraries and debug utilities to facilitate VMEbus access by the CPU

VMISFT-9450, IOWorks Board Drivers - Libraries with drivers for a wide variety of VMIC analog and digital I/O boards

VMISFT-9510, Visual Soft Logic Control™ - Package containing total development and control IOWorks software listed above. Contains Visual IOWorks, C Package, Access, and Board Support Package.

VxWorks

VMISFT-7418, VxWorks Board Support Package - Provides the software needed to run VxWorks OS on VMIC Pentium processor-based computers.

SPECIFICATIONS

6U double Eurocard format, two slot	
Height	9.2 in. (233.4 mm)
Depth	6.3 in. (160 mm)
Thickness	1.6 in. (40.6 mm)

VMEbus Performance – Block Transfers

All data rates expressed in Mbyte/s.

Master BLT 32-bit Write	25.0
Master BLT 32-bit Read	20.5
Master MBLT 64-bit Write	52.3
Master MBLT 64-bit Read	42.1
Slave BLT 32-bit Read	30.3
Slave BLT 32-bit Write	29.0
Slave BLT 64-bit Read	58.8
Slave BLT 64-bit Write	58.0

Power Requirements:

+5 VDC (±5 percent), 8.0 A (typical), 10 A maximum

+12 VDC (±5 percent), 105 mA (typical), 150 mA maximum

-12 VDC (±5 percent), 25 mA (typical), 50 mA maximum

Note: The currents at +12 and -12 VDC are specified with the serial connectors open.

Operating Temperature:

0 to 55 °C	Forced air cooling required
0 to 50 °C	233 MHz option

Relative Humidity: 10 to 90 percent, noncondensing

VMEbus Interface:

DTB Master:	BLT32/BLT64, A32/D32, A24/D32, A16/D32
DTB Slave:	BLT32/BLT64, A32/D32, A24/D32, A16/D32
Requester:	Programmable, BR(3-0), ROR, RWD, BCAP
Interrupt Handler:	IH(1 to 7) D8(O)
Interrupter:	Programmable, IRQ7* to IRQ1*
Arbiter:	SGL, PRI, RRS
BTO:	Programmable (4 - 1,024 ms)
Compliance:	Rev. C.1

PMC Mezzanine Site:

5 V signaling, Types 1 and 2
32-bit PCI bus, 33 MHz maximum

MTBF: 25,502 hours (217F)

COMPATIBLE PRODUCTS

The VMIVME-7588 can be used with a number of VMIC’s PMC bus and VMEbus products.

Floppy/Hard Disk: VMIC produces three floppy/hard drive modules to support the built-in IDE and floppy controller ports.

The VMIVME-7452 provides up to 1.3 Gbyte of hard disk storage and a 3.5-inch 1.44 Mbyte floppy drive. The unit fits into a standard VMEbus 6U single-slot form factor. An internal flexible cable configuration reduces front panel clutter.

The VMIVME-7453 provides 1 Gbyte of hard disk storage and a 3.5-inch 1.44 Mbyte floppy drive. The unit fits into a standard VMEbus 6U single-slot form factor with cable connections available from the front panel.

CD-ROM Support: Since much of today’s advanced software is delivered on CD-ROM, the SCSI-2 port can be used with an external CD-ROM drive such as the 4PleX from Plextor.

The VMIPMC-5576XL utilizes a fiber-optic cable capable of data transfer rates up to 6.2 Mbyte/s over 2,000 m distances. The board provides up to 16 Mbyte of Reflective Memory. Up to 256 multidrop nodes can be supported.

The VMIPMC-5588 utilizes a fiber-optic cable capable of data transfer rates up to 29.5 Mbyte/s over 1,000 foot distances. The board provides up to 16 Mbyte of Reflective Memory. Up to 256 multidrop nodes can be supported.

VMEbus: The VMIVME-7588 enables access to VMIC's wealth of VMEbus products. If you have real-world control, monitoring, and real-time networking requirements, VMIC has a solution for you. Today's system requirements demand state-of-the-art solutions. Our advanced I/O features such as Built-in-Test, self-test, isolation, digital autocalibration, and intelligent on-board DSP give our customers those solutions.

Analog Input:

- Up to 64 channels
- 12- and 16-bit DAC
- Isolation
- Differential and single-ended
- Low- and high-speed models
- Programmable gains and filters
- Simultaneous sample-and-hold
- Autocalibration
- Signal conditioning: RTD, strain gauge, and thermocouples

Analog Output:

- Up to 32 channels
- 12- and 16-bit DAC
- Isolation
- Voltage and current outputs
- Programmable function generator

Digital Input:

- Up to 128 channels per board
- Change-of-state and time tagging
- Isolated
- Contact and voltage sensing
- Pulse accumulators
- AC and DC inputs up to 240 V
- TTL, RS-422, or RS-485

Digital Output:

- Up to 128 channels
- TTL and high voltage
- Isolated
- Solid-state and mechanical relays, latching or momentary
- Programmable function generator
- Real-time and off-line fault detection and isolation

Chassis and Power Supplies: VMIC provides a number of chassis and table top enclosures to complete your installation. A variety of power supplies are available to suit your system needs.

TRADEMARKS

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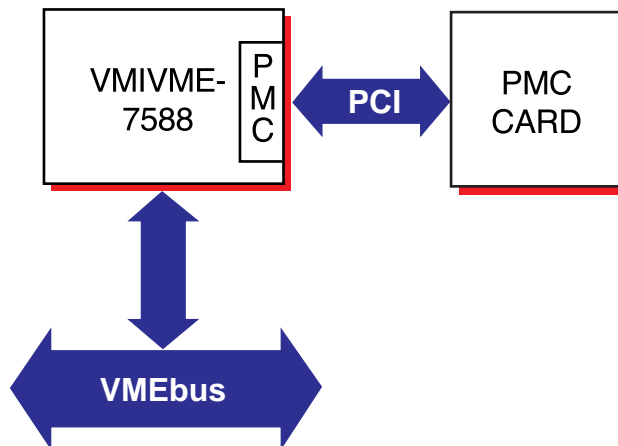


Figure 1. PMC Expansion Site



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