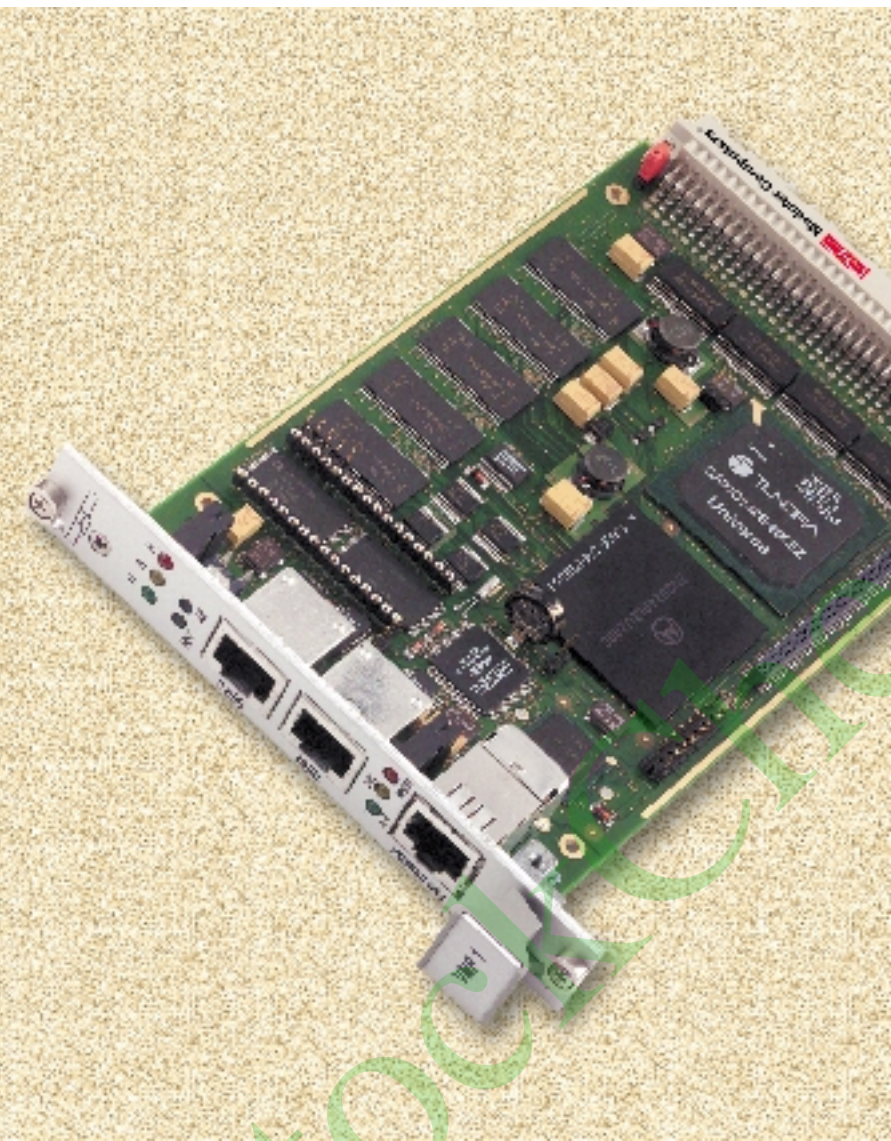




HIGH-  
PERFORMANCE  
CPUs  
SINGLE-BOARD  
COMPUTERS

# VMP1

## VME Processor Module



Computing in rugged environment

- ▶ Integrated PowerPC MPC8240 with internal MPC603e core
- ▶ VME64 industry standard interface
- ▶ PCI local bus 33 MHz
- ▶ PCI Expansion Connector
- ▶ Up to 128 MB SDRAM/100 MHz
- ▶ Up to 8MB Flash
- ▶ Optional Flash disk or NVSRAM
- ▶ Fast Ethernet
- ▶ Two RS232 ports
- ▶ Rugged 3U design
- ▶ Extended temperature version
- ▶ Universal Boot Loader

A well-balanced design achieving a maximum of computer performance versus power dissipation, realized using the highly integrated MPC8240 PowerPC, embedded in a rugged design.



# Product Overview

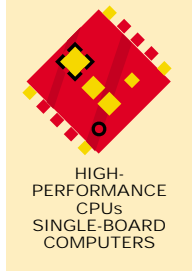
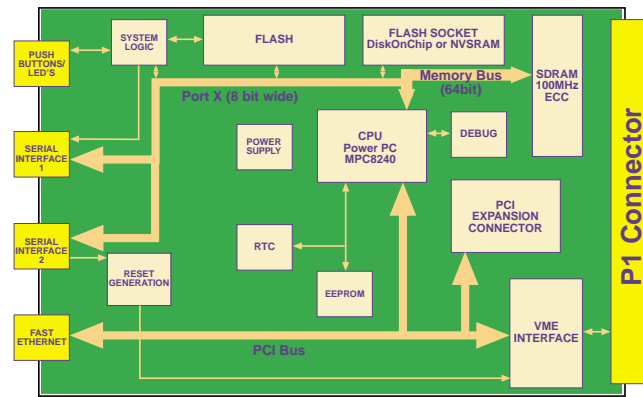
## VMP1

PEP's VME PowerPC Processor board with Floating point unit based on the MPC8240 is a straight forward computing design.

CPU, Memory and DMA  
**The VMP1 is a comprehensive computing platform realized as a lean CPU design with only those functions required for basic industrial calculation tasks. It addresses the need for increasing computing capacity while reducing the number of system components and taking up less space. Based on the MPC8240, a highly integrated microprocessor containing a PowerPC MPC603e core, two different clock versions, 200 MHz and 266 MHz, both with an FPU unit will be initially available. Anticipating the VMP1's use in data critical applications, the memory data path contains a selectable in-line ECC controller which can provide SDRAM single bit error correct or double bit error detect. For mass data transmission a dual channel DMA controller is provided. It can be programmed directly or through the use of descriptor chains located in memory. Data can thus be moved from PCI to memory or vice versa, memory to memory, or PCI to PCI.**

PCI bus and PCI Expansion capability  
**PCI is used as the local bus to connect the MPC8240 with the Fast Ethernet controller and the PCI/VME bridge. Moreover, it is routed to a 100 pin PCI expansion connector that can be used to add further functionality to the VMP1. One or two VMP1-IO modules can be plugged together with the VMP1 (e.g. two PMC slots can be added) resulting in a total package of either 8HP or 12HP.**

VME interface  
**The VMEbus interface (Universe 2) delivers beside all functionality that is**



needed by a VME CPU:

- automatic First-Slot-Detection
- integral FIFO buffers for multiple transactions in both directions
- programmable DMA controller with linked list support.

### LAN

The i82559 10/100 Mbps Fast Ethernet controller with an integrated 10/100 Mbps physical layer device is the foremost solution for PCI board LAN designs. It combines a low power consumption with a small package design which is ideal for power and space constrained environments.

### Serial ports

Two RS232 serial ports are realized with the 16C2550 UART and supports baud rates up to 1.5Mbps.

### Support

One of the prime advantages of utilizing the existing, time-tested, and proven MPC603e core is the legacy and infrastructure of support that currently exists. All notable third-party software tool vendors presently endorsing the PowerPC architecture have announced tools also for the MPC8240. It supports processor control and visibility through the JTAG/COP (common on-chip processor) interface that is accessible on VMP1. Utilizing third party tools, the developer can access and control the processor. It also has standard IEEE 1149.1a-1993 compliant boundary scan capability. The ECC data path has a mechanism to manually inject errors into memory

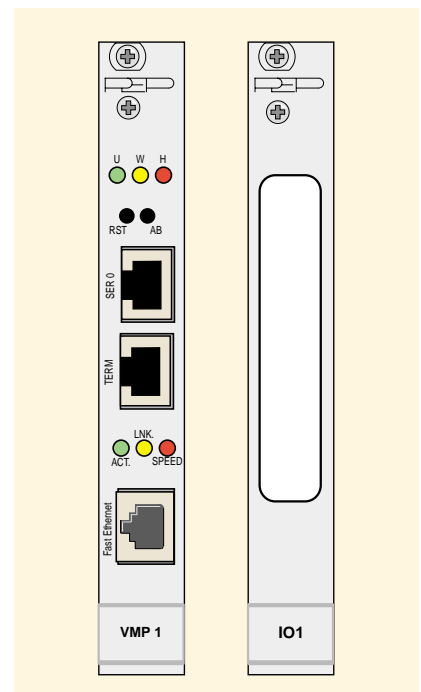
for use with maintenance and diagnostic utilities. Further a watch point and capture register on the internal bus as well as a set of address attributes on the external memory and PCI buses aid in debugging analysis.

### Universal Boot Loader

The VMP1 employs an operating system independent boot loader that enables the loading of any OS. This boot loader makes an update of the Flash contents and accomplishes an automatic download from Flash to SDRAM before booting the OS. For high performance reasons the OS is started from the SDRAM.

### Front-Panel

### VMP1



# Specifications

## VMP1

### Processor

Integrated PowerPC microprocessor  
Motorola MPC8240  
L1 cache 2 x 16 kB data/instruction cache;  
Internal processor core MPC603e  
Core Frequency 200 MHz or 250 MHz  
6.6 SPECint95  
5.5 SPECfp95  
375 Dhrystone (2.1) MIPS

PCI bridge and PCI arbiter  
Two channel controller DMA with chaining  
Programmable IRQ controller  
Multiple timers and counters

### Memory

Up to 128 MB direct soldered SDRAM/64 bit/100 MHz with ECC protection (8 bit parity)  
Up to 8MB direct soldered Flash (Boot Device and Program Storage)  
DIL Socket for:  
▶ NV-SRAM (up to 512 kB)/Cell Storage Life 10 years  
▶ Flash DiskOnChip (up to 144 MB)

### Front I/O

- ▶ Fast Ethernet Channel 10 Base-T/100 Base-TX; RJ-45; LAN Status LED's (Activity, Link, Speed) integrated IEEE 802.3 10 BASE-T and 100 BASE-TX compatible PHY  
integrated power management functions  
dynamic transmit chaining with multiple priorities  
transmit queues  
full duplex support at both 10 and 100 Mbps operation  
IEEE 802.3u Auto-Negotiation support  
3 Kbyte Transmit FIFO and 3 Kbyte Receive FIFO  
back-to-back transmission support with minimum inter frame spacing  
IEEE 802.3 x 100 BASE-TX Flow Control support  
TCP/UDP checksum off-load capabilities
- ▶ Two RS232 ports, 16550 compatible Dual UART; RJ-45
- ▶ Two push buttons RESET, ABORT (NMI) Board Status LED's (watchdog active, general purpose)

### Software Support

A Universal Boot Loader supports the start of any operating system like WindRiver's VxWorks®.

### PCI Expansion Interface

32 bit/33 MHz; 5 V Signaling;  
Up to two expansion modules are stackable.  
8 HP/12 HP version with one/two PMC slots or two/four PC\*MIP slots. This port can also be used to add customized functionality.

### VME Interface

ANSI/VITA 1-1994 VME64 interface on P1 (IEEE STD 1014); Universe 2  
DTB Master/Slave A16-A24; D08-D16  
9 user programmable slave images on VME and PCI bus  
4 mailboxes and location monitors for message oriented systems  
7 IRQ lines with flexible mapping

### Miscellaneous Functions

Timers: Four 32-bit timers, one 16-bit timer, one watchdog timer  
RTC: backup via GoldCap (5 days) or optional via replaceable battery (10 years)  
Debug Port: JTAG/BDM; 16 Pin row connector

### Common

Temp. Ranges: 0 °C to + 70 °C (standard)  
-40 °C to + 85 °C extended  
-55 °C to + 125 °C (storage)  
Oper. Humidity: 0% to 95% (noncond.)  
MTBF according to MIL-HDBK 217F  
VMP1 164,300h  
VMP1-IO1 251,000h

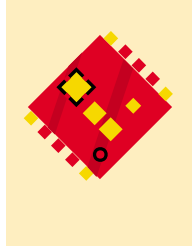
Power Consumption:  
+ 5V 6,8W\*/typ.  
+ 12V 0W\*  
-12V 0W\*

\*Without PCI Expansion Module and at 266 MHz, 64 MB SDRAM, 8MB Flash

Dimensions: 100 mm x 160 mm (3U card size)  
Front Panel Height:: 128.5 mm ;  
Width: 20 mm (0.8 inch)/4 HP  
Weight:: 180 g

# Ordering Information

## VMP1



Product	Description	Order No.
VMP1 <sup>1)</sup>	266 MHz MPC8240, 64 MB SDRAM with ECC, 8 MB Flash	20522
VMP1 <sup>1)</sup>	200 MHz MPC8240, 32 MB SDRAM without ECC, 4 MB Flash	20616
VMP1-IO1 <sup>2)</sup>	PCI expansion I/O; one PMC slot	20523
FLD-16 <sup>3)</sup>	16 MByte FLASH-Disk	19643
FLD-24 <sup>3)</sup>	24 MByte FLASH-Disk	19194
FLD-32 <sup>3)</sup>	32 MByte FLASH-Disk	19644
NVSRAM-512 <sup>4)</sup>	512 kByte non volatile SRAM; 32 pin DIP	20656
Cable-RS232	3 meter RS232 Serial Interface cable with RJ45 to 25 Pin D-Sub (male) for terminal connection	15191
VxW-BSP-VMP1 <sup>5)</sup>	VxWorks Board Support Package for development for use with Tornado on 3.5" floppy disk and the boot image integrated into onboard Flash	20657
KIT-VMP1	User's manual documentation in PDF format on 3.5" floppy disk	20615
MAN-VMP1	Printed user's manual for the VMP1	19973

© PEP - 1999. <sup>TM</sup> All trademarks are recognised. Subject to change without notice  
Publication Number 20693 DS-0799

- Note:
- <sup>1)</sup> SDRAM capacity of 96 MB or 128 MB and Flash capacity higher than 8 MB on request
  - <sup>2)</sup> PC\*MIP or custom I/O modules on request
  - <sup>3)</sup> FLASH-Disks up to 144 MByte are also available on request
  - <sup>4)</sup> Smaller NVSRAM capacity on request
  - <sup>5)</sup> Further Operating System support on request

▶ USA ▶ GERMANY ▶ FRANCE ▶ UK ▶ SWEDEN ▶ BENELUX ▶ POLAND ▶ ITALY ▶ SPAIN ▶ NORWAY  
▶ DENMARK ▶ FINLAND ▶ SWITZERLAND ▶ CZECHIA ▶ HUNGARY ▶ CIS ▶ CHINA ▶ JAPAN ▶ KOREA

▶ Visit our home page at: <http://www.pep.com>

Benelux  
PEP Modular Computers Benelux  
Koning-Albert-Laan 46  
B-1780 WEMMEL  
Tel.: ++32 (0)2 456 06 40  
Fax: ++32 (0)2 461 00 31

Postbus 9712  
NL-4801 LV BREDA  
Tel.: ++31 (0)76 5217 957  
Fax: ++31 (0)76 5217 959

France  
EURO PEP Paris  
Les Bureaux du Manoir  
18 Chemin du Fond du Chêne  
F-78 620 L'ETANG LA VILLE  
Tel.: ++33 (0) 1 39 16 10 30  
Fax: ++33 (0) 1 39 16 10 25

Great Britain  
PEP Modular Computers (UK) Ltd.  
Riverside Business Centre  
SHOREHAM-BY-SEA  
BN43 6RE  
Tel.: ++44 (0) 1273 44 11 88  
Fax: ++44 (0) 1273 44 11 99

Korea  
PEP DASAN Systems Co., Ltd.  
6F KOSMO Tower  
1002 Daechi-dong, Kangnam-ku  
Seoul, Korea (Zip135-280)  
Tel.: ++82 2 34 84 - 65 50  
Fax: ++82 2 34 84 - 65 51

Poland  
PEP Modular Computers Sp. z o.o  
Al. Jerozolimskie 144  
Pok 714 Vp  
02-305 WARSZAWA  
Tel.: ++48 (0) 2 28 23 55 73  
Fax: ++48 (0) 2 28 23 55 73

Sweden  
PEP Modular Computers AB  
Hornackersvägen 8  
S-18314 TABBY  
Tel.: ++46 (0) 8 446 34 60  
Fax: ++46 (0) 8 732 63 10

USA  
PEP Modular Computers Inc.  
750 Holiday Drive, Building 9  
Pittsburgh, PA 15220  
Tel.: ++1 412 921 3322  
Fax: ++1 412 921 3356  
Toll free: 800/228-1737



PEP Modular Computers GmbH  
Sudetenstr. 7  
D-87600 KAUFBEUREN  
Tel.: ++49 (0) 8341 803 0  
Fax: ++49 (0) 8341 803 499