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MVME162P4

VME Embedded Controller with 4 IP Slots

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- Choice of processors: 32 MHz MC68040 enhanced 32-bit microprocessor with 8KB of cache, and MMU and FPU; or 25 MHz MC68LC040 enhanced 32-bit micro-processor with 8KB of cache and MMU
- A32/D64 VMEbus master/slave interface with system controller function
- High-performance DMA support for VMEbus D64 and local bus memory burst cycles
- 16MB of configurable SDRAM
- 512KB SRAM with battery backup
- 1MB Flash memory for on-board monitor/debugger or user-installed firmware
- 8K x 8 NVRAM and time-of-day clock with battery backup
- Two serial communication ports, console port as EIA-232-D DCE and second port user configurable for EIA-232-D/EIA-422 (V.36) DTE/DCE
- Four 16- or two 32-bit IndustryPack® ports with one DMA channel per port
- Optional SCSI and Ethernet interfaces
- Six 32-bit timers, one watchdog timer

Four-slot IndustryPack logic interface for embedded monitoring and control applications

The MVME162P4 family provides OEMs and solutions developers an ideal platform for embedded monitoring and control applications. It allows an OEM to minimize engineering expenses while integrating value-added hardware and software applications onto an off-the-shelf product.

In order to provide this wide range of solutions, the MVME162P4 allows a variety of MPU, memory, and interface options such as floating point, Ethernet, SCSI, and VME. The result is a variation of the MVME162P4 which most closely fits the application requirement.

The inclusion of the new “Petra” application-specific integrated circuit (ASIC), which replaces functions formerly implemented in the IP2 chip, MC2 chip, and MCECC chip, improves the performance of the memory subsystem. Memory configuration switches

enable the customer to tailor memory size for applications requiring smaller memory configurations.

MVME162P4 Details

Microprocessor Options

The MVME162P4 provides scalability by allowing several types of MPU options. Features such as clock speed and floating point capability can be selected.

Memory Expansion

The MVME162P4 is offered with a configurable SDRAM. The size of the memory is determined by switch settings and the memory devices.

VMEbus Interface

The VMEbus interface ASIC includes a local bus to/from VMEbus DMA controller, VME board support features, as well as global control and status register (GCSR) for microprocessor communications. The device also supports the VME D64 specification further enhancing system performance.

IndustryPack Interface

A key feature of the MVME162P4 is the IndustryPack logic interface. This interface provides a 32-bit data path for the IndustryPack modules to the local MC68040 bus. IndustryPack modules provide a wide variety of connections to “real-world” applications such as I/O, control, interface, analog and digital functions. Up to four single-wide or two double-wide IndustryPack modules can be installed on the MVME162P4 and still occupy only one VME slot. As I/O needs change, a new IndustryPack module can be installed thus preserving the customer’s overall investment.

IndustryPack Performance

Bus Frequency		Period and Bandwidth to 32-Bit IP Space		
MC68040	IP	Back-to-Back Examine (Note 1)	Four-Cycle DMA Burst (Note 2)	Single-Cycle DMA (Note 3)
25 MHz	8 MHz	4 IP clocks 8MB/s	10 IP clocks 12.8MB/s	4 IP clocks 8MB/s
32 MHz	8 MHz	3 IP clocks 10.6MB/s	10 IP clocks 12.8MB/s	4 IP clocks 8MB/s
32 MHz	32 MHz	6 IP clocks 21MB/s	12 IP clocks 42MB/s	6 IP clocks

	(Note 5)		(Note 4)	21MB/s

Notes:

1. Back-to-back cycles for a local bus master which is accessing a memory or I/O space location on an IndustryPack; assumes a zero-wait-state-acknowledge reply from the IndustryPack.
2. DMA burst cycles between a local bus slave and a memory or I/O space location on an IndustryPack; assumes a zero-wait-state-acknowledge reply from the IndustryPack.
3. DMA single cycles between a local bus slave and a memory or I/O space location on an IndustryPack; assumes a zero-wait-state-acknowledge reply from the IndustryPack.
4. Burst modes DMA is not supported when both bus frequencies are 32 MHz.
5. Because the specified bandwidth assumes a zero-wait-state IndustryPack cycle, it would be difficult to achieve the stated bandwidths for an IP bus frequency of 32 MHz.

Transition Module

An optional MVME712M transition module is available to support the use of standard I/O connections for the MVME162P4 series. This module takes the I/O connections for the peripherals on board the MVME162P4 series from the P2 connection of the module to a transition module that has industry-standard connections.

Software Support

The MVME162P4 is supported by a wide range of real-time kernels and embedded operating systems.

Lynx Real-Time Systems, Inc.:	LynxOS™
Integrated Systems, Inc.:	pSOS+™
Microware Systems Corporation:	OS-9®
Microtec:	VRTX32™
Wind River Systems, Inc.:	VxWorks®

Specifications

Processor

Microprocessor:	MC68040	MC68LC040
Clock Frequency:	32 MHz	25 MHz

Memory

Synchronous Dynamic RAM

Capacity:	16MB
Read/Write Burst Mode:	4-1-1-1/2-1-1-1
Parity (ECC):	Yes
Shared:	VMEbus and local bus

Static RAM

Capacity:	512KB
Read/Write Burst Mode:	5-3-3-3/5-3-3-3
Parity:	No
Shared:	VMEbus and local bus
Battery Type:	Lithium
Battery Life (approximate):	406 days continuous backup at 25° C, 81 days at 70° C

Flash

Capacity:	1MB
Parity:	No
Shared:	No

EPROM (32-pin PLCC)

Capacity:	One 1M x 8 in socket

VMEbus ANSI/VITA 1-1994 VME64 (IEEE STD 1014)

DTB Master:	A16–A32; D08–D64, BLT, UAT + MBLT
DTB Slave:	A24–A32; D08–D64, BLT, UAT + MBLT
Arbiter:	RR/PRI
Interrupt Handler:	IRQ 1–7
Interrupt Generator:	Any 1 of 7
System Controller:	Yes, jumperable
Location Monitor:	Four, LMA32

SCSI Bus

Controller:	NCR 53C710
Local Bus DMA:	Yes, with local bus burst
Asynchronous/Synchronous:	5.0MB per second/10.0MB per second
Connector:	68-pin micro D high density, available on P2

Ethernet

Controller:	82596CA

Local Bus DMA: Yes
Connector: DB-15, available on P2

IndustryPack Logic Interface

Data Width: 16/32-bit
Interrupts: Two levels
DMA: Four channels
Clock Speed: 8 or 32 MHz
Module Types: Four single-high, two double-high
Connectors: Access via four 50-pin planar connectors

Serial Ports

Controller:	85230
Console:	EIA-232-D DCE
Second Port:	User configurable, EIA-232 or EIA-530 DTE/DCE, or EIA-485
Baud Rate, bps max.:	38.4K sync/async
Connectors:	Available on the front panel through two DB-25 female connectors and P2

Hardware Support

Multiprocessing Support: Four mailbox interrupts, RMW, shared RAM
Debug/Monitor: 162Bug, boot and diagnostics
Transition Module (optional): MVME712M

Power Requirements (no IP Modules)

	Typical	Maximum
+5V ± 5%	2.0 A	2.5 A
+12V ± 5%	—	100 mA (max., with off-board LAN transceiver)
–12V ± 5%	100 mA	—

Board Size

Height: 233.4 mm (9.2 in.)
Depth: 160.0 mm (6.3 in.)
Front Panel Height: 261.8 mm (10.3 in.)

Width: 19.8 mm (0.8 in.)

Demonstrated MTBF

(based on a sample of eight boards in accelerated stress environment)

Mean:	190,509 hours
95% Confidence:	107,681 hours

Safety

All printed wiring boards (PWBs) are manufactured with a flammability rating of 94V-0 by UL recognized manufacturers.

Environmental

	Operating	Nonoperating
Temperature:	0° C to 55° C, forced air cooling	–40° C to +85° C
Altitude:	5,000 m	15,000 m
Humidity (NC):	5% to 90%	5% to 90%
Vibration:	2 Gs RMS, 20–2000 Hz random	6 Gs RMS, 20–2000 Hz random

Electromagnetic Compatibility (EMC)

Intended for use in systems meeting the following regulations:

U.S.: FCC Part 15, Subpart B, Class A (non-residential)
Canada: ICES-003, Class A (non-residential)

This product was tested in a representative system to the following standards:

CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class B; Immunity: EN50082-1

Ordering Information

Part Number	Description
All versions of the board are built with 16MB of SDRAM (which can be reconfigured as 1MB, 4MB, or 8MB for applications requiring smaller memory configurations), four IndustryPack DMA ports, two serial ports, and one SIMM module.	
MVME162P-244L	25 MHz MC68LC040

MVME162P-244LE	25 MHz MC68LC040, Ethernet
MVME162P-244LSE	25 MHz MC68LC040, SCSI and Ethernet
MVME162P-344	32 MHz MC68040
MVME162P-344S	32 MHz MC68040, SCSI
MVME162P-344E	32 MHz MC68040, Ethernet
MVME162P-344SE	32 MHz MC68040, SCSI and Ethernet
Related Products	
MVME712M	Four DB-25 female serial port connectors, Centronics parallel port connector, DB-15 Ethernet connector, SCSI connector, and P2 adapter
MVME712P2	P2 adaptor module from VME backplane to cabling for transition modules
SIMM05	EIA-232 DTE module (option)
SIMM06	EIA-232 DCE module (default configuration)
SIMM07	EIA-530 DTE module (option)
SIMM08	EIA-530 DCE module (option)
SIMM09	EIA-485 module (option)
Documentation	
V162PFXA/IH	MVME162P4 Installation and Use manual
V1X2PFXA/PG	MVME162P4/172P4 Programmer’s Reference Guide
V162PFXA/LT1	MVME162P4 (FX) Petra Customer Letter
VME712MA/IH2	MVME712 Transition Module Installation and Use
V162DIAA/UM	162Bug Diagnostics User’s Manual
68KBUG1/D	68K Debugging Package User’s Manual Part 1
68KBUG2/D	68K Debugging Package User’s Manual Part 2

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