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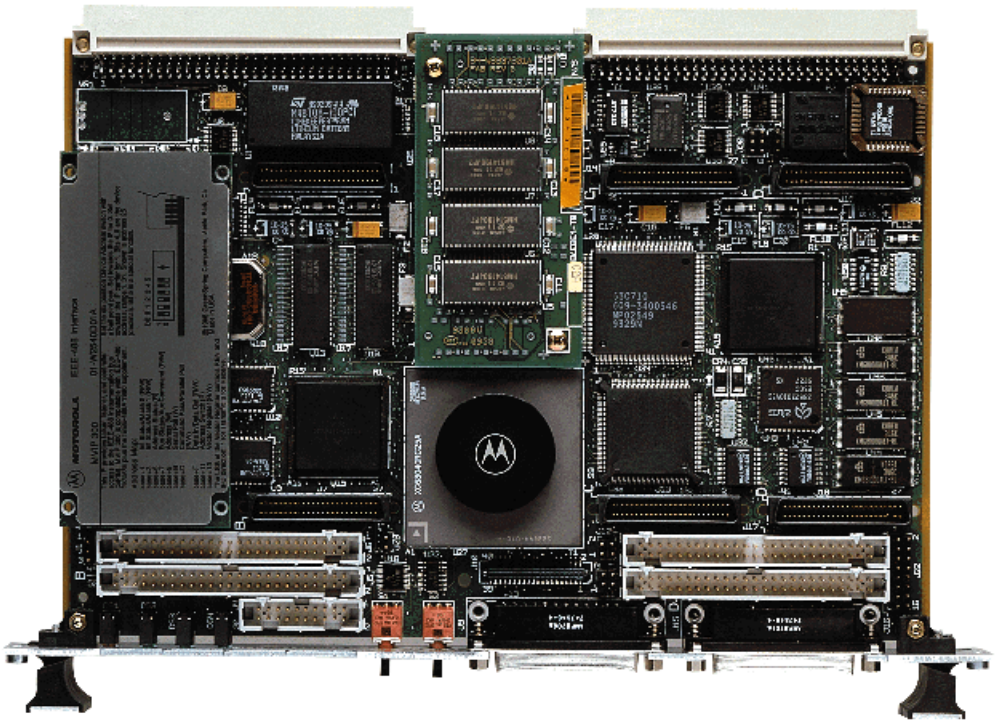
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MOTOROLA COMPUTER GROUP

Board Level Products

MVME162
EMBEDDED CONTROLLER



Advantages

The MVME162 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 MVME162 allows a variety of MPU, memory, and interface options such as floating-point, Ethernet, SCSI, and VME. The result is a variation of the MVME162 which most closely fits the application requirement.

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Features

- 32 MHz MC68040 enhanced 32-bit microprocessor with 8KB of cache, and MMU and FPU
- Optional 25 MHz MC68040 32-bit microprocessor with 8KB of cache, MMU, and FPU
- Optional 25 MHz MC68LC040 enhanced 32-bit microprocessor 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
- 4, 8 or 16MB of shared DRAM
- 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 DTE and second port user configurable for EIA-232-D/EIA-422 (V.36) DTE/DCE
- Four 16- or 32-bit IndustryPack® ports with one DMA channel per port
- Six 32-bit timers (four without VMEbus) and watchdog timer
- Optional SCSI bus interface with 32-bit local bus burst DMA
- Optional Ethernet transceiver interface with 32-bit local bus DMA
- One 32-pin PLCC EPROM socket
- Four-level requester, seven-level interrupter, and seven-level interrupt handler for VMEbus
- Remote RESET/ABORT/STATUS control functions
- On-board debugger and diagnostic firmware

The Motorola Commitment

Motorola Computer Group is committed to providing best-in-class embedded computing solutions. The MVME162 series reinforces this commitment by providing superior hardware, price performance, and faithfulness to the tenets of open computing: modularity, scalability, portability, and interoperability.

Motorola Computer Group is ISO9001 registered, and provides world class quality in manufacturing, engineering, sales, and marketing.

MVME162 Series Ordering Information (Order MVME162-)

MVME162			No SCSI or Ethernet	SCSI Only	Ethernet Only	SCSI and Ethernet
25 MHz	68LC040	4MB	-410*a*	-411*a*	-412*a*	-413*a*
		8MB	-430*a*	-431*a*	-432*a*	-433*a*
		16MB	—	—	—	-453*a*
32 MHz	68040	4MB	-510*a*	-511*a*	-512*a*	-513*a*
		8MB	-520*a*	-521*a*	-522*a*	-523*a*
		16MB	-530*a*	-531*a*	-532*a*	-533*a*

Serial Port 2 Configuration Modules	
SIMM05	EIA-232 DTE module (option)
SIMM06	EIA-232 DCE module (standard)
SIMM07	EIA-530 DTE module (option)
SIMM08	EIA-530 DCE module (option)
SIMM09	EIA-485 module (option)

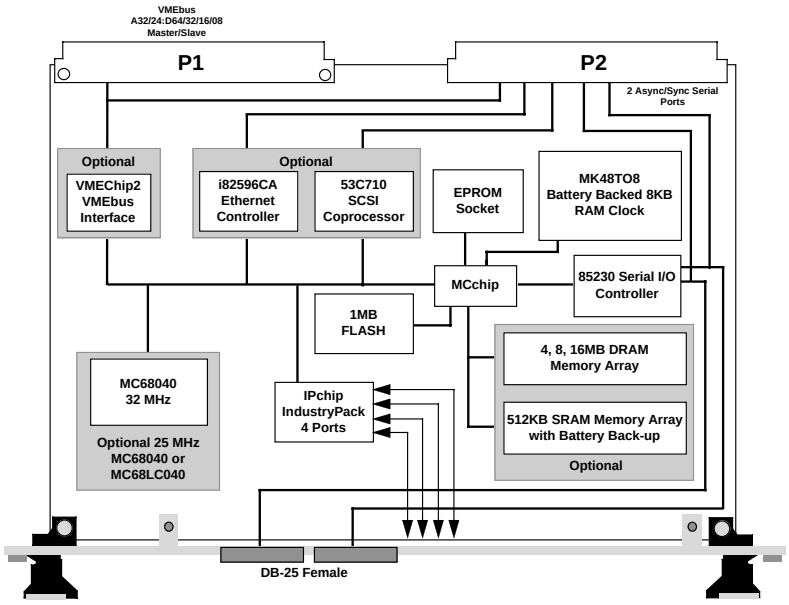
Expansion Memory MEM162 (Order MEM162-)	
-502*a*	4MB
-503*a*	12MB

Documentation	
68-MVME162SET	User's manual set

Notes

1. All models include: 512KB SRAM with battery backup, 1MB Flash memory with MVME162BUG installed, two EPROM sockets, 8K x 8 NVRAM/TOD Clock, two serial ports, four IndustryPack ports, and timers.
2. As denoted above, *a* indicates a major revision level and is not normally part of the model number unless a major revision has occurred to the product.
3. Firmware source and object modules are available upon request.

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MVME162 Embedded Controller

Microprocessor Options

The MVME162 provides scalability by allowing several types of MPU options. Features such as clock speed and floating point capability can be user specified.

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.

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 (Note 5)	6 IP clocks 21MB/s	12 IP clocks 42MB/s (Note 4)	6 IP clocks 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 band width assumes a zero wait state IndustryPack cycle, it would be difficult to achieve the stated bandwidths for an IP bus frequency of 32 MHz.

IndustryPack Interface

A key feature of the MVME162 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 MVME162 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.

Memory Expansion

The MVME162 is offered with 4MB of on-board DRAM. These versions can be expanded up to 16MB by using customer-installable memory modules.

Transition Modules

Optional MVME712 Series Transition Modules are available to support the use of standard I/O connections for the MVME162 Series. These modules take the I/O connections for the peripherals on board the MVME162 Series from the P2 connection of the module to a transition module that has industry standard connections.

Software Support

The MVME162 is supported by a wide range of real-time kernels and embedded operating systems.

Emerge Systems Inc.:	RTUX™
Eyring Corporation:	PDOS®
Integrated Systems, Inc.:	pSOS+™
Industrial Programming, Inc.:	MTOS™
JMI Software Systems, Inc.:	C EXECUTIVE®
Microware Systems Corporation:	OS-9®/OS-9000™
Microtec:	VRTX32™
Wind River Systems, Inc.:	VxWorks®

Specifications

MVME162 Embedded Controller

Processor

Microprocessor:	MC68040
Clock Frequency:	32 MHz
Microprocessor:	MC68LC040 or MC68040
Clock Frequency:	25 MHz

Memory

Type:	Dynamic RAM
Capacity:	4MB, 8MB
Read/Write Burst Mode:	4-1-1-1/3-2-2-2
Parity:	No
Shared:	VMEbus and local bus
Type:	Dynamic RAM
Capacity:	16MB
Read/Write Burst Mode:	4-2-2-2/3-2-2-2
Parity:	No
Shared:	VMEbus and local bus
Type:	Flash
Capacity:	1MB
Parity:	No
Shared:	No
Type:	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 (40° C):	200 days
EPROM (32-pin PLCC):	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

Ethernet

Controller:	82596CA
Local Bus DMA:	Yes

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

Power Requirements (no IP Modules)

	Typical	Maximum
+5V ± 5%	3.5 A	4.5 A
+12V ± 5%	—	100 mA (max., with off-board LAN transceiver)
–12V ± 5%	100 mA	—

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

Hardware Support

Multiprocessing Support:	4 mailbox interrupts, RMW, shared RAM
Debug/Monitor:	MVME162FW, boot and diagnostics
Transition Module (opt.):	MVME712 Series

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.)

Connectors

Serial Ports:	Available on the front panel through two DB-25 female connectors and P2
Ethernet, SCSI Peripherals:	Available on P2
IndustryPack I/O:	Available via four 50-pin connectors on planar

Environmental

	Operating	Nonoperating
Temperature:	0° C to +70° C, forced air cooling exit air	–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	8 Gs RMS, 20–2000 Hz random

Demonstrated MTBF

Mean/90% Confidence:	190,509/107,681

Regulatory Compliance

Intended for use in systems meeting the following EMI/RFI regulations:

US:	FCC Class B
Canada:	DOC Class B
Europe:	VDE Class B, CISPR-B, CE Mark
Safety:	All printed wiring boards (PWBs) are manufactured with a flammability rating of 94V-0 by UL recognized manufacturers.

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