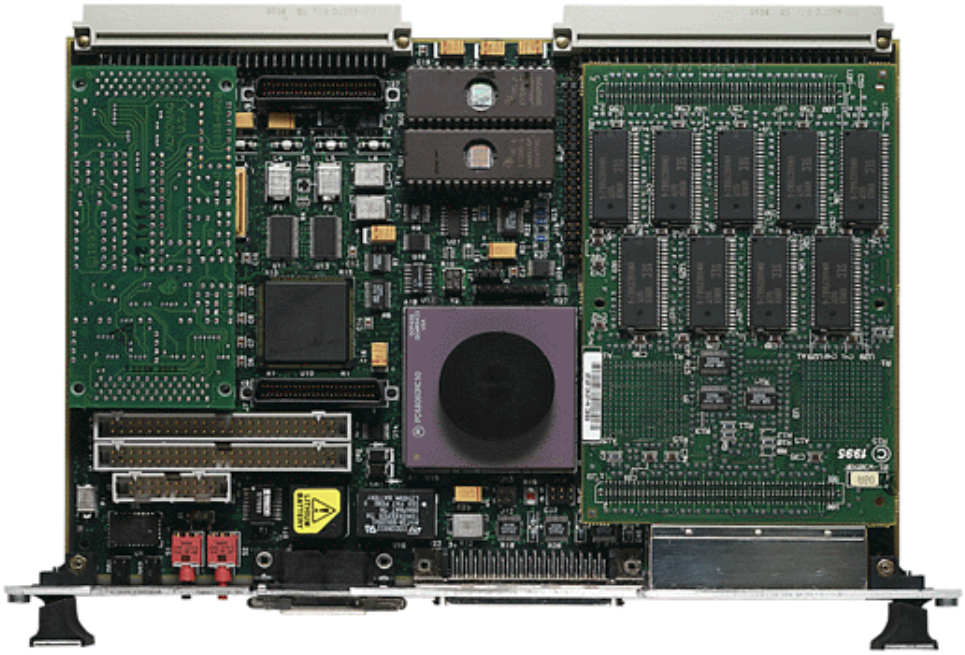
MOTOROLA COMPUTER GROUP

Board Level Products

MVME162LX
EMBEDDED CONTROLLER



Advantages

The MVME162LX embedded controller provides a powerful and functional CPU which can be customer-configured for specific applications.

The MVME162LX extends the range of solutions provided by the MVME162 series by boosting the performance level and increasing the number of customer specified options. This flexibility allows a user to configure cost effective solutions ranging from embedded controllers to single board computers. With the compute power of the MC68040 and the flexibility of the IndustryPack® mezzanine interface, the MVME162LX combines the mechanical ruggedness of VME with the cost effectiveness of PC-type products.

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Features

- 25 MHz MC68LC040 enhanced 32-bit microprocessor with 8KB of cache and MMU
- Optional 25 MHz MC68040 32-bit microprocessor with 8KB of cache, MMU, and FPU
- Optional VMEchip2 A32/D64 VMEbus master/slave interface with system controller function
- High performance DMA supports VMEbus D64 and local bus memory burst cycles
- 4, 8, or 16MB of shared DRAM
- 4, 8, 16, 32 or 64MB of shared DRAM with error checking and correction (ECC)
- 128KB of SRAM with battery backup
- Optional 1MB Flash memory for on-board monitor/debugger for user specified requirements
- 8K x 8 NVRAM and time-of-day clock with battery backup
- Four serial communication ports, configured as EIA-232-D DTE
- Two IndustryPack ports
- 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
- Four 32-pin JEDEC sockets for EPROM and Flash (models MVME162-2*xx*/3*xx* only; models MVME162-7*xx*/8*xx* have only two sockets)
- 4-level requester, 7-level interrupter, and 7-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 MVME162LX 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-)

Clock Speed	MPU Type	Memory Type	No SCSI or Ethernet	SCSI Only	Ethernet Only	SCSI and Ethernet
25 MHz	MC68LC040	4MB	-210a	-211a	-212a	-213a
		8MB	-300a	-301a	-302a	-303a
		4MB ECC	-230a	-231a	-232a	-233a
		8MB ECC	-320a	-321a	-322a	-323a
		16MB ECC	-250a	-251a	-252a	-253a
		32MB ECC	-340a	-341a	-342a	-343a
25 MHz	MC68040	4MB	-220a	-221a	-222a	-223a
		8MB	-310a	-311a	-312a	-313a
		4MB ECC	-240a	-241a	-242a	-243a
		8MB ECC	-330a	-331a	-332a	-333a
		16MB ECC	-260a	-261a	-262a	-263a
		32MB ECC	-350a	-351a	-352a	-353a
32 MHz	MC68040	4MB	—	—	—	-723a
		4MB ECC	—	—	—	-743a
		16MB ECC	—	—	—	-763a
		8MB	—	—	—	-813a
		8MB ECC	—	—	—	-833a
		32MB ECC	—	—	—	-853a
		16MB	—	—	—	-863a

Expansion Memory (Order MEM162-)

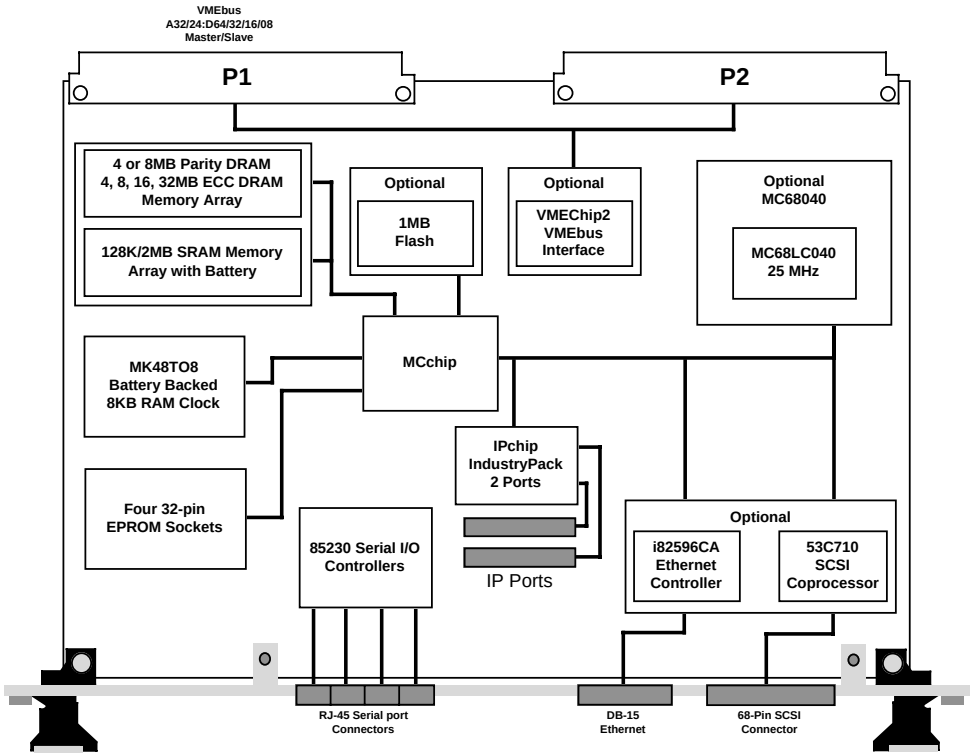
-202a	4MB (non-stacking)
-203a	16MB ECC (non-stacking)
-204a	16MB ECC (stacking)
-207a	4MB ECC (non-stacking)
-208a	4MB ECC (stacking)
-209a	8MB ECC (non-stacking)
-210a	8MB ECC (stacking)
-211a	32MB ECC (non-stacking)
-212a	32MB ECC (stacking)

Documentation

68-M162LXSET	User's Manual set
68-1X7DS	Peripheral chipset manuals

Notes

1. All models include: 128KB SRAM with battery backup, 1MB Flash memory with MVME162BUG installed, four EPROM sockets, 8K x 8 NVRAM/TOD Clock, four serial ports, two IndustryPack ports, and timers.
2. As denoted above, 'a' indicates the major revision level. The alpha character is not normally part of the model number unless a major revision has occurred to the product.
3. All models listed above may not be immediately available. Models without VMEbus interface are available upon request. Contact your local Motorola Computer Group sales representative.
4. Firmware source and object modules are available upon request.
5. Non-stacking memory modules must be used as the terminal MVME162 memory module, either alone or on top of a stacking module. Stacking memory modules must be used as the first MVME162 memory module and will accept one non-stacking module installed on top of it.



MVME162LX Embedded Controller

IndustryPack Interface

A key feature of the MVME162 is the IndustryPack interface. IndustryPack modules provide a wide variety of connectivity to "real-world" I/O. Expansion is accomplished by means of a mezzanine board mounted to the MVME162. Up to two single-wide IndustryPack modules can be installed on the MVME162LX and still occupy only one VME slot.

VMEbus Interface

VMEbus interface functionality is provided by the Motorola-designed VMEchip2 ASIC. In addition to controlling the system's VMEbus functions, the VMEchip2 includes a local bus to/from VMEbus DMA controller, VME board support features, as well as Global Control and Status Register (GCSR) for interprocessor communications. The MVME162LX also provides support for the VME D64 specification within the VMEbus interface, further enhancing system performance.

For deeply embedded applications, versions of the MVME162LX are available without the VMEbus interface. These versions have power and ground connections through the P1 VMEbus connector.

Peripheral Interface

Peripheral I/O connections for the MVME162LX Series are located on the front panel of the module. Serial port connection is via four RJ-45 connectors. SCSI devices are interfaced via an industry-standard 68-pin connector. A DB-15 connector is used for Ethernet. IndustryPack modules connect to external I/O devices via 50-pin connectors behind the front panel of the MVME162LX.

Memory Options

The MVME162LX provides users with a variety of data storage options such as Parity DRAM, ECC (Error Checking and Control) DRAM, EPROM/ROM, Flash and battery-backed SRAM.

Software Support

The MVME162LX 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

MVME162LX Embedded Controller

Processor

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

Memory

Dynamic RAM

Capacity:	4MB	8MB	16MB
Read Burst Mode:	4-1-1-1	4-2-2-2	4-2-2-2
Write Burst Mode:	3-2-2-2	3-2-2-2	3-2-2-2
Shared:	VMEbus and Local Bus		

ECC Dynamic RAM

Capacity:	4, 8, 16 or 32 MB
Wait States:	3 read, 0 write
Read Burst Mode:	5-1-1-1
Write Burst Mode:	2-1-1-1
Shared:	VMEbus and Local Bus

Static Ram

Capacity:	128KB
Read Burst Mode:	5-3-3-3
Write Burst Mode:	5-3-3-3
Parity:	No
Shared:	VMEbus and Local Bus
Battery Type:	Lithium
Battery Life (40° C):	200 days

ROM/EPROM (150ns)

Number of Sockets:	
MVME162-2*xx*/3*xx*	Four (512K x 16)
MVME162-7*xx*/8*xx*	Two (512K x 16)
Capacity:	4MB
Access Cycles:	Six read, seven write

Flash (120ns)

Capacity:	1MB
Access Cycles:	Five read, six-write

Counters/Timers

Real-Time Timers/Counters:	Six 32-bit, 1 µsec resolution
TOD Clock Device:	M48T08; 8KB NVRAM
Watchdog Timer:	Time-out generates Reset

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

DTB Master:	A16-A32; D08-D64, BLT, UAT + MBLT
DTB Slave:	A16-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:	4, LMA32

SCSI Bus

Controller:	NCR 53C710
Local Bus DMA:	Yes, with Local Bus Burst
Asynchronous:	5.0MB/s
Synchronous:	10.0MB/s

IndustryPack Logic Interface

Data Width:	16/32-bit
Interrupts:	Two levels
DMA:	Four channels
Clock Speed:	8/32 MHz
Module Types:	Four single-high, two double-high
Transfer Rate-8 MHz:	8MB/sec 16-bit; 16MB/sec 32-bit

Ethernet

Controller:	82596CA
Local bus DMA:	Yes

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	

Asynchronous Serial Ports

Controller:	85230
Number of Ports:	Four
Configuration:	EIA-232-D DTE (all four ports)
Async Baud Rate:	38.4Kbps max.
Sync Baud Rate:	38.4Kbps max.

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.)

Hardware Support

Multiprocessing Hardware Support:	Four mailbox interrupts, RMW, shared RAM
Debug/Monitor:	MVME162FW, boot and diagnostics

Peripheral Connectors

Serial Ports:	Four RJ-45 connectors
Ethernet:	DB-15
SCSI:	68-pin Micro D high density
IndustryPack I/O:	Access via two 50-pin connectors

Demonstrated MTBF

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

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

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.

For more information, visit our World Wide Web site at **http://www.mot.com/computer**
For fax-back service dial **1-800-682-6128** in the U.S. and **602-438-4636** outside of the U.S.
To call us dial **1-800-759-1107** in the U.S. and **512-434-1525** outside of the U.S.
Corporate headquarters address: Motorola Computer Group, 2900 S. Diablo Way, Tempe, AZ 85282

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