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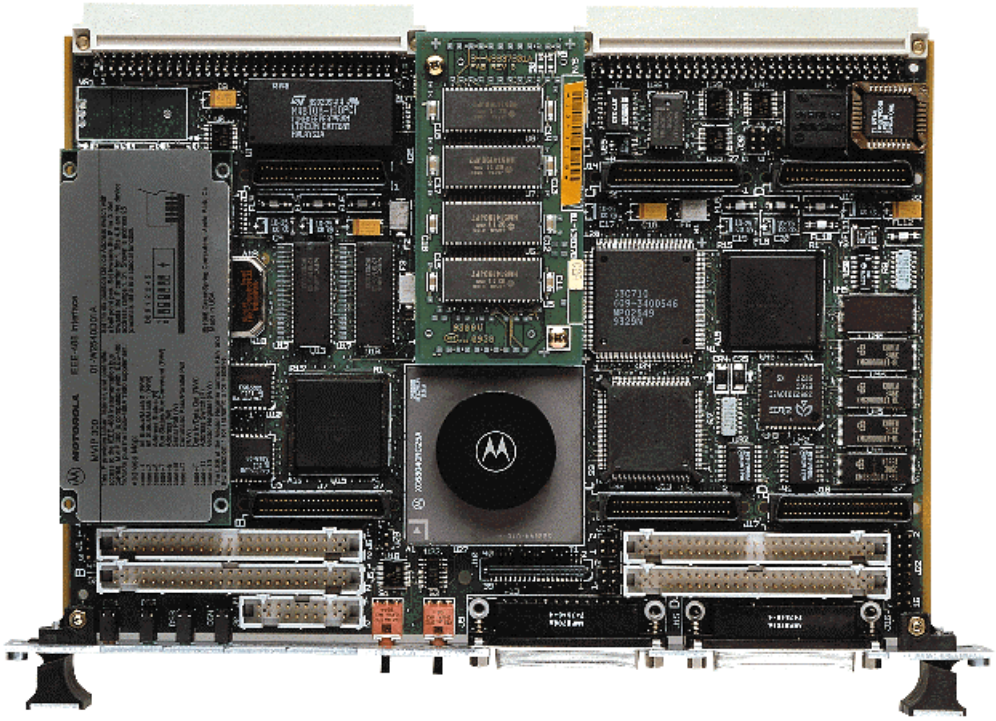
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MOTOROLA COMPUTER GROUP

Board Level Products

MVME162FX
EMBEDDED CONTROLLER



Advantages

The MVME162FX 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 MVME162FX allows a variety of MPU, memory, and interface options such as floating-point, Ethernet, SCSI, and VME. The result is a variation of the MVME162FX which most closely fits the application requirement.

MOTOROLA

Features

- Choice of processors:
  - 32 MHz MC68040 enhanced 32-bit microprocessor with 8KB of cache, and MMU and FPU
  - 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 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**
- **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 MVME162FX series reinforces this commitment by providing superior hardware, price performance, and faithfulness to the tenets of open computing: modularity, scalability, portability, and interoperability.

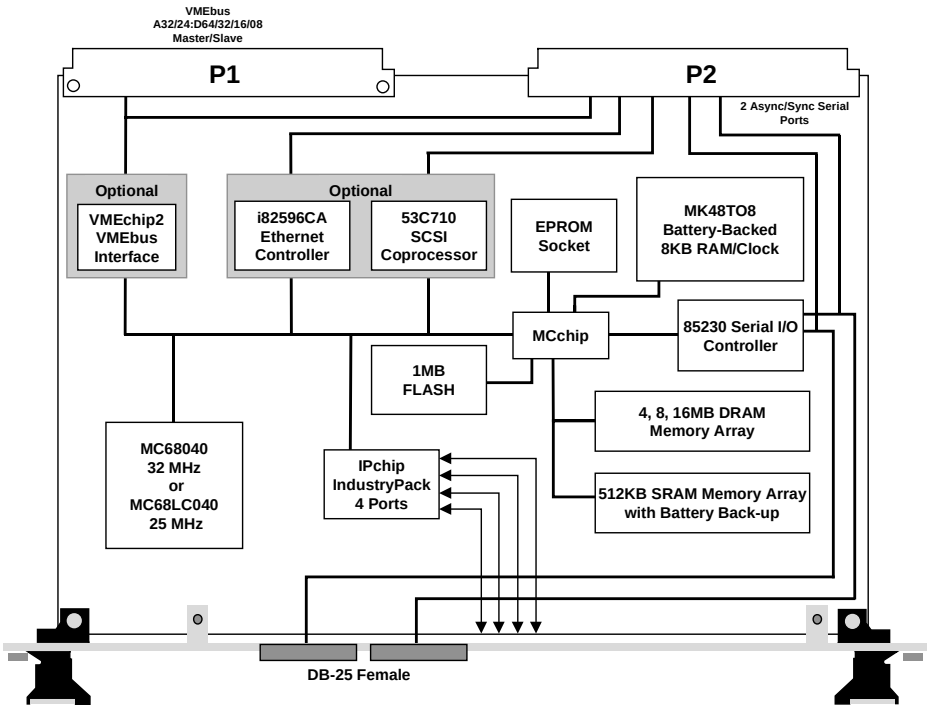
Motorola Computer Group is ISO9001 registered, and provides world class quality in manufacturing, engineering, sales, and marketing.

Ordering Information

Part Number	Description
All models include 512KB SRAM with battery backup, 1MB Flash memory with 162Bug installed, one EPROM socket, 4MB DRAM, 8K x 8 NVRAM/TOD clock, two serial ports, four IndustryPack ports, and timers.	
25MHz MC68LC040	
MVME162-410*y*	4MB DRAM, no SCSI or Ethernet
MVME162-411*y*	4MB DRAM, SCSI only
MVME162-412*y*	4MB DRAM, Ethernet only
MVME162-413*y*	4MB DRAM, SCSI and Ethernet
MVME162-430*y*	8MB DRAM, no SCSI or Ethernet
MVME162-431*y*	8MB DRAM, SCSI only
MVME162-432*y*	8MB DRAM, Ethernet only
MVME162-433*y*	8MB DRAM, SCSI and Ethernet
MVME162-453*y*	16MB DRAM, SCSI and Ethernet
32 MHz MC68040	
MVME162-510*y*	4MB DRAM, no SCSI or Ethernet
MVME162-511*y*	4MB DRAM, SCSI only
MVME162-512*y*	4MB DRAM, Ethernet only
MVME162-513*y*	4MB DRAM, SCSI and Ethernet
MVME162-520*y*	8MB DRAM, no SCSI or Ethernet
MVME162-521*y*	8MB DRAM, SCSI only
MVME162-522*y*	8MB DRAM, Ethernet only
MVME162-523*y*	8MB DRAM, SCSI and Ethernet
MVME162-530*y*	16MB DRAM, no SCSI or Ethernet
MVME162-531*y*	16MB DRAM, SCSI only
MVME162-532*y*	16MB DRAM, Ethernet only
MVME162-533*y*	16MB DRAM, SCSI and Ethernet
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)
DRAM Expansion Memory	
MEM162-502*y*	4MB
MEM162-503*y*	12MB
Documentation	
V162FXA/IH	MVME162FX Installation and Use manual
V162FXA/PG	MVME162FX Programmer's Reference Guide
V162DIAA/UM	162Bug Diagnostics User's Manual

Notes

1. *y* indicates product revision level if any; for example, "-410A."
2. Firmware source and object modules are available upon request.
3. Documentation is also available on line at http://www.mcg.mot.com/literature.



MVME162FX Embedded Controller

Microprocessor Options

The MVME162FX provides scalability by allowing several types of MPU options. Features such as clock speed and floating point capability can be selected.

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 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 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.

IndustryPack Interface

A key feature of the MVME162FX 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 MVME162FX 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 MVME162FX 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 MVME162FX series. These modules take the I/O connections for the peripherals on board the MVME162FX series from the P2 connection of the module to a transition module that has industry-standard connections.

Software Support

The MVME162FX 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

MVME162FX Embedded Controller

Processor

Microprocessor:	MC68040	MC68LC040
Clock Frequency:	32 MHz	25 MHz

Memory

Dynamic RAM

Capacity:	4MB, 8MB	16MB
Read/Write Burst Mode:	4-1-1-1/3-2-2-2	4-2-2-2/3-2-2-2
Parity:	No	
Shared:	VMEbus and local bus	

Flash

Capacity:	1MB
Parity:	No
Shared:	No

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
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:	MVME162FXFW, 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

Safety

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

Electromagnetic Compatibility (EMC)

Intended for use in systems meeting the following regulations:

U.S.: FCC Part 15, Subpart B, Class A (nonresidential)

Canada: ICES-003, Class A (nonresidential)

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

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