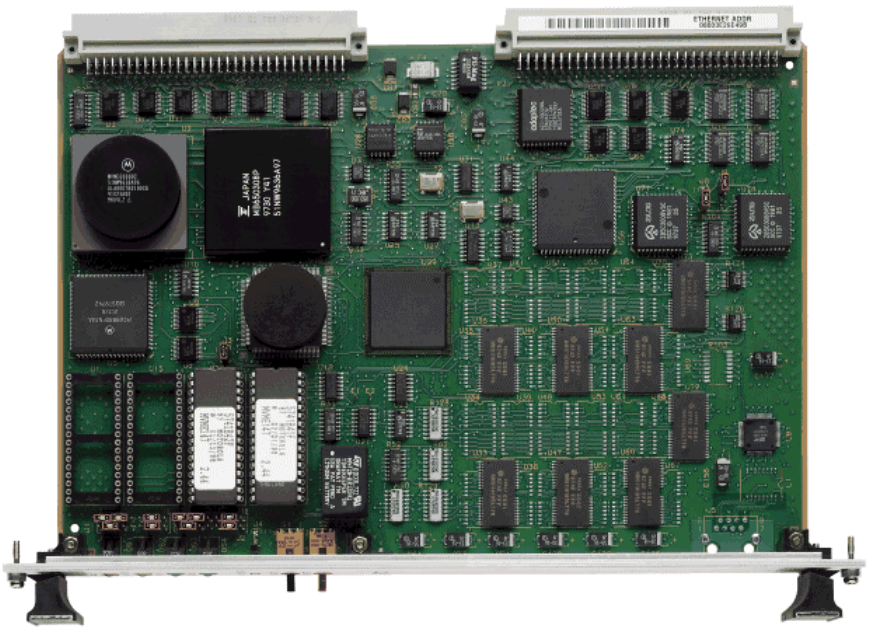
MOTOROLA COMPUTER GROUP

Board Level Products

MVME147
SINGLE-BOARD COMPUTER



Advantages

The MVME147 series offers one of the world's finest VMEbus single-board computers. The on-board resources and peripheral controllers eliminate the need for additional modules in the VMEbus backplane thus reducing costs and freeing up valuable bus slots for additional functions. The MVME147 series features an MC68030 enhanced 32-bit microprocessor. The MC68030 was the first general purpose microprocessor with on-chip cache memory for both instructions and data which increases the processor's efficiency by 20 to 40 percent. The MC68030 features a complete memory management unit (MMU) which provides the software protection and virtual memory functions critical to many applications.

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Features

- 16, 25, or 33.33 MHz MC68030 enhanced 32-bit microprocessor
- 16, 25, or 33.33 MHz MC68882 floating-point coprocessor
- 4, 8, 16, or 32MB of shared DRAM, with programmable parity
- 4K x 8 SRAM and time-of-day clock with battery
- Four 28/32-pin ROM/PROM/EPROM/EEPROM sockets, 16-bits wide
- A32/D32 VMEbus master/slave interface with system controller function
- Four EIA-232-D serial communications ports
- Centronics® compatible printer port
- Two 16-bit timers and watchdog timer
- SCSI bus interface with DMA
- Ethernet transceiver interface
- 4-level requester, 7-level interrupter, and 7-level interrupt handler for VMEbus
- On-board debugger and diagnostic firmware

Transition Modules

Optional MVME712 series transition modules are available to support the use of standard I/O connections for the MVME147 series. These modules take the I/O connections for the peripherals on board the MVME147 series from the P2 connection of the module to a transition module that has industry standard connections

Development Software

Development software for the MVME147 series includes the on-board debugger/monitor firmware and driver packages for the UNIX® SYSTEM V/68 and VMEexec® environments. Debugger/monitor firmware is included on the board.

The Motorola Commitment

Motorola Computer Group is committed to providing best-in-class embedded computing solutions. The MVME147 series reinforces this commitment by providing superior hardware, price performance and faithfulness to the tenets of open computing: modularity, scalability, portability and interoperability.

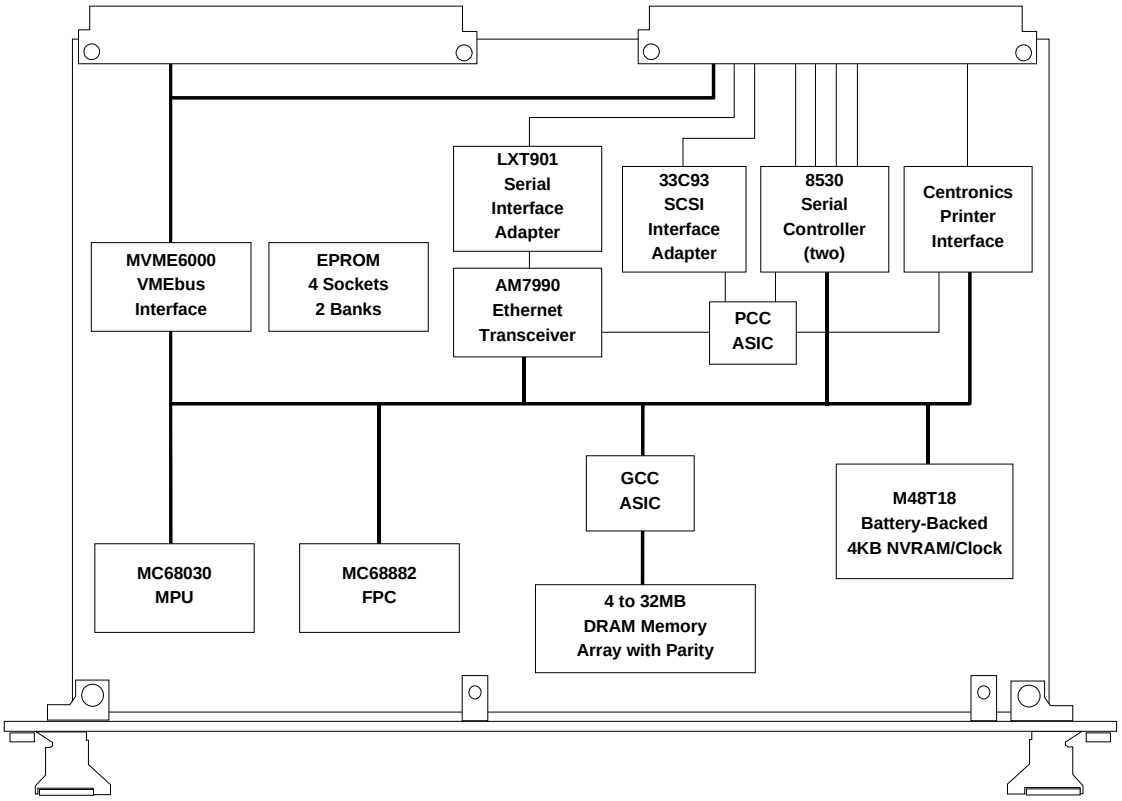
Motorola Computer Group is ISO9001 and ISO9002 registered, and provides world class quality in manufacturing, engineering, sales, and marketing.

Ordering Information

Part Number	Description
MVME147-010	16 MHz, 4MB DRAM, No Parity, 4 SIO, 1 PIO, SCSI
MVME147-011	25 MHz, 4MB DRAM, 4 SIO, 1 PIO, Ethernet and SCSI
MVME147-012	25 MHz, 8MB DRAM, 4 SIO, 1 PIO, Ethernet and SCSI
MVME147-013	25 MHz, 16MB DRAM, 4 SIO, 1 PIO, Ethernet and SCSI
MVME147-014	25 MHz, 32MB DRAM, 4 SIO, 1 PIO, Ethernet and SCSI
MVME147-022	33.33 MHz, 8MB DRAM, 4 SIO, 1 PIO, Ethernet and SCSI
MVME147-023	33.33 MHz, 16MB DRAM, 4 SIO, 1 PIO, Ethernet and SCSI
MVME147-024	33.33 MHz, 32MB DRAM, 4 SIO, 1 PIO, Ethernet and SCSI
Related Products	
MVME712A	4 DB-9 female serial port connectors, 1 RJ-11 connector, Centronics parallel port connector, and P2 adapter
MVME712B	DB-15 Ethernet connector and SCSI connector
MVME712M	4 DB-25 female serial port connectors, Centronics parallel port connector, DB-15 Ethernet connector, SCSI connector, and P2 adapter
MVME712P2	Adapter module from VME backplane to cabling for transition modules
MVME712-012	Same as MVME712A but with DIN connector at P2 for use with MVME946 chassis
MVME147FW*nn*	Object of the debugger/monitor where *nn*=software version; requires software license
Documentation	
VME147A/IH	MVME147 user's manual
V147BUGA1/UM and V147BUGA2/UM	147Bug user's manual, volumes 1 and 2
VME712MA/IH	MVME712 transition module user's manual

Notes

1. Major revision levels are indicated by alpha character at end of part number.
2. Firmware object is included in EPROM with each board, and firmware source code is available for purchase. Board support package source and object modules available upon request.
3. Documentation is also available on line at http://www.mcg.mot.com/literature.



MVME147 Block Diagram

Performance

	16 MHz		25 MHz		33.33 MHz		
Access Sequence	Read Cycles	Write Cycles	Read Cycles	Write Cycles	Read Cycles	Write Cycles	Notes
MPU to Local DRAM							
No Parity	4	4	4	4	4	4	1, 2
Delayed Parity	N/A	N/A	4	4	4	4	1, 2
Parity	N/A	N/A	5	4	5	4	1, 2
MPU to Local ROM	9	9	13	13	16	16	1, 3
VMEbus to Local DRAM	13 813ns	11 688ns	13 520ns	11 440ns	13 390ns	11 330ns	4, 5
MPU to Global RAM							
VMEbus Master	6 + A	6 + A	9 + A	9 + A	12 + A	12 + A	5, 6
System Controller/Not Master	11 + B	11 + B	17 + B	17 + B	22 + B	22 + B	5, 7
Not System Controller/Not Master	9 + C	9 + C	15 + C	15 + C	19 + C	19 + C	5, 8

Notes:

1. No arbitration overhead.
2. Except RMW cycles where the MVME147 is required to obtain VMEbus mastership before RMW cycle can be started.
3. Device access time must be 200ns or less.
4. DS0*/DS1* asserted to DTACK* asserted.
5. Typical values. Actual values may be greater or less depending on the state of the slave device.
6. A = ta/T cycles.
7. B = (ta + tr)/T cycles.
8. C = (ta + tg)/T cycles.

ta = DS0*/DS1* to the assertion of DTACK* (slave access time).
tr = Brx* low to BBSY high and AS* high (bus requested and granted).
tg = Brx* low to BGINx* low and AS* high (bus requested and granted).
T = MPU clock period, 16 MHz = 62.5 ns, 25 MHz = 40 ns, 33.33 MHz = 30 ns.

Specifications

MVME147 Single-Board Computer

Processor

Microprocessor:	MC68030
Co-processor:	MC68882
Clock Frequency:	16, 25 or 33.33 MHz

Memory

Main Memory:	Dynamic RAM
Capacity:	4, 8, 16, or 32MB
Single Cycle Accesses:	4 read/4 write
Read Burst Mode - no parity:	4-2-2-2
Read Burst Mode - parity:	5-3-3-3
Write Burst Mode:	4-2-2-2
Parity:	Yes, programmable (parity not available on MVME147-010)
EPROM:	16-bit, 32-pin DIP
# of Sockets (max. capacity):	4 (1M x 8)
Capacity:	4MB

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

DTB Master:	A16-A32; D08-D32
DTB Slave:	A16-A32; D08-D32, UAT
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:	33C93B
Local Bus DMA:	Yes
Asynchronous (8-bit mode):	1.5MB/s
Synchronous (8-bit mode):	4.0MB/s
Connector:	Routed to P2

Ethernet

Controller:	AM7990
Local bus DMA:	Yes
Connector:	Routed to P2

Clock/Timers

TOD Clock Device:	M48T18; 4KB NVRAM (available for user applications)
Timers/Counters:	Two 16-bit, one watchdog

Serial Ports

Controller:	85C30
Number of ports:	4
Configuration:	EIA-232 DTE
Async Baud Rate, bps max.:	19.2K
Sync Baud Rate, bps max.:	19.2K
Connector:	Routed to P2

Power Requirements

	Typical	Maximum
+5V ± 5.0%:	3.5 A	5.0 A
+12V ± 10.0%:		1.0 A (with off-board LAN transceiver)
–12V ± 10.0%:	100 mA	

Board Size

Height:	233.4 mm (9.187 in.)
Depth:	160.0 mm (6.299 in.)
Front Panel Height:	261.8 mm (10.3 in.)
Width:	19.8 mm (0.8 in.)

Hardware Support

Multiprocessor Hardware Support:	4 mailbox interrupts, RMW, shared RAM
Debug/Monitor (included):	MVME147BUG
Transistion Module (optional):	MVME712 series

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%	—
Vibration:	2 Gs RMS, 20–2000 Hz random	8 Gs RMS, 20–2000 Hz random

Demonstrated MTBF

(based on sample testing in accelerated stress environment)

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

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

Software Support

Integrated Systems, Inc:	pSOS+™
Lynx Real-Time Systems, Inc.:	LynxOS™
Microware Systems Corporation:	OS-9®
Microtec Research, Inc.:	VRTX-32™
Wind River Systems, Inc.:	VxWorks®

For more information, visit our World Wide Web site at **http://www.mcg.mot.com**
For fax-back service dial **1-800-682-6128** in the U.S. and **602-438-4636** outside of the U.S.
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Data Sheet: M147-D2