

MVME5500 Series
VME Single-Board
Computer



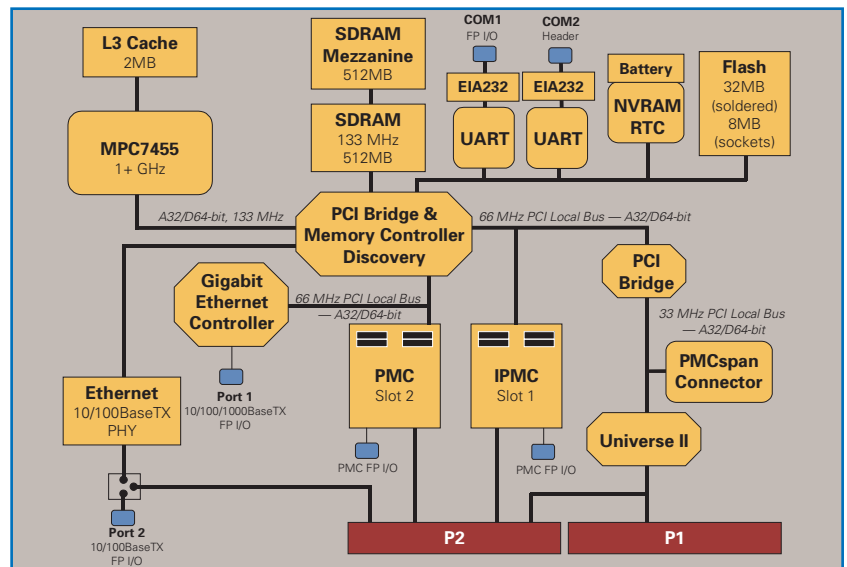
Motorola's highest performance VMEbus single-board computer

The MVME5500 is the latest flagship of the Motorola VME product line, enabling even higher levels of performance in a single VMEbus slot. The MVME5500 utilizes the latest MPC7455 processor running at speeds of 1 GHz and beyond, which is ideal for data intensive applications.

The MVME5500 provides more than just faster processor performance; it provides balanced performance from the processor, memory, local buses, and I/O subsystems. The powerful Marvell Discovery system controller, with support for a 133 MHz host bus and a 133 MHz SDRAM memory bus, is well matched to the high-speed processor. To match the system I/O to the outstanding processor performance, the MVME5500 provides dual 64-bit, 33/66 MHz PCI buses. Each PCI bus has a PMC site supporting cards running at 33 or 66 MHz. The Universe II VME interface and PMCspan connector are isolated from the PMC sites on a dedicated 33 MHz PCI bus segment, so that both PMC sites are capable of 66 MHz operation. The MVME5500 also offers a Gigabit Ethernet interface, a 10/100BaseTX Ethernet interface, and two serial ports. All of this adds up to a set of well-balanced, high-performance subsystems for unparalleled performance.

The MVME5500 series is designed to meet the needs of OEMs servicing the defense and aerospace, industrial automation, and medical imaging market segments. Customers looking for a "technology refresh" for their application while maintaining backward compatibility with their existing VMEbus infrastructure can upgrade to the MVME5500 series and take advantage of the enhanced performance features.

- MPC7455 processor at speeds of 1 GHz and beyond
- 256KB of on-chip L2 cache and 2MB of L3 cache
- AltiVec coprocessor for high-performance computational applications
- 512MB of on-board SDRAM ECC memory and 512MB additional memory via a memory mezzanine card for a total of 1GB of memory
- 40MB Flash memory (32MB soldered and 8MB in sockets)
- Dual PCI buses and dual PMC sites with a bus speed of up to 66 MHz
- Gigabit Ethernet interface and a 10/100BaseTX Ethernet interface
- 64-bit PCI expansion mezzanine connector allowing up to four more PMCs
- I/O compatibility with MVME51xx family
- Single VME slot even when fully configured with two PMC modules or one PMC module and an add-on memory mezzanine



Backward Compatibility

The MVME5500 continues the direction that Motorola started with the MVME5100 series of providing a migration path from Motorola's embedded controllers and single-board computers (SBCs) to a single platform. This migration path enables OEMs to support varying I/O requirements with the same base platform, simplifying part number maintenance, technical expertise requirements, and sparing.

The MVME5500 series offers customers a migration path from the MVME2300, MVME2400, MVME2600, MVME2700, and MVME5100 boards to allow them to take advantage of features such as the MPC7455 processor, Gigabit Ethernet, and 33/66 MHz PMC sites.

P2 I/O Modes

Like the MVME5100 series, the MVME5500 series supports two, jumper-configurable P2 I/O modes: PMC mode and IPMC mode. PMC mode is backward compatible with the MVME2300/MVME2400 and MVME5100 in PMC mode. In PMC mode, 64 pins from PMC Slot 1 and 46 pins from PMC Slot 2 are available on P2 for PMC rear I/O. In IPMC mode, the MVME5500 series supports legacy MVME761 or MVME712M I/O modules (with limited PMC I/O) when an IPMC761 or IPMC712 PMC card is populated in PMC Slot 1. In this configuration, PMC Slot 2 contains some signals that are reserved for extended SCSI.

IPMC Modules

The IPMC761 and IPMC712 are optional add-on PMC modules that provide backward compatibility with previous generation Motorola products (such as MVME2600, MVME2700, and MVME5100 in IPMC mode) using the MVME761 or MVME712M transition module. IPMC modules provide rear I/O support for the following:

- One single-ended Ultra Wide SCSI port
- One parallel port
- Four serial ports (two or three async and one or two sync/async, depending on module)

With this PMC card configuration, one PMC slot is still available, providing support for OEM product customization.

Transition Modules***MVME761***

The MVME761 transition module provides industry-standard connector access to the IEEE 1284 parallel port, a 10BaseT or 100BaseT port via an RJ-45 connector, two DB-9 connectors providing access to the asynchronous serial ports configured as EIA-574 DTE, and two HD-26 connectors providing access to the sync/async serial ports. These serial ports, labeled as Serial 3 and Serial 4 on the faceplate of the MVME761, are individually user-configurable as EIA-232, EIA-530, V.35, or X.21 DCE or DTE via the installation of Motorola serial interface modules (SIMs).

A P2 adapter provides interface module signals to the MVME761 transition module. The 3-row P2 adapter can be used for 8-bit SCSI. A 5-row P2 adapter supports 16-bit SCSI and PMC I/O.

MVME712M

The MVME712M transition module provides industry-standard connector access to the Centronics parallel port, a narrow SCSI port, and four DB-25 connectors providing access to the asynchronous/synchronous serial ports jumper configurable as EIA-232 DCE or DTE. A P2 adapter provides interface signals to the MVME712M transition module. The 3-row P2 adapter can be used for 8-bit SCSI.

To gain access to the additional user-definable I/O pins provided via the 5-row VME64 extension connector, a special P2 adapter board is available. This adapter panel replaces the traditional 3-row P2 adapter and extends its capability by providing access to the PMC I/O pins.

Software Support

Firmware Monitor

Firmware must fulfill the traditional functions of power-on self-test (POST), initialization, and operating system booting. Motorola's innovative firmware (known as MotLoad) that is resident on the MVME5500 exceeds these requirements with expanded features such as interrupt driven I/O, more comprehensive power-up tests, and extensive diagnostics with new scripting capability. And of course, MotLoad provides a debugger interface similar to the time proven "BUG" interface on previous VMEbus boards from Motorola.

Operating Systems and Kernels

WindRiver Systems VxWorks and MontaVista Linux Professional Edition will be available for the MVME5500.

Libraries

VSI/Pro VSIPL libraries from MPI Software Technology will be available on the MVME5500.

Built-In Test Software

Motorola Built-In Test (MBIT) software is available for use on the MVME5500 series. MBIT is an off-the-shelf software infrastructure designed to verify correct operation of Motorola hardware and enable the incorporation of system-level diagnostics. Two versions of MBIT, board-level and system-level, are available and are compatible with WindRiver Systems Tornado 2.1.

The board-level MBIT is a comprehensive diagnostic software package designed to verify the performance of board-mounted logic devices. All tests can execute at boot-up, while selected tests can run continuously in the background of user applications. An application programming interface (API) is included to provide access to test results and to modify and control the operation of device tests. A comprehensive user's manual is available.

The system-level MBIT includes all functionality and API function calls of the board-level version and enables system-wide testing. The system-level MBIT provides a framework and additional API function calls to support the inclusion of software designed to test custom hardware and/or system components. A comprehensive user's manual with software development guidelines is available.

SPECIFICATIONS

Processor

Microprocessor:	MPC7455
Clock Frequency:	1 GHz
On-chip L1 Cache (I/D):	32KB/32KB
On-chip L2 Cache (I/D):	256KB/256KB
L3 Cache:	2MB

System Controller

Marvell Discovery GT-64260A

Main Memory

Type:	PC133 ECC SDRAM
Speed:	133 MHz
Capacity:	512MB on-board, expandable to 1GB with add-on memory mezzanine card. If a PMC module is plugged into PMC Slot 1, the memory mezzanine card cannot be used because the PMC module covers the memory mezzanine connector.
Configurations:	512MB in two banks

Flash Memory

Type:	EEPROM, on-board programmable
Capacity:	8MB via two 56-pin TSOP sockets; 32MB soldered Flash
Write Protection:	32MB of surface-mount Flash is write-protectable via jumper

NVRAM

Capacity:	32KB (4KB available for users)
Cell Storage Life:	50 years at 55° C
Cell Capacity Life:	5 years at 100% duty cycle, 25° C
Removable Battery:	Yes

Counters/Timers

TOD Clock Device:	M48T37V
Real-Time Timers/Counters:	Eight, 32-bit programmable
Watchdog Timer:	Time-out generates reset

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

Controller:	Tundra Universe II
DTB Master:	A16-A32; D08-D64, SCT, BLT
DTB Slave:	A24-A32; D08-D64, BLT, UAT
Arbiter:	RR/PRI
Interrupt Handler/Generator:	IRQ 1-7/Any one of seven IRQs
System Controller:	Yes, jumperable or auto detect
Location Monitor:	Two, LMA32

Ethernet Interfaces

Port 1

Controller:	Intel 82544EI Gigabit Ethernet controller
Interface Speed:	10/100/1000Mb/s
Connector:	Routed to front panel RJ-45

Port 2

Controller:	Controller integrated into GT-64260A system controller
Interface Speed:	10/100Mb/s
Connector:	Routed to front panel RJ-45 or optionally routed to P2, RJ-45 on MVME761

Asynchronous Serial Ports

Controller:	Two TL16C550C UARTs
Number of Ports:	Two, 16550 compatible
Async Baud Rate, bps max.:	38.4K EIA-232, 115Kb/s raw
Connector:	Routed to front panel RJ-45; one on planar for development use

Dual IEEE P1386.1 PCI Mezzanine Card Slots

Address/Data:	A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors
PCI Bus Clock:	33/66 MHz
Signaling:	3.3V or 5V, configurable with keying pin
Power:	+3.3V, +5V, $\pm 12V$
Module Types:	Two single-wide or one double-wide, front panel or P2 I/O, PMC and PrPMC support

Note: If a PMC module is plugged in PMC Slot 1, the memory mezzanine card cannot be used because the PMC module covers the memory mezzanine connector.

PCI Expansion Connector

Address/Data:	A32/D32/D64
PCI Bus Clock:	33 MHz
Signaling:	5V
Power:	+3.3V, +5V, $\pm 12V$
Connector:	114-pin connector located on MVME5500 planar, same location as on MVME5100 planar

Power Requirements

(Not including power required by PMC or IMPC modules)

	+5V $\pm 5\%$	+12V $\pm 10\%$	-12V $\pm 10\%$
MVME5500:	TBD	TBD	TBD
MVME5500 with MVME761:	TBD	TBD	TBD

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.)
Max. Component Height:	14.8 mm (0.58 in.)

IPMC Modules

PMC Interface

Address/Data:	A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors
PCI Bus Clock:	33 MHz
Signaling:	5V
Module Type:	Basic single-wide; P2 I/O

SCSI Bus

Controller:	Symbios 53C895A
PCI Local Bus DMA:	Yes, with PCI local bus burst
Asynchronous (8-bit mode):	5.0MB/s
Ultra SCSI:	20.0MB/s (8-bit mode), 40.0MB/s (16-bit mode)

Note: 16-bit SCSI operation precludes the use of some PMC Slot 2 signals.

Synchronous Serial Ports

Controller:	85230/8536
Number of Ports:	Two (IPMC761); one (IPMC712)
Configuration:	IPMC761: TTL to P2 (both ports), SIM configurable on MVME761; IPMC712: EIA-232 to P2
Baud Rate, bps max.:	2.5M sync, 38.4K async
Oscillator Clock Rate (PCLK):	10 MHz/5 MHz

Asynchronous Serial Ports

Controller:	16C550 UART; 85230/8536
Number of Ports:	Two (IPMC761); three (IPMC712)
Configuration:	EIA-574 DTE (IPMC761); EIA-232 (IPMC712)
Async Baud Rate, bps max.:	38.4K EIA-232, 115Kb/s raw

Parallel Port

Controller:	PC97307
Configuration:	8-bit bi-directional, full IEEE 1284 support; Centronics compatible (minus EPP and ECP on MVME712M)
Modes:	Master only

Power Requirements

(Additional power load placed on MVME5500 with IPMC installed)

	IPMC761	IPMC712
+5V:	0.5 A max.	0.5 A max.
+3.3V:	0.75 A max.	0.75 A max.

Transition Modules

I/O Connectors

	MVME761	MVME712M
Asynchronous Serial Ports:	Two, DB-9 labeled as COM1 and COM2	Three, DB-25 labeled as Serial 1, Serial 2, and Serial 3
Synchronous Serial Ports:	Two HD-26 labeled as Serial 3 and Serial 4 (user-configurable via installation of SIMs), Two 60-pin connectors on MVME761 planar for installation of two SIMs	One, DB-25 labeled as Serial 4
Parallel Port:	HD-36, Centronics compatible	D-36, Centronics compatible
Ethernet:	10BaseT or 100BaseT, RJ-45	NA
SCSI:	8- or 16-bit, 50- or 68-pin connector via P2 adapter	8-bit, standard SCSI D-50

Board Size

Height:	233.4 mm (9.2 in.)
Depth:	80.0 mm (3.1 in.)
Front Panel Height:	261.8 mm (10.3 in.)
Front Panel Width:	MVME761: 19.8 mm (0.8 in.) MVME712M: 39.6 mm (1.6 in.)

All Modules

Environmental

	Operating	Non-operating
Temperature:	0° C to +55° C (inlet air temp. w/forced air cooling)	-40° C to +85° C
Vibration:	2 Gs RMS, 20-2000 Hz random	1 G sinusoidal, 5-100 Hz 2 axes

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 (non-residential)

Canada: ICES-003, Class A (non-residential)

Motorola Computer Group board products are tested in a representative system to the following standards, results pending for configurations with IPMC712:

CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class A; Immunity: EN55024

ORDERING INFORMATION

Part Number	Description
MVME5500-0161	1 GHz MPC7455 processor, 512MB SDRAM, Scanbe handles
MVME5500-0163	1 GHz MPC7455 processor, 512MB SDRAM, IEEE handles
Memory	
RAM5500-007	512MB memory mezzanine expansion card
Once released, documentation is available for online viewing and ordering at http://www.motorola.com/computer/literature	

General availability of the MVME5500 series is scheduled for March 2003.

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