Datasheet

MVME5100 Series

VME Processor Modules

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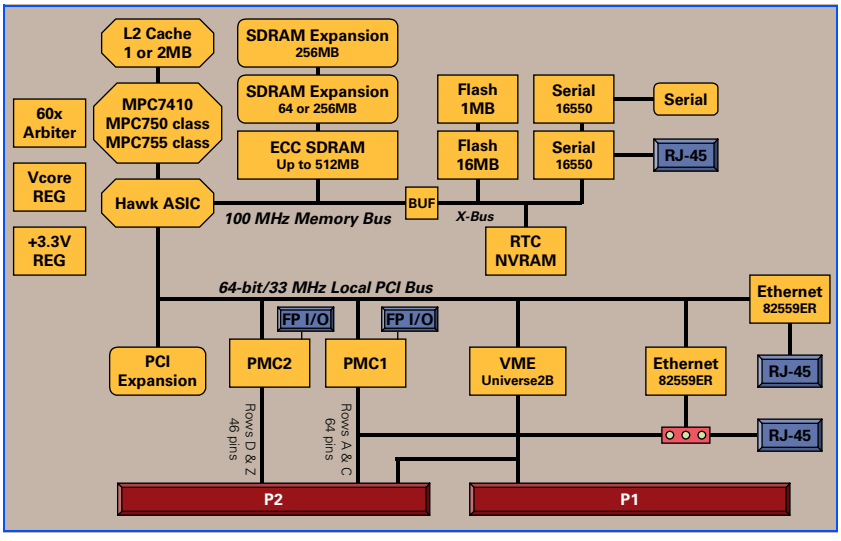
Supercomputing levels of performance in a scalable, single-board computer

The MVME5100 Series is the flagship of the Motorola PowerPlus II VME Architecture line, enabling supercomputing levels of performance in a single VMEbus slot. Based on an integrated PCI bridge-memory controller ASIC designed by Motorola Computer Group, PowerPlus II takes memory performance to new levels with 582MB/s memory read bandwidth and 640MB/s burst write bandwidth. Plus, PowerPlus II Architecture supports full PCI throughput of 264MB/s without starving the processor from its memory.

The extended temperature versions of the MVME5100 Series offer hardware and software compatible products to enhance the existing MVME5100 product. The new versions operate at extended temperature ranges of –20° to 71° C vs. 0° to 55° C for the already existing commercial versions. The temperature range is advantageous to OEMs that require extended operating temperatures for their equipment.

The MVME5100 is designed to meet the needs of OEMs servicing the defense and aerospace, industrial automation and medical market segments.

- MPC7410, MPC750 or MPC755 class microprocessor with 32KB/32KB L1 cache
- Up to 2MB of secondary backside cache
- 100 MHz front-side bus
- Up to 512MB of on-board ECC SDRAM—expandable up to 1GB with optional RAM500 memory expansion modules
- 17MB Flash memory
- Dual IEEE P1386.1 compatible 32/64-bit PMC expansion slots
- 64-bit PCI expansion mezzanine connector allowing up to four more PMCs
- Dual 16550 compatible async serial ports
- Dual 10BaseT/100BaseTX Ethernet
- 32KB NVRAM and time-of-day clock with replaceable battery backup
- Four 32-bit timers and one watchdog timer
- On-board debug monitor
- Single VME slot even when fully configured with two PMC modules and both add-on memory mezzanines



I/O Compatibility

Historically, Motorola has offered two tracks in its PowerPC Architecture VME portfolio. The first track (which includes the MVME2600/2700) provides typical single-board computer I/O features including Ethernet, SCSI, multiple serial ports, a parallel port and a single PMC slot. The on-board I/O is routed to P2 and made available to the user via Motorola MVME761 or MVME712M transition boards. The second track (which includes the MVME2300/2400) offers limited on-board I/O (Ethernet and a single serial port both via the front panel) but provides dual PMC slots enabling maximum user I/O customization.

The MVME5100 merges the best features of both tracks enabling the OEM to support varying I/O requirements with the same base platform, simplifying part number maintenance, technical expertise requirements and sparing.

P2 I/O Modes

The MVME5100 supports two, jumper-configurable P2 I/O modes, PMC mode and IPMC mode.

PMC mode is backward compatible with the MVME2300/MVME2400. 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.

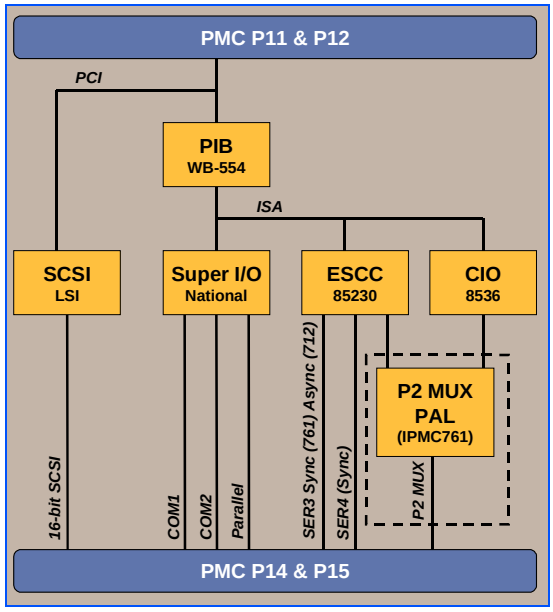
In IPMC mode, the MVME5100 supports legacy MVME761 or MVME712M I/O modules (with limited PMC I/O) when an IPMC761 or IPMC712 PMC card is populated in PMC slot 1. In this configuration, PMC slot 2 contains some signals that are reserved for extended SCSI.

IPMC Modules

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

- One single-ended Ultra Wide SCSI port
- One parallel port
- Four serial ports (2 or 3 async and 1 or 2 sync/async, depending on module)

With this PMC card configuration, the memory mezzanine, one PMC slot and the PMCspan are still available, providing support for OEM product customization.



SPECIFICATIONS

MVME5100 Processor Module

Processors

Microprocessor:	MPC7410	MPC750 class	MPC755 class
Clock Frequency:	400 or 500 MHz	450 MHz	400 MHz
On-chip Cache (I/D):	32K/32K	32K/32K	32K/32K
Secondary Cache:	2MB	1MB	1MB

Main Memory

Type:	PC100 ECC SDRAM with 100 MHz bus
Capacity:	Up to 512MB on-board, expandable to 1GB with RAM500 memory mezzanines
Single Cycle Accesses:	10 Read/5 Write
Read Burst Mode:	7-1-1-1 idle; 2-1-1-1 aligned page hit
Write Burst Mode:	4-1-1-1 idle; 2-1-1-1 aligned page hit
Architecture:	64-bit, single interleave

Flash Memory

Type:	EEPROM, on-board programmable
Capacity:	1MB via two 32-pin PLCC/CLCC sockets; 16MB surface mount
Read Access (16MB port):	70 clocks (32-byte burst)
Read Access (1MB port):	262 clocks (32-byte burst)

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

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

Controller:	Tundra Universe
DTB Master:	A16–A32; D08–D64, 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

Counters/Timers

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

Ethernet Interface

Controller:	Two Intel 82559ER
Interface Speed:	10/100Mb/s
PCI Local bus DMA:	Yes, with PCI burst
Connector:	One routed to front panel RJ-45, one routed to front panel RJ-45 or optionally routed to P2, RJ-45 on MVME761

Asynchronous Serial Ports

Controller:	16C550C UART
Number of Ports:	Two, 16550 compatible
Configuration:	EIA-574 DTE
Async Baud Rate, bps max.:	38.4K EIA-232, 115Kbps raw
Connector:	One 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 MHz
Signaling:	5V
Power:	+3.3V, +5V, ±12V; 7.5 watts maximum per PMC slot
Module Types:	Two single-wide or one double-wide, front panel or P2 I/O

PCI Expansion Connector

Address/Data:	A32/D32/D64
PCI Bus Clock:	33 MHz
Signaling:	5V
Connector:	114-pin connector located on the planar of the MVME5100

Power Requirements

(not including power required by PMC or IMPC modules)

	+5 V ±5%	+12 V ±10%	–12 V ±10%
MVME5100:	3.0 A typ.	8.0 mA typ.	2.0 mA typ.

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, 115Kbps 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 MVME5100 Series with IPMC installed)

	+5V ±5%	+12V ±10%	–12V ±10%
MVME5100:	3.8 A max. 3.0 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5106:	3.8 A max. 2.6 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5107:	4.7 A max. 3.5 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5110-21*xx*:	3.8 A max. 3.1 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5110-22*xx*:	4.7 A max. 3.5 A typ.	8.0 mA typ.	2.0 mA typ.

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 100BaseTX, RJ-45	not available
SCSI:	8- or 16-bit, 50- or 68-pin connector via P2 adapter	8-bit, standard SCSI D-50

All Modules

Environmental

(Minimum of 400 LFM of forced air cooling is recommended for operation in the higher temperature ranges.)

	Operating	Nonoperating
Commercial Temperature:	0° C to +55° C (inlet air temp. w/forced air cooling)	–40° C to +85° C
Extended Temperature:	–20° C to +71° C	–40° C to +85° C
Humidity (NC):	5% to 90%	5% to 90%
Vibration:	2 Gs RMS, 20–2000 Hz random	6 Gs RMS, 20–2000 Hz random

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)

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: EN55024

Safety

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

Demonstrated MTBF

(based on a sample of eight boards in accelerated stress environment)

Mean: 190,509 hours

95% Confidence: 107,681 hours

ORDERING INFORMATION

All models of the MVME51*xx* are available with either VME Scanbe front panel (-*xxx*1) or IEEE 1101 compatible front panel (-*xxx*3).

Part Number	Description
	450 MHz MPC750 Commercial Models
MVME5100-016*x*	450 MHz MPC750, 512MB ECC SDRAM, 17MB Flash and 1MB L2 cache
	400 MHz MPC755 Extended Temperature Models
MVME5106-114*x*	400 MHz MPC755, 128MB ECC SDRAM, 17MB Flash and 1MB L2 cache
MVME5106-115*x*	400 MHz MPC755, 256MB ECC SDRAM, 17MB Flash and 1MB L2 cache
MVME5106-116*x*	400 MHz MPC755, 512MB ECC SDRAM, 17MB Flash and 1MB L2 cache
	400 and 500 MHz MPC7410 Commercial Models
MVME5110-216*x*	400 MHz MPC7410, 512MB ECC SDRAM, 17MB Flash and 2MB L2 cache
MVME5110-226*x*	500 MHz MPC7410, 512MB ECC SDRAM, 17MB Flash and 2MB L2 cache
	500 MHz MPC7410 Extended Temperature Models
MVME5107-214*x*	500 MHz MPC7410, 128MB ECC SDRAM, 17MB Flash and 2MB L2 cache
MVME5107-215*x*	500 MHz MPC7410, 256MB ECC SDRAM, 17MB Flash and 2MB L2 cache
MVME5107-216*x*	500 MHz MPC7410, 512MB ECC SDRAM, 17MB Flash and 2MB L2 cache
	MVME712M Compatible I/O
IPMC712-001	Multifunction rear I/O PMC module; 8-bit SCSI, Ultra Wide SCSI, one parallel port, three async and one sync/async serial ports
MVME712M	Transition module connectors: One DB-25 sync/async serial port, three DB-25 async serial port, one AUI connector, one D-36 parallel port, and one 50-pin 8-bit SCSI; includes 3-row DIN P2 adapter module and cable