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COMPUTING

MVME5100

NXP® MPC7410 or MPC750 VME SBC

Data Sheet

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

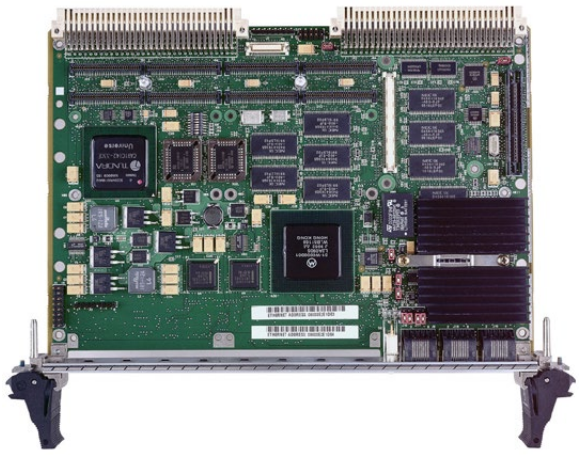
- MPC7410 or MPC750 microprocessor with 32 KB/32 KB L1 cache
- Up to 2MB of secondary backside cache
- 100 MHz frontside bus
- Up to 512MB of on-board ECC SDRAM expandable up to 1GB with optional RAM500 memory expansion modules
- 17MB flash memory
- Dual IEEE P1386.1 compatible 32/64-bit PMC expansion slots
- 64-bit PCI expansion mezzanine connector allowing up to four more PMCs
- Dual 16550 compatible async serial ports
- Dual 10BaseT/100BaseTX Ethernet
- 32 KB 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

RoHS 5/6 Pb SOLDER EXEMPT

The Artesyn Embedded Technologies MVME5100 series features the NXP MPC7410 or MPC750 microprocessor with 32 KB/32 KB L1 cache. It uses the Artesyn PowerPlus II Architecture to support full PCI throughput of 264MB/s without starving the processor from its memory.

Based on an integrated PCI bridge-memory controller ASIC, PowerPlus II enables 582 MB/s memory read bandwidth and 640MB/s burst write bandwidth.

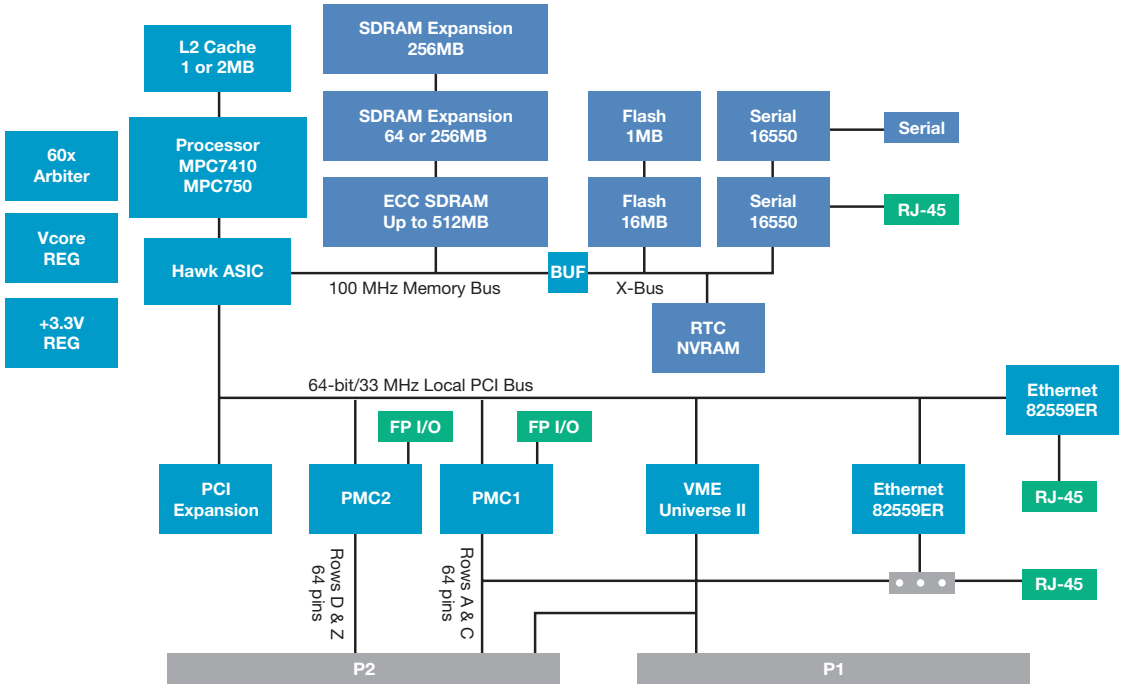
The MVME5100 is designed to meet the needs of OEMs servicing the defense and aerospace, industrial automation and transportation market segments.



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MVME5100 Block Diagram



Overview

I/O COMPATIBILITY

Historically, Artesyn 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 Artesyn 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 and IPMC. 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 onP2 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.

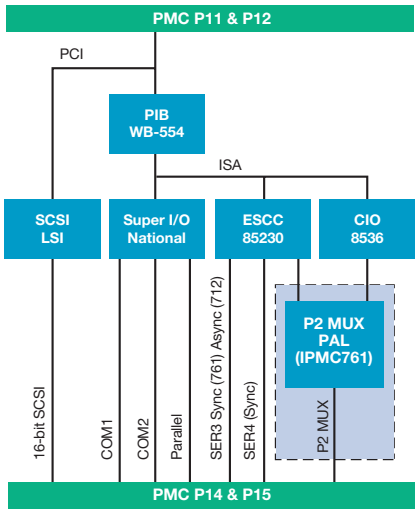
IPMC MODULES

The IPMC761 and IPMC712 are optional add-on PMC modules that provide backward compatibility with previous-generation Artesyn 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.

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TRANSITION MODULES

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, DCE or DTE via the installation of Artesyn Serial Interface Modules (SIMs). A P2 adapter board provides interface signals to the MVME761 transition module. Two separate P2 adapter boards are available: one for 3-row backplanes and one for 5-row backplanes. The 3-row P2 adapter board provides connection for 8-bit SCSI. A 5-row P2 adapter board supports 16-bit SCSI and PMC I/O.

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 board provides interface signals to the MVME712M transition module. The 3-row P2 adapter board also provides connection 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 board and extends its capability by providing access to the PMCI/O pins.

Software Support

FIRMWARE MONITOR

Firmware must fulfill the traditional functions of test and initialization and provide operating system boot support. The MVME5100 firmware monitor exceeds these requirements with a proven monitor from the embedded VME leader. It expands features like powerup tests with extensive diagnostics, as well as a powerful evaluation and debug tool for simple checkout or when high-level development debuggers require additional support. All this is included with the MVME5100 firmware; plus it supports booting both operating systems and kernels.

OPERATING SYSTEMS AND KERNELS

MVME5100 supports booting a variety of operating systems, including VxWorks from Wind River Systems, Inc., Integrity from Green Hills, and Linux from a variety of partners.

Specifications

PROCESSOR

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

MAIN MEMORY

- Type: PC100 ECC SDRAM with 100 MHz bus
- Capacity: Up to 512MB on-board, expandable to 1.5GB 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; 16 MB surface mount
- Read Access (16MB port): 70 clocks (32-byte burst)
- Read Access (1MB port): 262 clocks (32-byte burst)

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NVRAM

- Capacity: 32 KB (4 KB 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: 10/100 Mbps
- 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: RS-232 DTE/DCE
- Async Baud Rate, bps max.: 38.4 K EIA-232, 115 Kbps 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: 5 V
- Power: +3.3 V, +5 V, ±12 V; 7.5 watts maximum per PMC slot
- Module Types: Two single-wide or one doublewide, front panel or P2 I/O

PCI EXPANSION CONNECTOR

- Address/Data: A32/D32/D64
- PCI Bus Clock: 33MHz
- Signaling: 5 V
- 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

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: 5 V
- 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.: 2.5 M sync, 38.4 K async
- Oscillator Clock Rate (PCLK): 10 MHz/5 MHz

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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.: 38.4 K EIA-232, 115 Kbps 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)

	+5 V ±5%	+12 V ±10%	–12 V ±10%
MVME5100	3.8 A max. 3.0 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5110- 21xx	3.8 A max. 3.1 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5110- 22xx	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 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	Non-operating
Temperature	0 °C to +55 °C (inlet air temp. with forced air cooling*)	–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 COMPATBILITY (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:
  - 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.

ESTIMATED MTBF

MTBF estimated per Telcordia SR-332, issue 2, ground fixed, controlled environment, unit ambient air temperature of 40 °C is 610,000 hours at 60% confidence level. Contact Artesyn for alternative environments or temperatures.

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Ordering Information

All models are available with either VME Scanbe front panel (-xxx1) or IEEE 1101 compatible front panel (-xxx3).

Part Number	*Description*	*Weight*
MVME51005E-0161	450 MHz MPC750, 512MB ECC SDRAM, 17MB flash and 1MB L2 cache Scanbe 5E	0.37 kg
MVME51005E-0163	450 MHz MPC750, 512MB ECC SDRAM, 17MB flash and 1MB L2 cache IEEE 5E	0.42 kg
400/500 MHz MPC7410 Commercial Models		
MVME51105E-2161	400 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache Scanbe 5E	0.42 kg
MVME51105E-2163	400 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache IEEE 5E	0.42 kg
MVME51105E-2261	500 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache Scanbe 5E	0.38 kg
MVME51105E-2263	500 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache IEEE 5E	0.42 kg
MVME712M Compatible I/O		
IPMC7126E-002	Multifunction rear I/O PMC module; 8-bit SCSI, Ultra Wide SCSI, one parallel port, three async and one sync/async serial ports	
MVME712M6E	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	
MVME761 Compatible I/O		
IPMC7616E-002	Multifunction rear I/O PMC module; 8-bit SCSI, one parallel port, two async and two sync/async serial ports	
MVME7616E-001	Transition module: Two DB-9 async serial port connectors, two HD-26 sync/async serial port connectors, one HD-36 parallel port connector, one RJ-45 10/100 Ethernet connector; includes 3-row DIN P2 adapter module and cable (for 8-bit SCSI)	
MVME7616E-011	Transition module: Two DB-9 async serial port connectors, two HD-26 sync/async serial port connectors, one HD-36 parallel port connector, and one RJ-45 10/100 Ethernet connector; includes 5-row DIN P2 adapter module and cable (for 16-bit SCSI); requires backplane with 5-row DIN connectors	
SIM232DCE6E	EIA-232 DCE Serial Interface Module 6E	
SIM232DTE6E	EIA-232 DTE Serial Interface Module 6E	
Related Products		
PMCSPAN16E-002	Primary PMC expansion for MVME5100/5110/5500 w/Scanbe handles, 6E	
PMCSPAN26E-002	Primary PMC expansion for MVME5100/5110/5500 w/IEEE handles, 6E	
PMCSPAN16E-010	Secondary PMC expansion for PMCSPAN26E-002 w/Scanbe handles, 6E	
PMCSPAN26E-010	Secondary PMC expansion for PMCSPAN26E-002 w/IEEE handles, 6E	
RAM5006E-005	Stackable (top) 128MB ECC SDRAM mezzanine 6E	
RAM5006E-015	Stackable (bottom) 128MB ECC SDRAM mezzanine 6E	
RAM5006E-006	Stackable (top) 256MB ECC SDRAM mezzanine 6	
RAM5006E-016	Stackable (bottom) 256MB ECC SDRAM mezzanine 6E	
RAM5006E-010	Stackable (top) 512MB ECC SDRAM mezzanine 6E	
RAM5006E-020	Stackable (bottom) 512MB ECC SDRAM mezzanine 6E	
Documentation		
V5100A/IH	MVME5100 Installation and Use	
V5100A/PG	Programmer's Reference Guide	
VME761A/IH	MVME761 Transition Module Installation and Use	
VME712MA/IH	MVME712 Transition Module Installation and Use	
PPCBUGA1/UM **PPCBUGA2/UM**	PPCBug Firmware Package User's Manual (volumes one and two)	
PPCDIAA/UM	PPCBug Diagnostics Manual	

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SOLUTION SERVICES

Artesyn Embedded Technologies provides a portfolio of solution services optimized to meet your needs throughout the product lifecycle. Design services help speed time-to-market. Deployment services include global 24x7 technical support. Renewal services enable product longevity and technology refresh.

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