MVME4100 Series

VMEbus Single-Board Computer

Embedded Computing for Business-Critical Continuity™

The MVME4100 is designed for a broad range of applications including industrial automation, imaging, radar and sonar.

- 1.3 GHz system-on-chip Freescale MPC8548E with e500 processor core, double precision floating point operations, integrated memory controller, DMA engine, PCI-X and PCI Express interface, Ethernet, and local I/O
- Extended temperature (-40 °C to +71 °C)
- 2GB of DDR2 ECC memory, 128MB NOR flash and 4GB NAND flash
- 512KB of MRAM non-volatile memory
- Four Gigabit Ethernet ports
- Five serial ports
- USB 2.0 controller for integrating cost-effective peripherals (commercial temperature only)
- 2eSST VMEbus protocol with 320MB/s transfer rate across the VMEbus
- Board support packages for VxWorks and Linux
- Dual 33/66/100MHz PMC sites for expansion via industry standard modules with support for processor PMCs
- 8x PCI/PCI-X expansion connector for PMC/XMC expansion using Emerson XMCspan carrier
- MVME7216E direct-connect rear transition module (RTM) for I/O routing through rear of VMEbus chassis

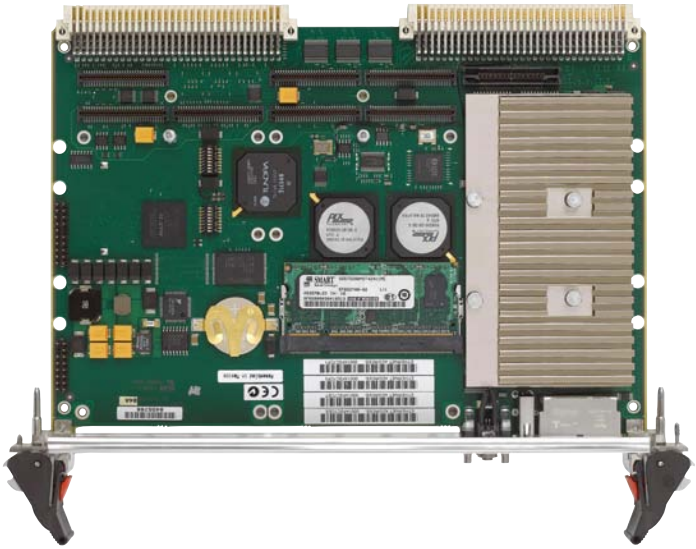
The MVME4100 single-board computer from Emerson Network Power incorporates the fastest Freescale 8548E processor, industry-leading storage options, extensive I/O and flexible expansion options including an on-board PMC site and up to four optional XMC sites via expansion cards.

The MVME4100, with the Freescale MPC8548E system-on-chip (SoC) processor, provides a high-performance, cost-effective continuation for currently deployed VME infrastructure. The Freescale e500 core coupled with the current operating systems allows for double precision floating point operations. In addition, the processor-enabled supplementary encryption engine can be leveraged to address new opportunities meeting the ever-growing demands for network privacy and data security.

The MVME4100 memory and storage options raise the bar in the embedded computing market. 2GB of DDR2 RAM is provided in SO-DIMM format. Innovative MRAM is included for truly non-volatile memory. Also included are 4GB of NAND flash, which can take the place of some rotating media or removable flash, while offering improved performance and life cycle.

High speed 2eSST protocol and extensive I/O – four Gigabit Ethernet ports, five serial ports, USB and PMC/XMC sites – round out the MVME4100 to provide maximum performance and flexibility.

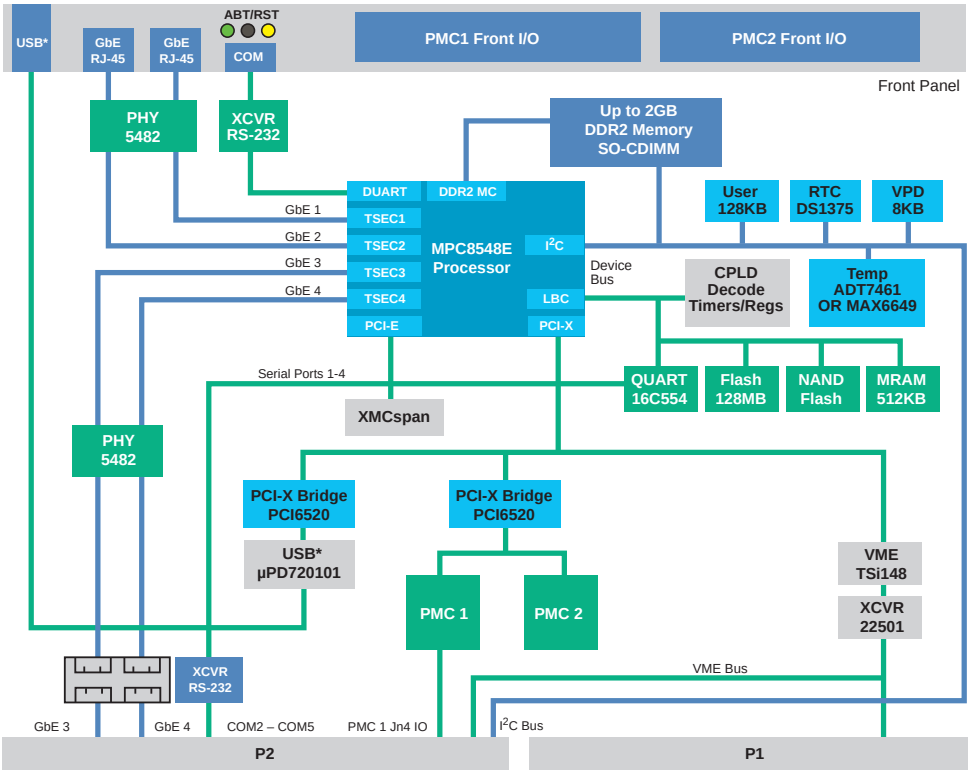
Extended temperature (-40 °C to +71 °C) variants support a wide range of operating and storage temperatures in addition to increased tolerances for shock. This enables the boards to operate in harsh environments while maintaining structural and operational integrity.



RoHS 6/6 COMPLIANT

EMERSON™
Network Power

MVME4100 Block Diagram



*** Commercial temperature only**

Overview

VMEBUS 2ESST PERFORMANCE

The 2eSST protocol offers an available VME bus bandwidth of up to 320MB/s, an increase of up to 8x over VME64, while maintaining backward compatibility with VME64 and VME32. The combination of the latest Texas Instruments VMEbus transceivers and the Tundra Tsi148 VMEbus bridge's legacy protocol support allows customers to integrate the MVME4100 series into their existing infrastructure providing backward compatibility and thereby preserving their investment in existing VMEbus boards, backplanes, chassis and software.

BALANCED PERFORMANCE

The MVME4100 series provides more than just faster VMEbus transfer rates; it provides balanced performance from the processor, memory subsystem, local buses and I/O subsystems. This coupled with a wealth of I/O interfaces make the MVME4100 series ideal for use as an application-specific compute blade, or an intelligent I/O blade/carrier. The Freescale MPC8548E system-on-chip (SoC) processor, running at speeds up to 1.3 GHz, is well-suited for I/O and data-intensive applications. The integrated SoC design creates an I/O intensive state-of-the-art package that combines a low power processing core with on-chip L2 cache and an integrated DDR2 memory controller, PCI Express, DMA , Ethernet and local device I/O. The on-chip PCI Express interface and DDR2 memory buss are well matched to the processor. To ensure optimal I/O performance, the MVME4100 also offers quad Gigabit Ethernet interfaces, USB 2.0 (commercial temperature only), and five (5) RS-232 serial connections. All of this adds up to a set of well-balanced, high-performance subsystems offering unparalleled performance.

Backward Compatibility

PCI EXPANSION

The MVME4100 has an 8x PCI Express connection to support PCI Express expansion carriers such as the Emerson XMCSPAN-001 or XMCSPAN-002.

TRANSITION MODULES

The MVME7216E transition module provides industry-standard connector access to two 10/100/1000BaseT ports, and four asynchronous serial ports configured as EIA-232 DTE. All of these are via RJ-45 connectors. The MVME7216E RTM is designed to directly connect to the VME backplane in chassis' with an 80mm deep rear-transition area.

Software Support

FIRMWARE MONITOR

The MVME4100 firmware (known as MOTLoad) is resident in the MVME4100 flash and provides power on self-test (POST enhancements available after release), initialization and operating system booting capabilities. In addition, it provides a debugger interface similar to the time proven "BUG" interface on previous VMEbus boards from Emerson.

OPERATING SYSTEMS AND KERNELS

The MVME4100 series supports booting a variety of operating systems including a complete range of real-time operating systems and kernels.

Specifications

PROCESSOR

- Microprocessor: Freescale MPC8548E with e500 core
- Clock Frequency: 1.3 GHz
- On-chip L1 Cache (I/D): 32K/32K
- On-chip L2 Cache: 512KB

SYSTEM CONTROLLER

- Integrated within MPC8548E

MAIN MEMORY

- Double data rate (DDR2) SDRAM with ECC
  - Speed: DDR2-533
  - Capacity: 2GB
  - Form: SO-DIMM

FLASH MEMORY

- NOR flash, on-board programmable
  - Capacity: 128MB
  - Write Protection: Hardware via switch, software via register or sector lock
- NAND flash, on-board programmable
  - Capacity: 4GB
  - Write Protection: Software via register

NON-VOLATILE MEMORY

- SEEPROM, on-board programmable
  - Capacity: 128KB (available for users), 8KB base-board Vital Product Data (VPD)
- MRAM
  - Capacity: 512KB

VMEBUS INTERFACE

- Compliance: ANSI/VITA 1-1994 VME64 (IEEE STD 1014), ANSI/VITA 1.1-1997 VME64 Extensions, VITA 1.5-199x 2eSST
- Controller: Tundra Tsi148 PCI-X to VMEbus bridge with support for VME64 and 2eSST protocols
- DTB Master: A16, A24, A32, A64; D08-D64, SCT, BLT, MBLT, 2eVME, 2eSST
- DTB Slave: A16, A24, A32, A64; D08-D64, SCT, BLT, MBLT, 2eVME, 2eSST, UAT
- Arbiter: RR/PRI
- Interrupt Handler/Generator: IRQ 1-7/Any one of seven IRQs
- System Controller: Yes, switchable or auto detect
- Location Monitor: Two, LMA32

ETHERNET INTERFACE

- Controller: MPC8548E Triple Speed (TSEC) Ethernet Controllers
- Interface Speed: Four @ 10/100/1000Mbps (TSEC)
- Connector: Two Gigabit Ethernet ports routed to front panel RJ-45, two Gigabit Ethernet ports to VMEbus P2 connector, pin out matching MVME7216E RTM
- Indicators: Link status/speed/activity

ASYNCHRONOUS SERIAL PORTS

- Port 1
  - Controller: MPC8548E DUART (second port N/C)
  - Number of Ports: One 16550 compatible
  - Configuration: EIA-232 DTE (RxD, TxD, RTS, CTS)
  - Async Baud Rate, b/s max.: 38.4K RS-232, 115Kbps raw
  - Connector: One front panel micro DB-9
  - Micro DB-9 to DB-9 adapter cable: SERIAL-MINI-D2
- Ports 2-5
  - Controller: Exar ST16C544D QUART
  - Number of Ports: Four 16550 compatible
  - Configuration: EIA-232 (RxD, TxD, RTS, CTS)
  - Async Baud Rate, b/s max: 38.4K RS-232, 115Kbps raw
  - Connector: Via VMEbus P2 connector, pinout matching MVME7216E RTM
- USB Interface (commercial temperature only)
  - Controller: NEC μ720101
  - Configuration: USB 2.0
  - Number of ports: One
  - Connector: One powered port routed to front panel

DUAL IEEE P1386.1 PCI MEZZANINE CARD SLOTS

- Address/Data: A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors (PN4 for PMC1 only)
- PCI Bus Clock: 33 MHz, 66 MHz or 100 MHz PCI/PCI-X
- Signaling: +3.3V, +5V
- Power: +3.3V, +5V, ±12V
- Module Types: Two single-wide or one double-wide, front panel or P2 I/O, PMC and PrPMC support, PMC1 site Pn4 routed to VMEbus P2 connector rows A and C

PCI EXPANSION CONNECTOR FOR INTERFACE TO XMCSPAN BOARDS

- 8x PCI Express interface
- One 76-pin connector located on MVME4100 planar

COUNTERS/TIMERS

- TOD Clock Device: Maxim DS1375 I^2C device with battery backup
- Cell Storage Life: 10 years at 25 °C
- Cell Capacity Life: One year at 100% duty cycle, 25 °C
- Removable Battery: Yes
- Real-Time Timers/Counters: Four, 32-bit programmable timers in PLD; four, 32-bit programmable/cascadable timers in MPC8548E
- Watchdog Timer: In PLD

BOARD SIZE AND WEIGHT

- 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.)
- Weight: TBD (IEEE handles)

POWER REQUIREMENTS

(Not including power required by PMC or IPMC modules)

Board	Power (+5V ± 5%)
MVME4100	~40W

CALCULATED MTBF

- TBD

OTHER FEATURES

- RoHS compliant
- Jumper-less configuration
- On-board temperature sensor
- JTAG header for connection of diagnostic tools

FRONT PANEL

- IEEE or SCANBE handles
- Connectors for serial, 2x Gigabit Ethernet and USB port (commercial temperature only)
- Openings for PMC sites
- Reset switch
- Status LEDs

Transition Modules

I/O CONNECTORS

- MVME7216E
  - Asynchronous Serial Ports: Four, RJ-45, labeled as COM2-5
  - Ethernet: Two 10/100/1000BaseTX, RJ-45

NON-VOLATILE STORAGE

- 8KB VPD SEEPROM

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: 19.8 mm (0.8 in.)

CALCULATED MTBF

- TBD

All Modules

ENVIRONMENTAL

	Commercial	-ET
Cooling Method:	Forced Air	Forced Air
Operating Temperature:	0 °C to +55 °C	–40 °C to +71 °C
Storage Temperature:	–40 °C to +85 °C	–50 °C to +100 °C
Vibration Sine:	1G, 5 - 200 Hz	1G, 5 - 200 Hz*
Vibration Random:	N/A	TBD*
Shock:	N/A	20g/11mS*
Humidity:	5% to 90% RH	to 100% RH
Conformal Coating:	No	Yes

*Final ET shock and vibration capabilities TBD. Values shown are minimums.

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)
- Emerson board products are tested in a representative system to the following standards, results pending:
  - CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class B; Immunity: EN55024

Ordering Information	
Part Number	Description
MVME4100-0171	1.3 GHz MPC8548E, 4G NAND flash, 2G, SCANBE (ENP1)
MVME4100-0173	1.3 GHz MPC8548E, 4G NAND flash, 2G, IEEE (ENP1)
MVME4100ET-0171	Extended temperature –1.3 GHz MPC8548E, 4G NAND flash, 2G, SCANBE (ENP2)
MVME4100ET-0173	Extended temperature –1.3 GHz MPC8548E, 4G NAND flash, 2G, IEEE (ENP2)
Related Products	
XMCSPAN-001	XMC expansion, IEEE handles
XMCSPAN-002	XMC expansion, SCANBE handles
MVME7216E-101	Rear transition module
MVME721ET-101	Extended temp RTM, new NEW I/O on 5 row P2, two GbE, four serial, PIM, 6E (for use with MVME3100/4100/7100)
MVME721ET-102	Extended temp RTM SCANBE, I/O on 5 row P2, two GbE, four serial, PIM, 6E (for use with MVME3100/4100/7100)
SERIAL-MINI-D2	Serial cable - Micro D sub connector to standard DB-9

SOLUTION SERVICES

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