MVME2502

NXP® QorIQ® P2020 VME64x SBC

DATA SHEET

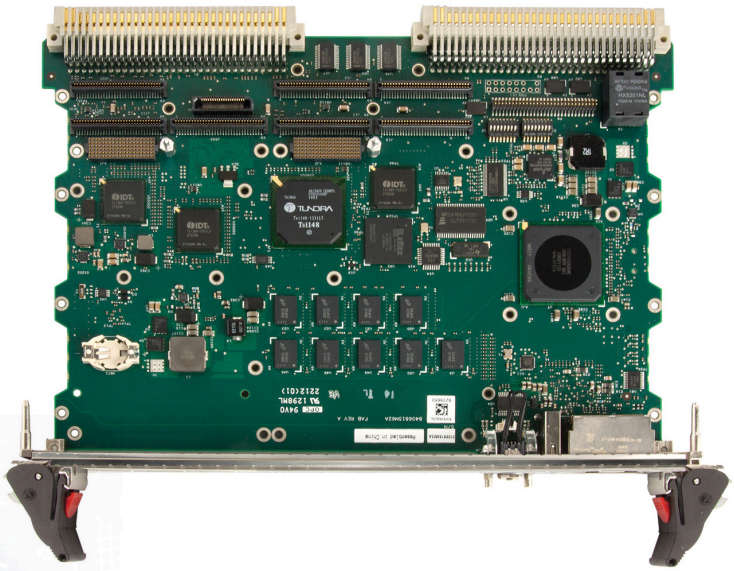
- 1.0 GHz or 1.2 GHz NXP QorIQ P2020 processor based 6U VME board
- 2GB ECC DDR3-800 soldered down, support 4GB or 8 GB configurations
- Dual PMC/XMC sites
- 8GB eMMC solid state storage
- 512KB MRAM non-volatile data storage
- Three RJ-45 Gigabit Ethernet interfaces
- Five serial ports
- One USB 2.0 interface
- Optional rear transition module
- Hard drive mounting kit available
- Optional conformal coating
- Extended temperature (-40 °C to +71 °C), rugged variants

RoHS 6/6 COMPLIANT

The SMART Embedded Computing MVME2502 is a VME form factor single-board computer based on the very popular NXP QorIQ P2020 dual core processor which features e500 cores delivering an excellent performance-to-power ratio. Compared to the other MVME2500 variants in the series, MVME2502 offers dual PMC/XMC sites whereas MVME2500 provides a single site solution. In addition it offers a range of front panel I/O including serial, USB 2.0, and Gigabit Ethernet plus a rear transition module with two Gigabit Ethernet, four RS-232 serial and a PMC Interface Module site. The MVME2502 comes standard with 2GB of soldered down DDR3-800 ECC DRAM, 8GB eMMC module and has a SATA connector for an optional 2.5" SATA SSD/HDD. Other features include dual flash banks, 3 independent tick timers, and on board 512K MRAM.

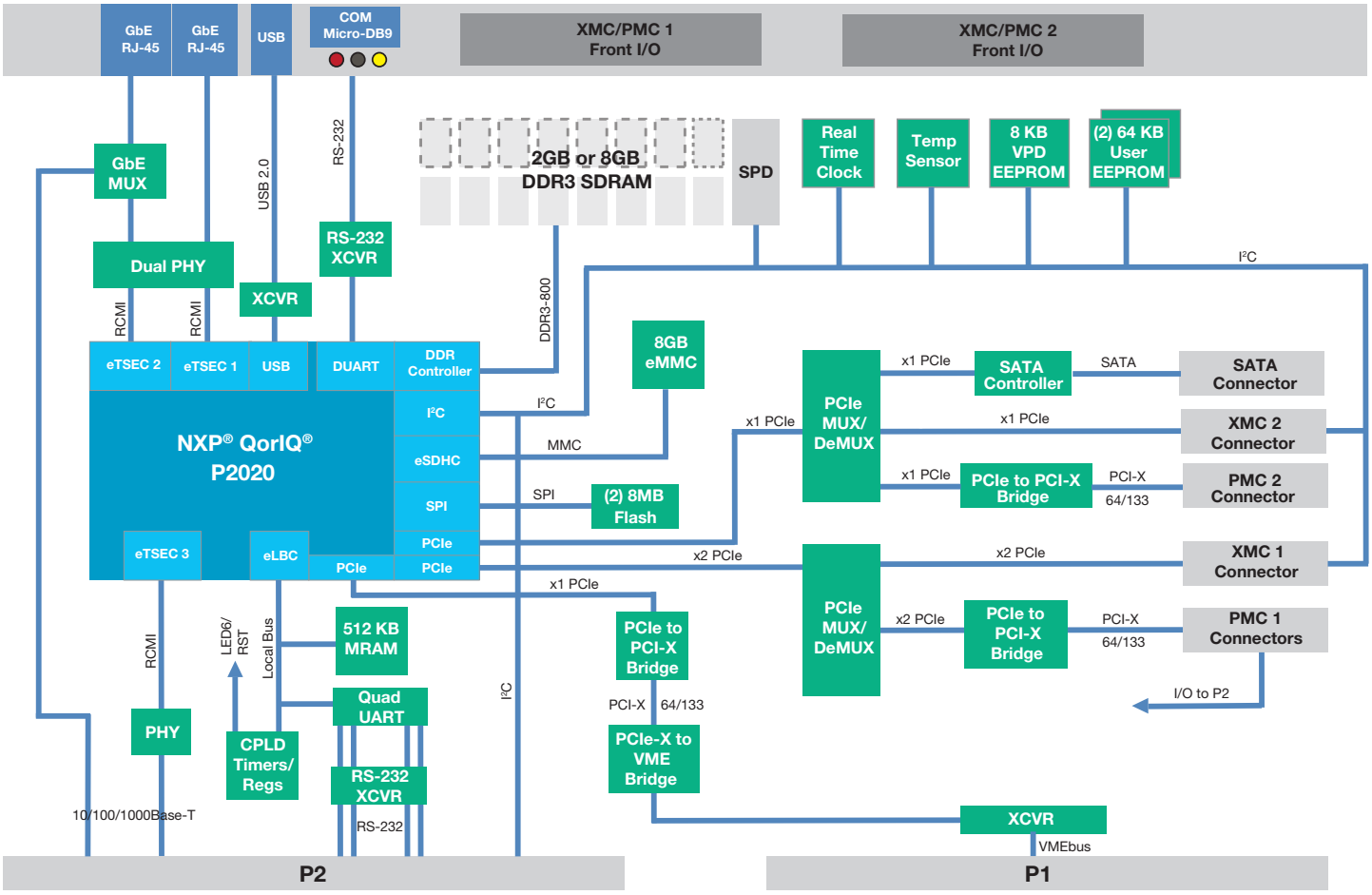
MVME2502 is designed to work in legacy VMEbus chassis with a 3-row backplane connector environment with a reduced I/O capacity and reduced peripheral power budget. It is also designed to work in a more modern and higher performance VME chassis environment with a five-row backplane connector in the 2eVME or the 2eSST protocol mode.

With such a wide range of I/O options, MVME2502 is designed for applications such as industrial control, semiconductor process equipment, radar, sonar and transportation signalling. It is available in commercial and rugged, extended temperature options which make it suitable for a wider range of environments.



SMART™ Embedded Computing

MVME2502 Block Diagram



Transition Modules

The MVME7216E transition module provides industry standard connector access to two 10/100/1000BaseTX ports, and four asynchronous serial ports configured as RS-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 80 mm deep rear transition area. This transition module is compatible with the MVME3100, MVME4100 and MVME7100 boards.

Software Support

FIRMWARE MONITOR

The MVME2502 uses U-Boot firmware which is resident in the MVME2502 flash and provides power-on self-test, initialization and operating system booting capabilities. It is based on the 2013.01 patched U-Boot provided by NXP.

OPERATING SYSTEMS AND KERNELS

The MVME2502 supports a variety of Linux operating systems.

MVME2502
Data Sheet

Specifications

HARDWARE PROCESSOR/CHIPSET

- 1.2 GHz NXP P2020 dual-core processor (ENP1 variants)
- 1.0 GHz NXP P2020 dual-core processor (ENP2 variants)
- 512 KB L2 shared cache
- Integrated, on-chip controllers for DDR2/3, PCI Express, USB 2.0, DUART, 10/100/1000 Ethernet, DMA, SDHC, SPI flash and I2C
- Eight 32-bit timers

MEMORY

- Single channel, dual banks 800MB/s
- 2GB ECC DDR3-800, soldered down, standard
- Designed to support 4GB or 8GB configurations

USER FLASH/NVRAM MEMORY

- 512 KB MRAM (NVRAM)
- 8GB Embedded MMC module (eMMC)

BOOT FLASH MEMORY

- 16MB SPI flash (2x 8MB)
- Support for crisis recovery

VMEBUS INTERFACE

- Compliance: ANSI/VITA 1-1994 VME64 (IEEE STD1014), ANSI/VITA 1.1-1997 VME64 Extensions, VITA 1.5-199x 2eSST
- Controller: IDT Tsi148 PCI-X to VMEbus bridge with support for VME64 and 2eSST protocols

I/O CAPABILITIES

- Three RJ-45 Gigabit Ethernet interfaces (one front, one rear, one configurable to front or rear)
- Two PMC/XMC with autosense
- One Micro DB-9 RS232 COM port (front)
- Four RJ-45 RS-232 serial ports (rear)
- One Type A USB 2.0 interface (front)
- SATA port optional on-board hard drive (in place of PMC2/XMC2)

MVME721 TRANSITION MODULE I/O

- Two GbE interfaces
- Four RS-232 serial ports
- PMC I/O from PMC1

SOFTWARE

- U-Boot Firmware
- VxWorks 6.8, 6.9 and 7.0 BSP

OTHER FEATURES

- Watchdog unit
- Three independent 32-bit tick timers
- Status and user LEDs
- Reset switch
- Locking ejector handles (IEEE handle versions)
- Temperature sensors

POWER REQUIREMENTS

- Maximum for 1.2 GHz ENP1 variant
  - 5.0V 5.7A 28W (Estimated)
- Maximum for 1.0 GHz ENP2 variant TBD

ENVIRONMENTAL

Ruggedization Level	ENP1	ENP2
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 (10min/axis)	1G, 5 to 200 Hz	5G, 15 to 2000 Hz
Vibration Random (1hr/axis)	.01 g2/Hz, 15 to 200 Hz	.04 g2/Hz, 15 to 2000 Hz (8 GRMS)
Shock	20 g/11 mS	30g/11 mS
Humidity	to 95% RH	to 100% RH
Conformal Coating*	No	Option (Acrylic or Urethane)

* Conformal coating these products may result in up to a 2 °C reduction in operating temperature limits.

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)
- SMART EC board products are 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
  - KCC Mark

DOCUMENTATION

- Installation and Use Guide
- Quick Start Guide
- RoHS Certificate of Compliance
- EC Declaration of Conformity
- U-Boot Release Notes
- Linux Release Notes

ESTIMATED MTBF

Per Telcordia SR-332, Issue 2, ground fixed, controlled environment, unit ambient air temperature of 40 °C is 819,000 hours at 60% confidence level. Contact SMART EC for alternative environments or temperatures.

Ordering Information		
Part Number	**Description**	**Weight**
MVME2502-02120201E	MVME2502, P2020 at 1.2 GHz, 2GB DDR3-800, 8GB eMMC, ENP1, IEEE handles	0.70 kg
MVME2502-02120201S	MVME2502, P2020 at 1.2 GHz, 2GB DDR3-800, 8GB eMMC, ENP1, SCANBE handles	–
MVME2502-02100202E	MVME2502, P2020 at 1.0 GHz, 2GB DDR3-800, 8GB eMMC, ENP2, IEEE handles	0.70 kg
MVME2502-02100202S	MVME2502, P2020 at 1.0 GHz, 2GB DDR3-800, 8GB eMMC, ENP2, SCANBE handles	–
MVME2502-021CC	QORIQ P2020 1.0GHZ, 2GB DDR3 2PMC/XMC ENP2 EXT TEMP, IEEE, CONFORMAL COATING	–
MVME2502-021CC-2	QORIQ P2020 1.0GHZ, 2GB DDR3 2PMC/XMC ENP2 EXT TEMP, IEEE, POLYURETHANE CONFORMAL COATING	–
REAR TRANSITION MODULES		
MVME7216E-101	RTM, IEEE NEW I/O ON 5 ROW P2, 2 GIGE, 4 SERIAL, PIM, 6E (FOR USE WITH MVME250x/3100/7100/4100)	
MVME721ET-101	RTM, IEEE NEW I/O ON 5 ROW P2, 2 GIGE, 4 SERIAL, PIM, 6E ENP2 (FOR USE WITH MVME250x/3100/4100/7100)	
MVME721ET-101-CC-2	RTM, IEEE NEW I/O ON 5 ROW P2, 2 GIGE, 4 SERIAL, PIM, 6E ENP2 (POLYURETHANE CONFORMAL COATED)	
ACCESSORIES AND CABLES		
SERIAL-MINI-D2	SERIAL CABLE - MICRO D SUB CONNECTOR TO STANDARD DB9	
ACC/CABLE/SER/DTE/6E	SERIAL CABLE, RD 009, 2M, 2 DTE MD/D, RJ-45 TO DB9	
MVME2502-HDMNTKIT2	MVME2502 HD MOUNTING KIT ENP2	

SOLUTION SERVICES

SMART Embedded Computing 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 worldwide technical support. Renewal services enable product longevity and technology refresh.

CONTACT DETAILS

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