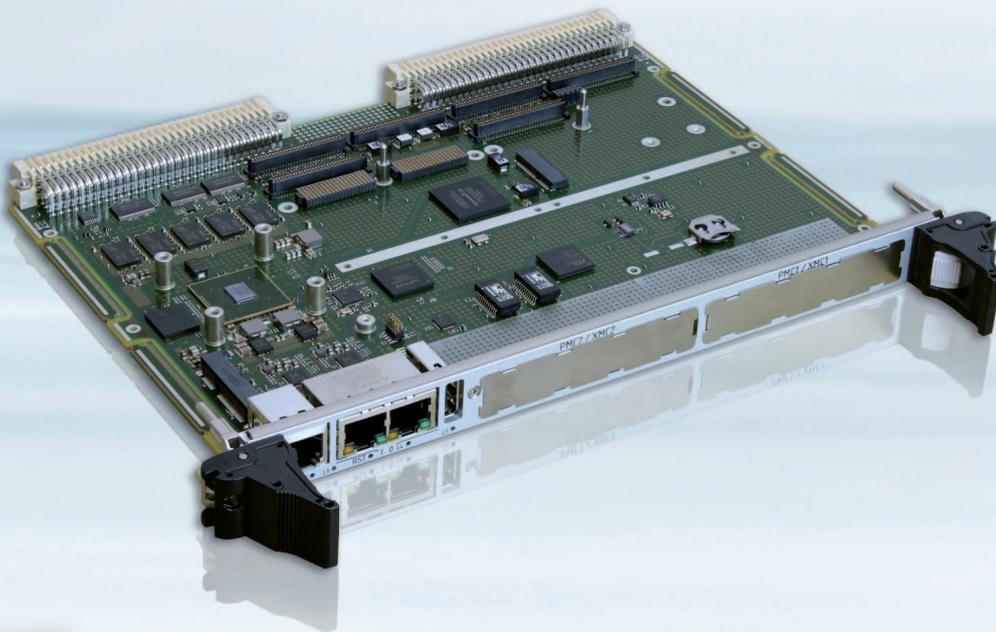


VM6103



LOW POWER DISSIPATION BLADE COMPUTER Designed for Intense I/O Control Applications

- ▶ Dual-Core or Quad-Core 1 GHz / 1.6 GHz 64-bit ARM based Processor
- ▶ < 10 W Low Power Dissipation, in Dual-Core 1 GHz
- ▶ High versatility with of I/O expansions: Dual PMC, XMC, Mini-PCIe slots
- ▶ High capacity of storage: 32 GB eMMC and M.2 SATA III SSD Socket
- ▶ Long Term Supply and Support

VM6103 – 6U VME LOW POWER CONNECTIVITY ENGINE

The VM6103 is the first member of a full range of High-Performance, Low Power dissipation Kontron range of products featuring QorIQ 'Layerscape' multicore ARM processors.

The VM6103 Connectivity Engine provides a flexible off-the-shelf method for quickly developing and deploying cost-conscious high-performance with low power dissipation tailored systems.

The low power consumption of the powerful Dual-Core 64-bit ARM Cortex-A53 makes the VM6103 well-suited to critical environments such as industrial, transportation and defense applications.

The VM6103 features a highly scalable computing performance as it is available either with a dual-core or quad-core ARM processor clocked at a frequency from 1 GHz up to 1.6 GHz.

The outstanding flexibility of the design of VM6103 provides numerous I/O expansion slots and the processing upgrade using pinout compatible 4-core processors.

QORIQ 'LAYERSCAPE' LS1023 AND LS1043

The LS1023 and LS1043 are pin-compatible cost-effective, power-efficient, and highly integrated System-on-Chip (SoC) design that extends the reach of the line of QorIQ communications processors, featuring extremely power-efficient 64-bit ARM® Cortex®-A53 cores with ECC-protected L1 and L2 cache memories for high reliability, running from 1.0 GHz up to 1.6 GHz. These processors include Neon SIMD co-processing and DP FPU.

The VM6103 running the Dual-Core 1 GHz LS1023A processor features the outstanding performance of 4600 DMIPS/ 5240 64b CoreMark in a power dissipation budget which does not exceed 10 W.

The VM6103 offers a straightforward upgrade path for both new customers and existing legacy QorIQ Power Architecture e500, e600 users.

EXTENSIVE I/O SUPPORT

The VM6103 base version provides two Gigabit Ethernet ports, configurable either on front or rear on P0 in compliance with VITA 31.1, four serial lines, up to 8 GPIOs, three USB links, one SATA M.2 storage slot, one miniPCI-express slot and two onboard Mezzanine Sites, supporting PMC and XMC for one of the two slots.

FULLY RUGGED BY DESIGN

Designed specifically for harsh environments, the VM6103 is ideal for applications where high reliability and survivability are a must. Available in Kontron air- and conduction-cooled ruggedization levels, the VM6103 also aims Natural Convection cooled applications.

LONG TERM PROGRAM: HIGH AVAILABILITY, LOW TCO

Kontron is providing outstanding elements to increase reliability and to lower Total-Cost-of-Ownership (TCO) for VM6103. Kontron provides a Long Term Supply program service (LTS) for over 15 years.

A comprehensive Health Management is optionally available to support easy field maintenance. All this makes the VM6103 the ideal candidate for long term programs.

CENTRALIZED HEALTH MANAGEMENT

A shelf manager is optionally available for centralized health management. Moreover, sequenced system power-up and Temperature/Power/Performance management are available. The Power-On Built-in Test (PBIT) option is a comprehensive package for board and system diagnosis.

LEGACY COMPATIBILITY

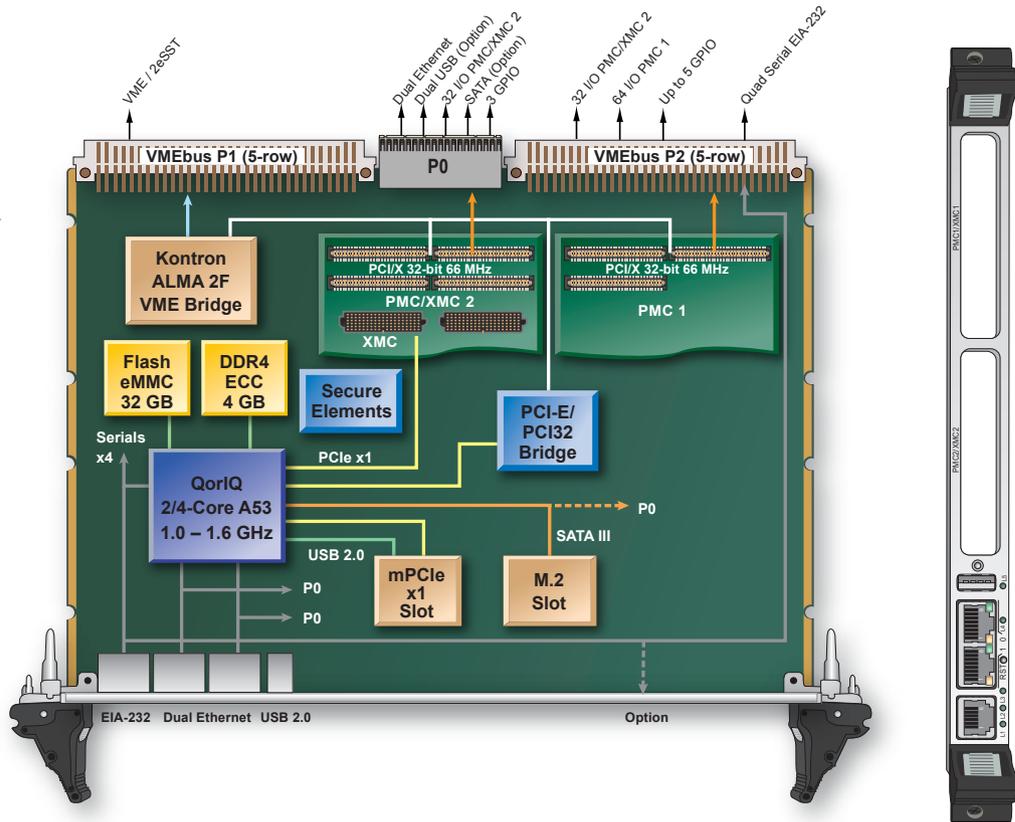
The VM6103 is front and rear I/O compatible with Kontron's line of x86 and Power VME SBCs, supporting the same Rear Transition Module. The net effect of this fit form function compatibility is to allow our customers a simple line replacement policy of the SBC in deployed systems



TECHNICAL INFORMATION

| | | | |
|---|------------------------------------|---|---|
| FORM FACTOR SYSTEM ON CHIP (SOC): QORIQ LAYERSCAPE LS1023A/LS1043A | | 6U VME, single slot, 0.8 inch pitch | |
| | Processor | One NXP QorIQ Layerscap LS1023A Dual-Core or LS1043A Quad-Core 64-bit ARM® Cortex®-v8 A53 based processor speed from 1.0 GHz up to 1.6 GHz 1 MB L2 cache Neon SIMD Co-processor and DP FPU Power dissipation lower than 10 W 28-nanometer silicon technology | |
| | Memory Controller | Integrated 36-bit DDR4 memory controller with ECC support up to 1600 MT/s. | |
| | PCI Express 2.0 Interface | 1 lane PCIe to PCIe/ PCI bridge to PMC1, PMC2 and VME bridge 1 lane 5 GT/s gen2 PCIe to XMC1 1 lane 5 GT/s gen2 PCIe to miniPCIe slot | |
| | SATA | Up to 6 Gb/s integrated Serial ATA host controllers 1 SATA port on M.2 socket (or P0 depending on build option) | |
| | USB | 3 USB 2.0 ports | |
| | Gigabit Ethernet Controller | 2 Gigabit MAC with RGMII Interface | |
| | QSPI | Connects to two QSPI flash devices (64 Mbytes each) | |
| | System Memory | 4 GB DDR4 SDRAM at 1600 MT/s | |
| | SPI Flash | Firmware Boot Device, 2x 64 Mbytes | |
| | eMMC Flash | 32 GB 4-bit eMMC 4.5 MLC flash | |
| | F-RAM | F-RAM 1 Mbit of non-volatile ferroelectric RAM | |
| | EEPROM | One serial 256 Kbit EEPROM dedicated to VPD data One serial 256 Kbit EEPROM dedicated to system data | |
| | ON-BOARD CONTROLLER | Watchdog | Five watchdog timer with configurable timeout counter with timeout periods from 0.5 to 128 seconds, generates IRQ or reset or IRQ/reset cascaded (cPLD implementation) cPLD watchdog also available |
| | | Ethernet PHY | Ethernet PHY with 2 Ethernet 10/100/1000 BASE-T(X) ports. The Ethernet PHY is connected to the SoC through a 2x RGMII links. Each port is software configurable either on front panel (RJ-45) or on rear P0 |
| | | System CPLD | One CPLD Board controller for power sequencing, reset handling, monitoring, failure detection, VME I2C communication. Provides configuration/status registers on IFC interface |
| | PMC/XMC SLOTS | VME | Kontron ALMA2f VME controller with ZeSST on FPGA |
| Dual PMC | | PCI32 @ 66 MHz, VI/O is fixed and set to 3.3 V | |
| XMC | | PCIe x1, Gen2 (only for slot 2, no XMC interface on slot 1) | |
| MINIPCI SLOT | Mechanical format | PMC IEEE1386 type, SA and RC | |
| | PCI-Express | PCIe x1, Gen2 | |
| | USB | USB 2.0 (should be exclusive with P0 build option) | |
| M.2 SLOT | Mechanical format | Full-mini card 52 pin count | |
| | SATA | Gen3 (should be exclusive with P0 connector) | |
| SYSTEM REAR INTERCONNECTION | Mechanical format | Type 2242 Z-height lower than 4.7 mm, Key M | |
| | Gigabit Ethernet | 2x 10/100/1000 BASE-T(X) on P0 | |
| | USB Ports | 2x high-speed USB Ports on P0 | |
| | SATA Ports | 1x SATA Ports on P0 | |
| | Serial Ports | 4x EIA-232 null-modem Tx/Rx Serial Ports rear panel on P2 | |
| | GPIO | 3x GPIOs on P0 and 5 x GPIOs on P2 depending on build option | |
| | PMC slot 1 | I/Os available on P2 | |
| | PMC/XMC slot 2 | 32 I/Os available on P2 32 I/Os available on P0 | |
| FRONT INTERFACE | Gigabit Ethernet | 2x 10/100/1000Base-T(X) on RJ-45 connectors. | |
| | Serial Port | 1x RS-232 UART interfaces, RJ-12 connector or 4x RS-232 as option | |
| | USB Port | 1x USB 2.0 port for storage or keyboard/mouse | |
| | Reset | One Reset button and Shelf Manager control (SMB command on VME) | |
| | LEDs | Bicolor LEDs on front panel | |
| MISCELLANEOUS | Board Temperature | ADT7461A on-chip sensor and remote thermal diode. 3x LM73 sensors | |
| | Battery | BR1225 on board socket, SuperCap manufacturing build option available, exclusive of battery socket | |
| | Backplane Power Supply | +5 V only fully protected by fuse +12 V for PMC/XMC slot +5 V aux optional -12 V for PMC/XMC slot | |
| | Power Consumption | < 10 W without mezzanines, without options, without peripherals/devices (Dual-Core 1 GHz processor) | |

VM6103 BLOCK DIAGRAM AND FRONT PANEL



ENVIRONMENTAL SPECIFICATION

| | SA - STANDARD COMMERCIAL | WA - EXTENDED TEMPERATURE | RA - RUGGED AIR-COOLED | RC - RUGGED CONDUCTION-COOLED |
|----------------------------|--|---------------------------------------|---|--|
| Conformal Coating | Optional | Standard | Standard | Standard |
| Cooling Method | Convection | Convection | Convection | Conduction |
| Operating Temperature | 0° to +55°C | -20° to +65°C | -40° to +70°C | -40° to +85°C |
| Storage Temperature | -40° to +85°C | -45° to +100°C | -50° to +100°C | -50° to +100°C |
| Vibration Sine (Operating) | 20-500 Hz - 2 g | 20-500 Hz - 2 g | 20-2,000 Hz - 3 g | 22-2,000 Hz - 5 g |
| Random | f (Hz) 10 40 PSD (g ² /Hz) 0.01 0.01 | 100 200 2000 0.0007 0.0007 0.00005 | 5 Hz to 100 Hz +3 dB/octave 100 Hz to 1000 Hz 0.04 g ² /Hz 1000 Hz to 2000 Hz -6 dB/octave | 5 Hz to 100 Hz +3 dB/octave 100 Hz to 1000 Hz 0.1 g ² /Hz 1000 Hz to 2000 Hz -6 dB/octave |
| Shock (Operating) | 20 g/11 ms Half Sine | 20 g/11 ms Half Sine | 20 g/20 ms Half Sine | 40 g/20 ms Half Sine |
| Altitude (Operating) | -1,500 to 60,000 ft | -1,500 to 60,000 ft | -1,500 to 60,000 ft | -1,500 to 60,000 ft |
| Relative Humidity | 90% without condensation | 95% without condensation | 95% without condensation | 95% without condensation |

ORDERING INFORMATION

| ARTICLE | ORDER CODE | DESCRIPTION |
|---------|----------------------|---|
| VM6103 | VM6103-SA24-00000000 | 6U single slot 4 HP VME SBC, 1.0 GHz QorIQ dual core LS1023A processor, 4 GB DDR4-1600 SDRAM with ECC, 32 GB eMMC MLC flash, two PMC slots, one XMC slot, 3 GPIOs on P2, no P0 connector, Air-Cooled (0°C to +55°C), one SATA M.2 Type 2242/2260, key M slot for storage module, TPM/Wibu hardware build option equipped, four serial lines on P2, battery option equipped, MiniPCIe socket equipped. |
| VM6103 | VM6103-SA44-00000000 | 6U single slot 4 HP VME SBC, 1.6 GHz QorIQ quad core LS1043A processor, 4 GB DDR4-1600 SDRAM with ECC, 32 GB eMMC MLC flash, two PMC slots, one XMC slot, 3 GPIOs on P2, no P0 connector, Air-Cooled (0°C to +55°C), one SATA M.2 Type 2242/2260, key M slot for storage module, TPM/Wibu hardware build option equipped, four serial lines on P2, battery option equipped, MiniPCIe socket equipped. |

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