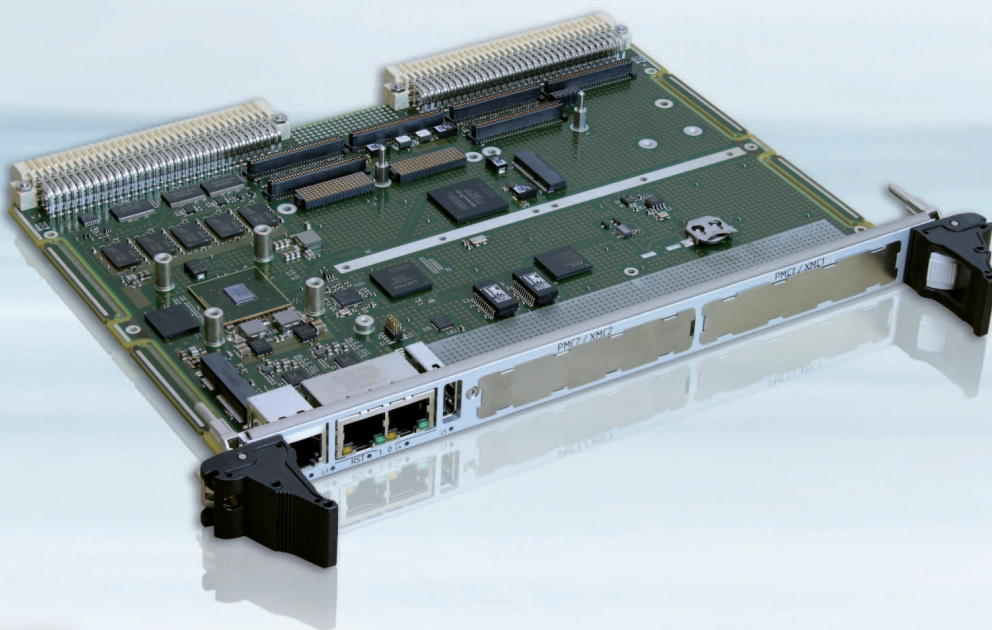


# VM6103

---



## 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

POSSIBILITIES START HERE



## 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

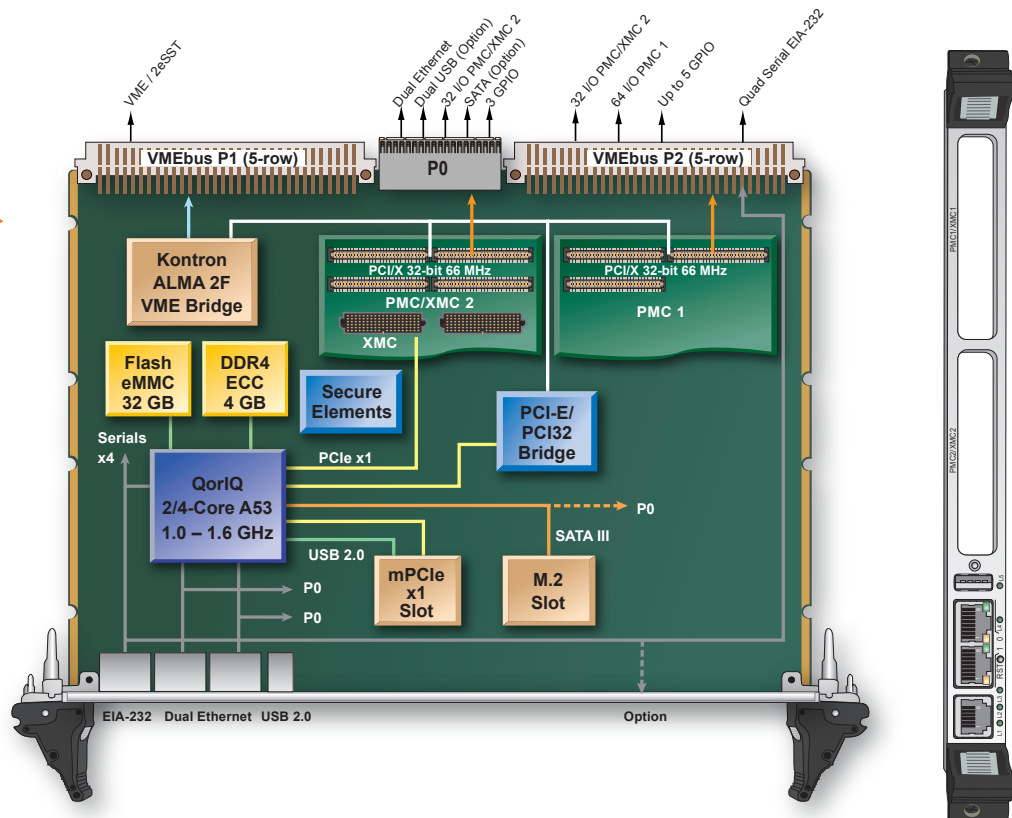
The VM6103 is front and rear I/O compatible with Kontron's line of x86 and Power VME SBCs, supporting the same Rear Transition Module. The net effect of this fit form function compatibility is to allow our customers a simple line replacement policy of the SBC in deployed systems



## ► TECHNICAL INFORMATION

<b>FORM FACTOR</b> <b>SYSTEM ON CHIP (SOC):</b> <b>QORIQ LAYERSCAPE</b> <b>LS1023A/LS1043A</b>		6U VME, single slot, 0.8 inch pitch
	Processor	One NXP QorIQ Layerscape 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
<b>ON-BOARD CONTROLLER</b>	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
	VME	Kontron ALMA2f VME controller with ZeSSST on FPGA
<b>PMC/XMC SLOTS</b>	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)
	Mechanical format	PMC IEEE1386 type, SA and RC
<b>MINIPCI SLOT</b>	PCI-Express	PCIe x1, Gen2
	USB	USB 2.0 (should be exclusive with P0 build option)
	Mechanical format	Full-mini card 52 pin count
<b>M.2 SLOT</b>	SATA	Gen3 (should be exclusive with P0 connector)
	Mechanical format	Type 2242 Z-height lower than 4.7 mm, Key M
<b>SYSTEM REAR INTERCONNECTION</b>	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
	Gigabit Ethernet	2x 10/100/1000Base-T(X) on RJ-45 connectors.
<b>FRONT INTERFACE</b>	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
	Board Temperature	ADT7461A on-chip sensor and remote thermal diode. 3x LM73 sensors
<b>MISCELLANEOUS</b>	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	100	200	2000	5 Hz to 100 Hz +3 dB/octave	5 Hz to 100 Hz +3 dB/octave
	PSD (g <sup>2</sup> /Hz)	0.01	0.01	0.0007	0.0007	0.00005	100 Hz to 1000 Hz 0.04 g <sup>2</sup> /Hz	100 Hz to 1000 Hz 0.1 g <sup>2</sup> /Hz
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.

### ► CORPORATE OFFICES

#### FRANCE

150 rue Marcelin Berthelot  
ZI de Toulon-Est - BP 244  
83078 TOULON CEDEX 9  
Tel.: + 33 4 98 16 34 00  
Fax: + 33 4 98 16 34 01  
sales.KFR@kontron.com

#### GLOBAL HEADQUARTERS

Lise-Meitner-Str. 3-5  
86156 Augsburg  
Germany  
Tel.: + 49 821 4086 0  
Fax: + 49 821 4086 111  
info@kontron.com

#### NORTH AMERICA

9477 Waples Street, Suite 150  
San Diego, CA 92121  
USA  
Tel.: + 1 888 294 4558  
Fax: + 1 858 677 0898  
info@us.kontron.com

#### ASIA PACIFIC

1-2F, 10 Building, N° 8 Liangshuihe 2<sup>nd</sup> Str.,  
Economical & Technol. Development Zone,  
Beijing, 100176, P.R.China  
Tel.: +86 10 63751188  
Fax: +86 10 83682438  
info@kontron.cn