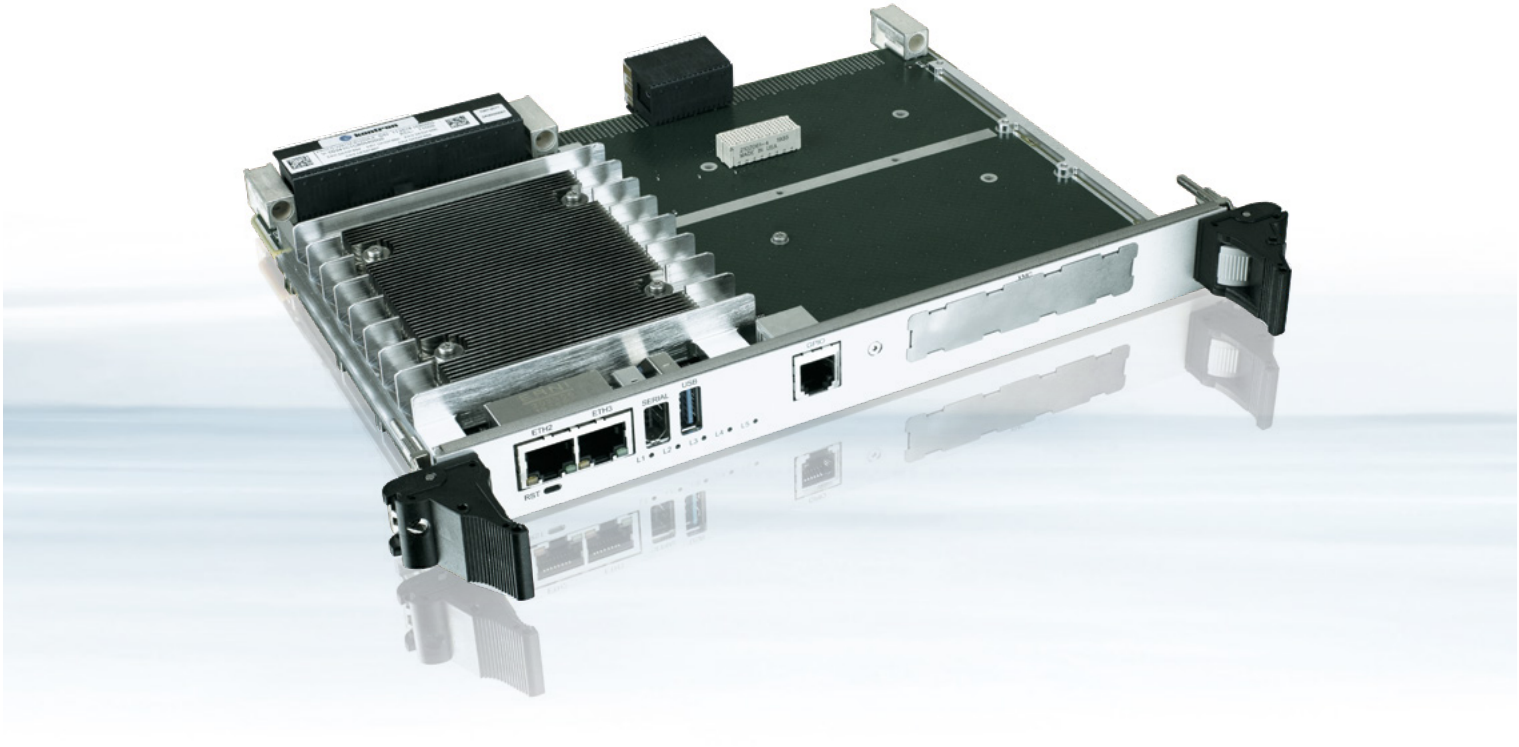
VX6124

6U OpenVPX Arm® Cortex®-A72 Computing Node



OpenVPX 6U 16 Core™ LX2160 Computing Node

- High End, Low power: 200k+ DMIPS, 45 W SBC
- 16 Arm® Cortex®-A72 cores @ 2.0 GHz NXP LX2160A SOC
- 16 128-bit NEON™ SIMD engines
- 40G BaseKR4 data plane, 10G BaseKR control plane port
- Arm® TrustZone, Kontron AppProtect support

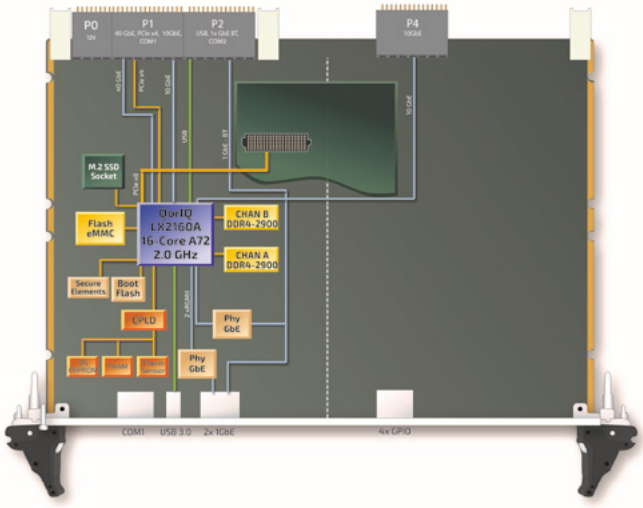
POSSIBILITIES START HERE kontron S&T Group

VX6124
6U VPX 16 Arm® Core Computing Node

KONTRON HIGH END Arm® ARCHITECTURE

Acknowledging the growing part of Arm® processors in the signal processing domain, Kontron extends its VPX portfolio of commercial-off-the-shelf (COTS) Computing Nodes segment with the VX6124, a 200k+ DMIPS processing blade featuring 40G Ethernet connectivity.

VX6124 is the 6U version of an architecture designed for long term programs and harsh environments, ideal for applications requiring outstanding bandwidth and digital security. This architecture can be used as a vehicle for 100G data plane system experiments (with Kontron VX6940 40G/100G switch for example).



// 6U High End Arm® Architecture

The new architecture is built around the NXP QorIQ Layerscape LX2160A processor equipped with 32 GByte DDR4 memory. The air cooled version is thermally and mechanically designed to optimize the use of Kontron XMC-GPU91 Radeon™ E9171, which adds to the massive computing power offered by the main CPU, another 1.2 TFlops of computing power via its eight compute units. The architecture boasts a direct x8 PCIe gen3 link to the XMC slot, giving a possibility of 8 GByte/s data bandwidth with the mezzanine silicon.

OPEN VPX/INTEROPERABILITY

The 40G data plane and 10G control plane ports meet the requirement of VITA65 / OpenVPX architectures

QORIQ® LAYERSCAPE® LX2160A COMMUNICATIONS PROCESSOR

The Layerscape LX2160A 'System on a Chip' (SoC) delivers the high-performance needed for compute-intensive networking applications. Equipped with sixteen Arm®v8 Cortex®-A72 CPU cores, 28 GHz SerDes technology and low FinFET power, this processor supports up to 100 Gbit/s Ethernet and the latest PCIe Gen4 technology. The wire rate I/O processor has 18 integrated MACs including dual 100 Gbit Ethernet ports and a 130 Gbit/s L2 switch. Every Arm®v8 Cortex®-A72 is associated with a 128-bit NEON™ SIMD engine.

Layerscape LX2160A Block Diagram

LX2160A KEY FEATURES

- 16 64-bit Arm® v8 Cortex®-A72 cores with 8 MByte L2 with ECC
- Dual DDR4 memory controllers with ECC, up to 3200 MT/s
- High speed Serdes I/O lanes with 35 GHz capability. Configurable for flexibility: 100G Ethernet and 1x PCIe x4 or SATA or mixed
- Switch function inside LX2160 enabling multiple ports Ethernet network
- Integranet DMA controllers
- Low sensitivity to cosmic radiation: suitable to space or avionics use cases.

VX6124 PERFORMANCE VS POWER DISSIPATION

The CPU subsystem fits a small power budget to enable efficient use of a mezzanine coprocessor (Such as Kontron XMC-GPU91). With the LX2160A processor speed set to 2.0 GHz, the VX6124 power budget does not exceed 45 Watts while offering the following performance:

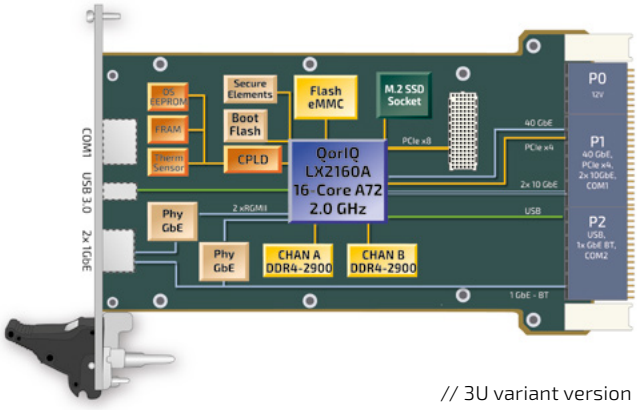
- 230.4k DMIPS (7.2 DMIPS/MHz/A72core)
- 140.48k CoreMark (4.39 CM/MHz/A72core)

VX6124

6U VPX 16 Arm® Core Computing Node

OTHER FORM FACTOR

This Arm® high end architecture has been designed to be compatible with 3U VPX variants. Contact Kontron with your program specific requirements.



// 3U variant version

DESIGNED TO MEET AIRBORNE ENVIRONMENT

VX6124 is an air cooled unit designed to meet harsh environments like VITA 47 class EAC3. It can operate in Jet Cabin temperature environments of 0 °C/+55 °C. Built-In test capabilities enable effective monitoring. Shock and Vibration capability meet system qualification for DO160E, curve B12.

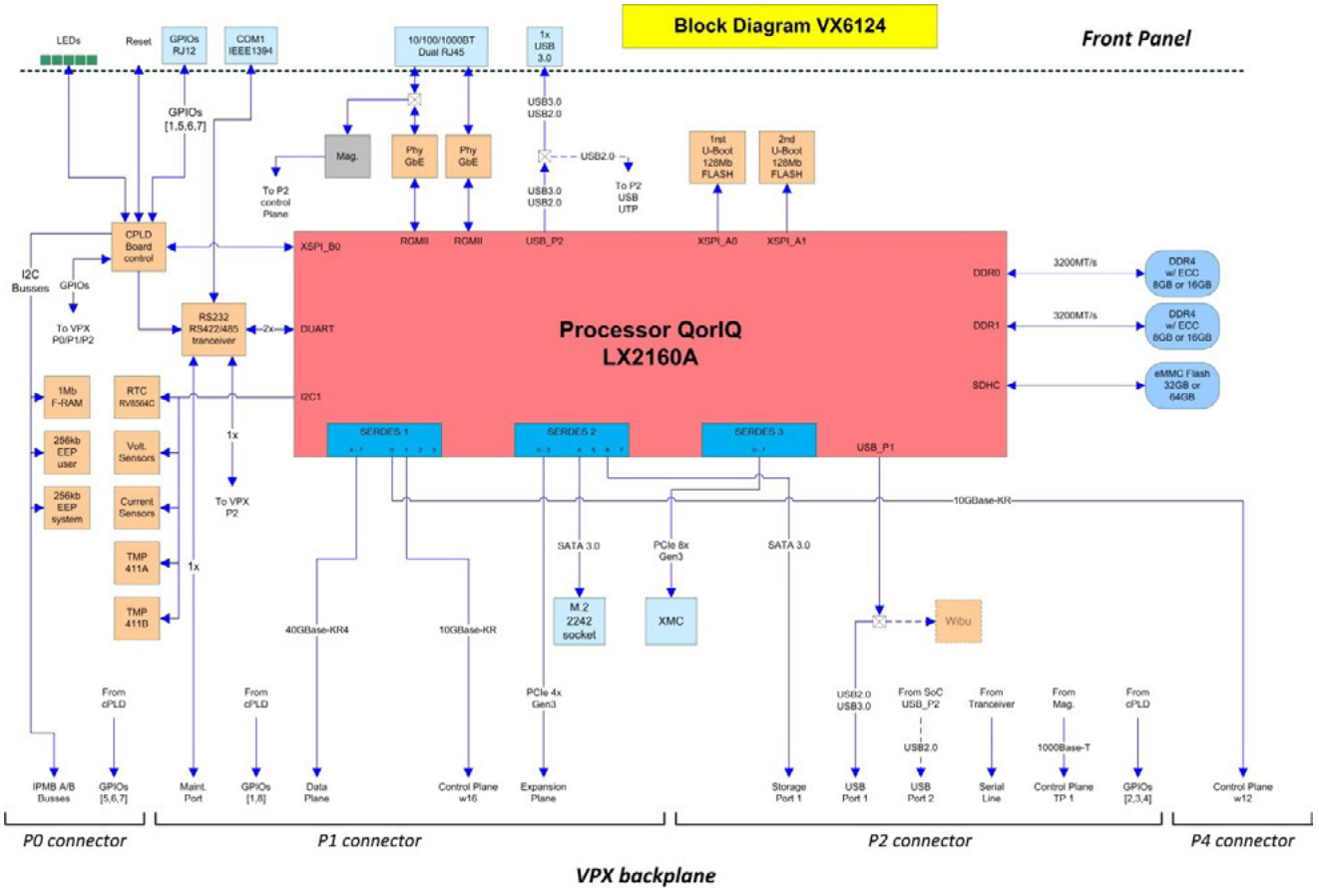
SOFTWARE

Kontron standard support includes U-Boot and Yocto Linux. Alternate boot device further secure field upgrades.
Other possible OSes include other Linux distributions (eg Fedora, Ubuntu, OpenWRT) via EFI Arm® boot as well as VxWorks™.

DIGITAL SECURITY

NXP Secure Boot and Arm® TrustZone are available. Kontron application code protection via AppProtect™ is also part of the VX6124 architecture. This enables a strict control of the deployment of critical applications at the unit level, with secure 'code in transit' and reverse engineering protection.

VX6124 DETAILED ARCHITECTURE



TECHNICAL INFORMATION

FORM FACTOR		6U VPX, single slot, 5HP (fits 1.0 inch pitch backplanes and card cages)
MAIN PROCESSOR	SYSTEM ON CHIP	NXP QorIQ® Layerscape® LX2160A SOC 16 core Arm® v8 Cortex®-A72 processor core running @2.0 GHz 30 Watts Power dissipation 28-nm silicon technology
ON-BOARD CONTROLLERS	ETHERNET PHY WATCHDOG SYSTEM CPLD	Two single port 10/100/1000BASE-T(X) Ethernet RGMII transceivers connected on front dual RJ45 connector PLD-based, timeout ranging from 4 ms to 510s, IRQ, Reset, dual-stages Power on/off control, reset control, local environmental control/monitoring, I2C interfaces to I2C bus IPMB A/B (rear P0), LEDs control, user and system GPIOs, internal registers that allow system management
MEMORY	SYSTEM MEMORY OS STORAGE FLASH (UBOOT) EEPROM F-RAM M.2 SSD OPTION	32 GByte dual channel DDR4 SDRAM running at 2900 MT/s, ECC, soldered 32 GByte MLC 5.1 eMMC device 2x 64 MByte serial NOR flash, with recovery image and UBoot settings One serial 256 Kbit EEPROM dedicated to system data One serial 256 Kbit EEPROM dedicated to application data 1-Mbit, non-volatile, FRAM dedicated to the backup of critical data when the board is powered off M.2 SSD Type M, 22 mm x 42 mm module
FRONT PANEL CONNECTIVITY	ETHERNET USB 2 AND 3 SERIAL LINE LEDS RESET	2x 10/100/1000BASE-T(X) Ethernet interface on dual RJ45 connector 1 USB 2.0 and USB 3.0 interface on USB type A upright connector 1 TIA-232 serial line with handshaking or TIA-422/485 or 2 TIA-232 simplified on IEEE1394 type connector, depending on build option 5 LEDs reporting the board CPU health status and activity Reset push button
ONBOARD CONNECTIVITY	M.2 SOCKET XMC SLOT	Bottom M.2 socket for SSD module. Supported size: Type M, 22 mm x 42 mm. VITA 61 XMC2.0: x8 PCIe Gen3 direct link to SOC, 12 V VPWR setting
BACKPLANE CONNECTIVITY	VPX INTERFACE P0 SUPERVISORY FUNCTIONS P0 POWER SUPPLY P1 P2 P4	SLT6-PAY-2F2U2T-10.2.5 Also useable in SLT3-PAY-1F1F2U1TU1T1U1T-14.2.16-slot profile Non Maskable RESET NVMRO, Master SMBus and Master/Slave SMBus interfaces for system management. Compatible with Kontron CMB (Monitoring Board), temperature and voltage sensors on the board PCIe optional use of common reference clock feature P0: VS1=12V, 3.3V_AUX, -12V_AUX for XMC slot VS2 and VS3=5V not used Data Plane: 40GBASE-KR4 as per IEEE802.3 clause 82 Control Plane: 1x 10GBASE-KR as per IEEE802.3 clause 72 Expansion plane: x4 PCIe 3.0 XMC I/Os: P1w9-X12d mapping as per VITA46.9 section 4.10 Single-Ended: Maintenance port (Rx,Tx), GPIOs (maskable reset), USB power USB: 1 USB 2.0 and USB 3.0 port + 1 USB 2.0 port Storage: 1 SATA 6 Gb/s link Control plane: 1 x 1000BASE-T Single-Ended: 1 serial line compliant TIA-232 or TIA-422/485 using dynamic configuration, 3 GPIOs, USB power Control Plane: 1x 10GBASE-KR as per IEEE802.3 clause 72
SOFTWARE SUPPORT		Uboot, Linux available now. Ask for: Windows, VxWorks
MECHANICAL SIZE		6U x 160 mm, Slot pitch: 1.00 inch according to VITA 48.1 Type 2

ORDERING INFORMATION

ARTICLE	PART NO.	DESCRIPTION
VX6124	VX6124-SAEG-1000000	6U Single slot 5HP (1") VPX SBC -Air-Cooled 'SA' (0 °C to 55 °C) - LX2160A sixteen Arm® A72 2.0 GHz QorIQ LayerScape Processor - 32 GByte soldered SDRAM with ECC - Soldered 16 GByte eMMC Flash - M2 SSD bottom slot, XMC 2.0 slot - Standard IO profile - No Secure element - - No PBIT - No coating

Global Headquarters

Kontron S&T AG

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