OpenVPX™ 3U Single Board Computer with T4240

The AcQ Inducom "MEDUSA" VPX3424 is a 3U OpenVPX™ (VITA 65) Single Board Computer (SBC) featuring the all-new T4240 QorIQ® Processor from Freescale Semiconductor. This 12-core, 24-thread processor running at up to 1.8GHz is based on the e6500 core with AltiVec® technology and offers the cutting edge of both performance (up to 216 GFlops) and power efficiency. With up to 12GB DDR3 RAM with ECC and a range of fast interconnects, it forms the beating heart of this new board, bringing you unparalleled performance.

MEDUSA VPX3424

Using the T4240's built-in AltiVec® technology accelerators, cryptographic engine and high-speed serial interfaces, the VPX3424 is capable of processing data at record-breaking speeds for many common algorithms such as FFTs, image analysis, networking or wireless protocols. Further accelerators allow for extensive hardware-based parsing, scheduling (QoS) and queue management.

FPGA-Powered Flexibility

The VPX3424 has a large, user-programmable FPGA and dozens of customizable OpenVPX™ User I/O pins, allowing you to add support for application specific interfaces or offload specialized tasks to the FPGA. From adding a simple PWM signal to multiple additional Ethernet controllers, the user-programmable FPGA adds great flexibility to meet your design needs.

Software Support

Support for VxWorks®, Integrity®, PikeOS™ and Linux is planned for the VPX3424, as well as an OS-less BSP. Other Operating Systems are available on request. Each supported software environment comes with extensive documentation, example software, compiler and IDE.
Furthermore, a development kit will be available for the on-board user-programmable FPGA with code examples and documentation to kick-start your firmware development.

Small Form Factor System

A conduction cooled ruggedized REDI (VITA 48) variant of the VPX3424 is available as part of the upcoming AcQ Inducom OpenVPX™-based small form factor system (VITA 75), a highly modular and extendable platform for a range of embedded applications. This system brings together an optimized combination of performance and SWaP. AcQ Inducom offers a wide range of boards for this system using the OpenVPX™ (VITA 65) architecture. These boards include I/O, networking and audio functionality. A PMC/XMC carrier (VPX3001) is also available. Contact us for more details on this system and how it can meet your application's needs.

OpenVPX™

- **Profile**
  The VPX3424 is compatible with a large number OpenVPX™ (VITA 65) slot and module profiles, making it suitable for a wide range of high-performance applications.

Compatible SLT profiles:	Compatible MOD profiles:	MOD3-PAY-2F2T-16.2.5-3	MOD3-PER-2F-16.3.1-2
SLT3-PAY-2F2U-14.2.3	MOD3-PAY-2F2U-16.2.3-2	MOD3-PAY-1D-16.2.6-1	MOD3-PER-2F-16.3.1-3
SLT3-PAY-1F1F2U-14.2.4	MOD3-PAY-2F2U-16.2.3-3	MOD3-PAY-1D-16.2.6-2	MOD3-PER-1F-16.3.2-1
SLT3-PAY-2F2T-14.2.5	MOD3-PAY-1F1F2U-16.2.4-1	MOD3-PAY-2F-16.2.7-1	MOD3-PER-1F-16.3.2-2
SLT3-PAY-1D-14.2.6	MOD3-PAY-1F1F2U -16.2.4-2	MOD3-PAY-2F-16.2.7-2	MOD3-PER-1U-16.3.3-1
SLT3-PAY-2F-14.2.7	MOD3-PAY-1F1F2U -16.2.4-3	MOD3-PAY-2F-16.2.7-3	MOD3-PER-1U-16.3.3-2
SLT3-PAY-1F2U-14.2.12	MOD3-PAY-1F1F2U -16.2.4-4	MOD3-PAY-1F2U-16.2.11-1	MOD3-STO-2U-16.5.1-1
SLT3-STO-2U-14.5.1	MOD3-PAY-1F1F2U -16.2.4-9	MOD3-PAY-1F2U-16.2.11-2	MOD3-STO-2U-16.5.1-2
	MOD3-PAY-1F1F2U -16.2.4-11	MOD3-PAY-1F2U-16.2.11-5	
	MOD3-PAY-2F2T-16.2.5-2	MOD3-PAY-1F2U-16.2.11-7	

- **Data Plane**
  As per the VITA 46.4 standard, two x4 lanes of Gen3 PCI Express® are available for high-bandwidth data movement via the OpenVPX™ data plane; supporting data rates of up to 8Gbaud per lane.

  These interfaces can be configured by software. They can be combined into a single x8 lane, Gen2 PCI Express® interface. The first x4 lane can be reconfigured into a Serial RapidIO® High-Bandwidth, Low-Latency interface, as per VITA 46.3; supporting Serial RapidIO® data rates of up to 5Gbaud per lane.

  Each link (FP) has its own PCIe controller, which can be individually configured. As a Root Complex (RC) it uses downstream ports, as an End Point (EP) it uses upstream ports.

- **Control Plane**
  The VPX3424 implements a Gigabit Ethernet control plane architecture. The VPX3424 supports up to four Ultra-Thin Pipes (1000BASE-KX) or up to two Thin Pipes (1000BASE-T) as its control plane interfaces.

- **User I/O**
  The User I/O pins on the VPX3424 are packed with high-speed interconnects and flexible I/O solutions. Four 10Gigabit and two Gigabit Ethernet connections are available for fast links to the T4240. Additionally, two USB, two SATA and two CAN ports are available on the User I/O pins.

  Up to 36 User I/O pins are available to a powerful user-programmable FPGA. Customers can freely determine the functionality of these pins by expanding the FPGA's firmware, which can include additional fast interconnects.

- **Utility Plane**
  The VPX3424 implements a system management infrastructure using the standard I^2C bus and IPMI protocol, an on-board system management block implements the Intelligent Platform Management Controller (IPMC) function.

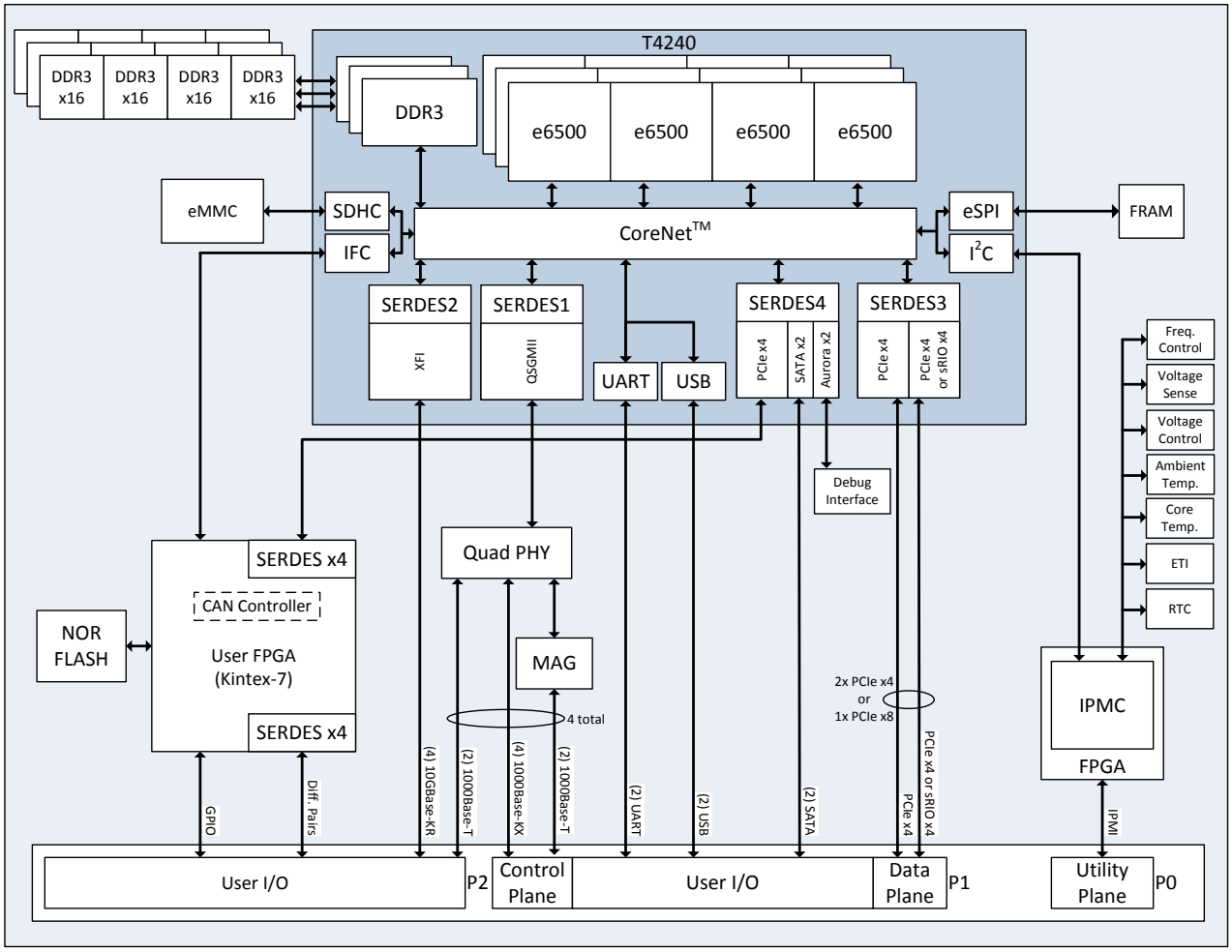
MEDUSA VPX3424

Features

- OpenVPX™ 3U Single Board Computer (VITA 46, VITA 65)
- Freescale® T4240 with 12 dual-threaded e6500 cores up to 1.8GHz (up to 216 GFlops)
  - Three clusters of 4 cores and 2MB cache per cluster
  - Each core has built-in AltiVec® technology accelerators
  - Highest SoC CoreMark™ score to date – 187,874 points (coremark.org)
  - Almost four times faster than the Freescale® P4080
  - QorIQ® Data Path Acceleration Architecture support
  - Advanced MMU capabilities for enhanced safety and reliability
  - Part of the Freescale® Product Longevity Program
- Up to 12GB of DDR3 RAM
  - Three DDR3 controllers; 64-bit bus with ECC up to 1866MT/s (2133MT/s TBC)
  - Backed by 1.5MB of CoreNet™ Platform Cache
- Non-volatile storage options:
  - 2Mbit of FRAM
  - Up to 64GB eMMC
  - 256MB Flash for programs
- User-programmable FPGA
  - Can use up to 36 free pins on the OpenVPX™ User I/O
  - PCI Express x4 connection between CPU and FPGA
  - IFC connection between CPU and FPGA
- Extensive on-board temperature, voltage and current monitoring and logging capabilities
- Board Management Control on IPMC bus (VITA 46.11)
- On-board Elapsed Time Indicator
- Debug facilities through AURORA and JTAG on-board connector
- Interfaces (available with use of RTM):
  - IPMC bus
  - Software configurable data plane:
    - 2x PCIe x4 **or** 1x PCIe x8 **or** 1x PCIe x4 and 1x Serial RapidIO® x4
  - Control plane: up to four Gigabit Ethernet links (1000BASE-T **or** 1000BASE-KX)
  - Four 10GBit Ethernet (10GBase-KR)
  - Two SATA 2.0 ports
  - Two USB 2.0 ports
  - SerDes x4 lanes
  - Software configurable: two UARTs **or** one UARTs with RTS/CTS
  - CAN ports, FPGA IP using GPIO pins
- Air-cooled and conduction cooled ruggedized REDI (VITA 48) variants available
- Operation temperature of components for the REDI compliant board, conduction cooled, is at least -40..+85° Celsius. The air cooled board may have different operation temperature range components.
- Optional conformal coating.

Ordering information

- **VPX3424/T01** T4240 1.5GHz Enc (std temp), air cooled, 3 x 2GB DDR3 RAM, 64GB eMMC
- **VPX3424/T02** T4240 1.8GHz Enc (std temp), air cooled, 3 x 2GB DDR3 RAM, 64GB eMMC
- **VPX3424/T03** T4240 1.5GHz Enc (ext temp), conduction cooled, 3 x 2GB DDR3 RAM, 64GB eMMC
- **VPX3416/T01** T4160 1.5GHz Enc (std temp), air cooled, 2 x 2GB DDR3 RAM, 64GB eMMC
- **VPX3416/T02** T4160 1.8GHz Enc (std temp), air cooled, 2 x 2GB DDR3 RAM, 64GB eMMC
- **VPX3416/T03** T4160 1.5GHz, Enc (ext temp), conduction cooled, 2 x 2GB DDR3 RAM, 64GB eMMC
- **RTM3424/T01** RTM for VPX3424 and VPX3416
- Other configurations on request.



MEDUSA VPX3424 blockdiagram

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