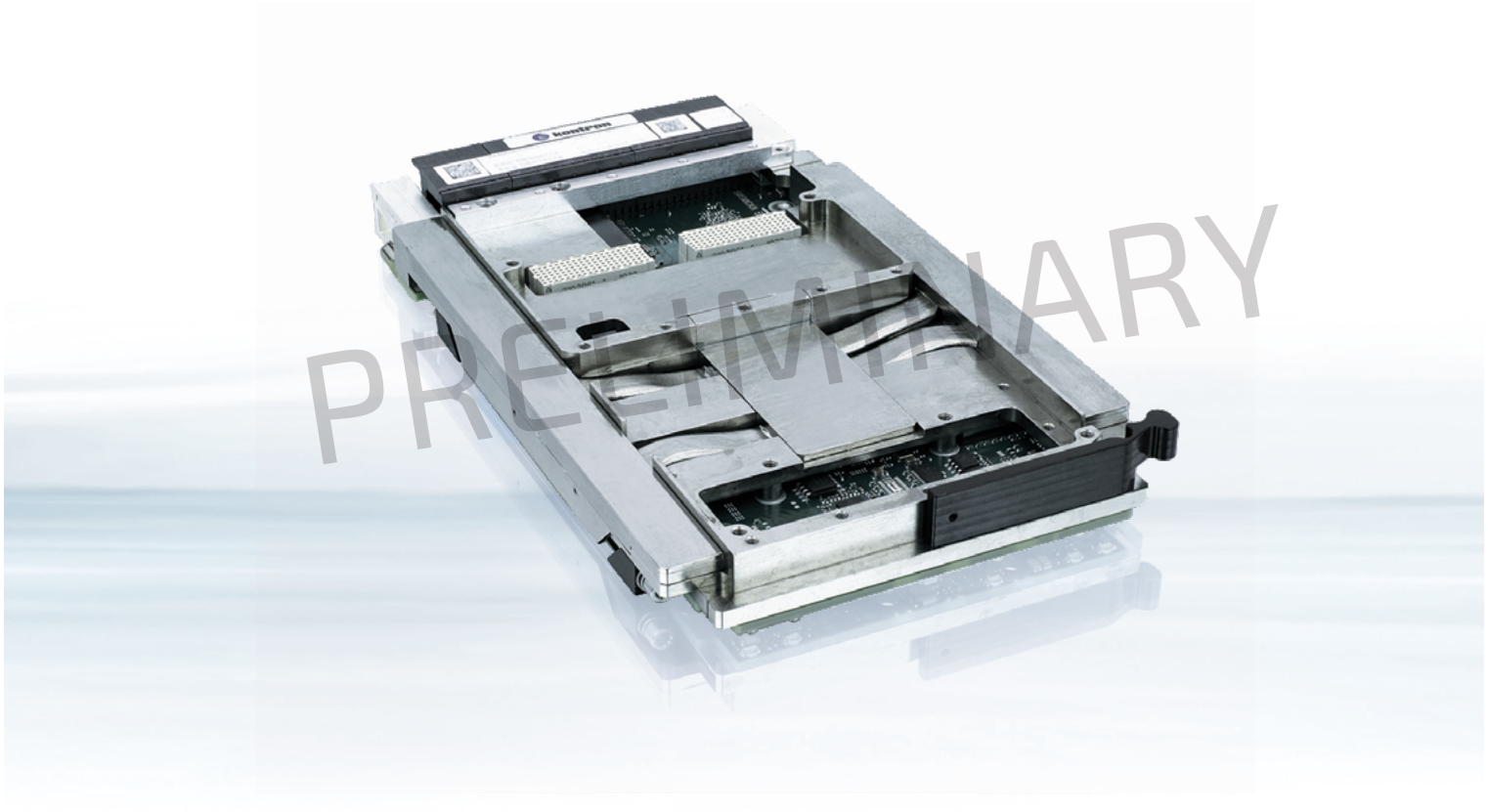
VX3070

Single Board Computing Node



Intel® 10nm x86 Microserver 3U VPX Blade

- Intel® Xeon® D processors with 100G Integrated Ethernet
- Up to 20 cores with AVX-512 vector engine
- Security enforced by Hardware Root of Trust
- VITA48 cooling builds with VITA 47 CC3 support
- Designed in accordance with SOSA™ requirements

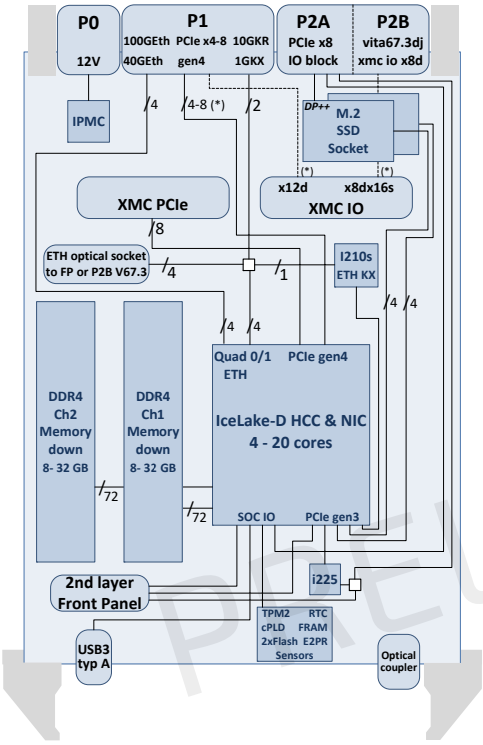
POSSIBILITIES START HERE kontron S&T Group

THE SOSA™ ARCHITECTURE BOOSTER

Kontron VX3070 computing node is now available to provide an instant boost to the computing performance of existing HPEC architectures designed in accordance with SOSA™.

With the VX3070, Kontron takes this outstanding silicon architecture to the next level, in the form of a rugged single 3U VPX board server, boasting numerous innovations and extensions designed to fulfill the most demanding mission profiles.

VX3070 BLOCK DIAGRAM



BACKPLANE OPTIONS DIFFERENCES

Leveraging the VX3070 architecture is a sure way to deploy a vast choice of applications and serve demanding programs with a single computer blade for years to come, optimizing development efforts and long term logistics.

(*) - **I/O intensive:** based on VITA65d1 mod3-16.2.15-4
P1: PCIe x4 and XMC IO x12d
P2A: IO block
P2B: XMC IO x8dx16s or vita67.3dj

(*) - **Compute intensive:** based on VITA65d1 mod3-16.6.13-1
P1 PCIe x8 (no XMC IO)
P2A: PCIe x8 or IO block or not equipped
P2B: vita67.3dj or x8dx16x or not equipped

THE ICELAKE-D PLATFORM

Outperforming the previous Intel® Xeon®-D 1500 SOC silicon, the 10nm IceLake-D SOC of the VX3070 targets a new generation of microserver and parallel computing node, with superb performance with a reasonable power budget. Offering capabilities such as Ethernet 100G and PCIe gen4, with ROCE V2 RDMA protocol and on chip DMA engine, VX3070 is a perfect fit for blade computing with demanding mechanical and power constraints. It fulfills the growing computing and I/O requirements of leading edge applications that target a minimum number of boards.

The CPU models selected for VX3070 typically range from 12, 16 or 20 cores units. 4 core or 8 core options are also possible for specific application architectures and mission profiles.

With specialized instructions for **Artificial Intelligence** (VNNI), **Signal Processing** (AVX512) and crypto algorithms, **Computer vision, media processing** and crypto applications enjoy twice the performance of the previous generation of micro server SOCs.

The Ethernet 100G/40G capability is available on 16 core models and above. Lower core number versions still support 50G/40G Ethernet interconnects. All versions support the ROCE V2 RDMA feature at the silicon level.

OPEN VPX PROFILES

The VX3070 design is availabe with the following VITA65 OpenVPX IO intensive and compute intensive profiles:

- IO intensive profile:
  MOD3-PAY-1F1F2U1TU1T1U1T-16.2.15-4
- Compute intensive slot profiles:
  MOD3p-PAY-1F1U1S1S1U1U4F1J-16.6.13-1
  MOD3p-PAY-1F1U1S1S1U1U2F1H-16.6.11-11

COMPATIBILITY WITH PREVIOUS PRODUCTS

The VX3070 is designed to replace Kontron computing nodes based on the Xeon D-1500 family of processors. Form fit function variants of the VX3070 allow plug and play replacement in existing system architectures using the VX305C-40G and the VX305H-40G. Compatibility covers: backplane connectivity, power envelope and feature set (see backplane compatibility list).

RELIABILITY AND ROBUSTNESS

The selected CPU SKU reliability is guaranteed for 10 years up to 100 % active usage profile.

VX3070 Air cooled meets VITA 47 class EAC4 V2 and can operate in extended temperature environments up to of 0 °C/+55 °C.

VX3070 Rugged Conduction cooled version is a Plug-in unit according to VITA 48.2 Type 2, Secondary Side Retainer. It can sustain from -40 °C up to 70 °C card edge temperature according to VITA 47 depending on the processing load and mezzanine power. It is available with the VITA 48 REDI Two-Level Maintenance bottom cover option C.

Other build options such as VITA 48.8 AFT or wider air cooled temperature range are available on request.

CYBER SECURITY, SECURE DEPLOYMENTS

VX3070 design is compatible with the Kontron **SEC-Line** elements and features a discrete TPM2 hardware root of trust. It supports secure boot, measured boot and hardware protection of crypto keys. The **AppProtect** technology protects application code both in transit and at rest, and restricts program execution solely to boards hosting a valid license.

VX3070 ARCHITECTURE

The Kontron VX3070 architecture is designed as a reusable building bloc offering the best CWAP ratio for a rugged high performance computer. Designing it to fit the 3U VPX standard computer blade, Kontron added numerous connectivity options which also make this computer the ideal candidate to build powerful and versatile rugged box servers and micro clouds.

USB3: ports are available at the front and at the rear. The USB3 type A can offer off board Storage, Graphics connectivity and its ecosystem is growing fast. VX3070 also features an on-board connector for 2nd layer custom front I/O connectivity.

NVMe Storage: top and bottom M.2 sockets are available to connect legacy SATA or PCIe gen3 SSD units. With PCIe, NVMe OS device drivers offer lower latency and better management of existing FLASH based storage.

Safety/Security module: VX3070 top M.2 socket is also capable of hosting custom intelligent modules for independant security or safety intelligent controllers.

Fiber Optics: VX3070 includes an on board optical transceiver socket hosting a Samtec FireFly™ module for Ethernet connectivity to the front panel or to the rear (VITA66.4). This offers fiber optics connectivity for high performance network ports (up to 100G), a key asset for external connectivity.

XMC mezzanine: the daughter card is linked to a x8 PCIe gen 4 port of the SOC. On the IO intensive model, the XMC slot implements x12d and x8dx16s I/O routing, respectively on P1 and P2B.

KONTRON SOFTWARE

Kontron provides a rich Linux BSP to fully exercise the capabilities of V3070 with any modern distribution. It is available as a bootable Fedora Live USB device for instant use and easy setup. The image also contains the BSP source code for easy migration to any linux distribution.

System Management: The linux device driver controlling the cPLD unit of the VX3070 has access to all the key low level features of the SBC. The cPLD does the central housekeeping of the computer blade: power supplies control and monitoring, SOC out-of-band signals, RESET, LEDs, ect). System management resources such as inter blade control and monitoring registers routed via VPX SMB buses can also be managed via the cpldtool command.

Out of band system management

VX3070 implements VITA46.11 IPMC Controller with dual redundant IPMB support.

PBIT: maximal coverage with no programming. VX3070 PBIT "Expert mode" innovative Learn/Compare approach allows to record all board settings and connections status to all peripherals as a reference, in one step. PBIT then compares with this reference at each boot, and signals any difference before having to dive into complex application code investigations. The PBIT compare operation occurs in the BIOS before the boot sequence, it is thus independant of the OS used.

Kontron is leading the charge for disruptive approach to continuous system monitoring with CMON-Line packages

CBIT: the turn-key CBIT is delivered as a Linux™ service. While running, it provides a continuous flow of health data, giving local or remote monitoring agents a synthetic vision of the computers health status, along with detailed information about each measurement point. Fully extensible, its data format is compatible with all modern high level APM solutions. While running Kontron Linux distribution, the CBIT service in each VX3070 provides an interactive CBIT dashboard accessible with any html browser.

The KEHM library at the heart of the CBIT service can also be used inside the customer application, allowing application driven resource sharing.

// VX3070 CBIT embedded dashboard

INTEL SOFTWARE

Intel® designs problem-specifics libraries and toolkit to leverage the silicon dedicated instructions and co processing engines.

Intel® Media SDK: Leverage fixed point HW accelerator, all codecs support with HEVC 10bit

AI & Computer vision: Intel® OpenVino™ includes media SDK for hardware assist media decode and leverages use of VNNI , HDDL.

TECHNICAL INFORMATION

FEATURE	VX3070 I/O INTENSIVE (16.2.15-4) SUCCESSOR OF VX305C-40G	VX3070 COMPUTE INTENSIVE (16.6.11-11) SUCCESSOR OF VX305H	VX3070 COMPUTE INTENSIVE (16.6.13-1)	COMMENTS
P1 DATA PLANE	40G Base-KR4 100G Base-KR4	40G Base-KR4 100G Base-KR4	40G Base-KR4 100G Base-KR4	ICL-D Enet Controller max BW is 100 Gbps (50 Gbps for < =12 cores)
P1 2nd DATA PLANE		10G Base-KR 1G Base-KX	10G Base-KR 1G Base-KX	One of 2nd Data Plane or Control Plane is 1G
P1 EXPANSION PLANE	4 Lane PCIe Gen 4	8 Lane PCIe Gen 4	8 Lane PCIe Gen 4	PCIe can be bifurcated to x4
P2 EXPANSION PLANE			8 Lane PCIe Gen 4	PCIe can be bifurcated to x4
P1 XMC MAP	x12d			8 lane PCIe Gen 4 to XMC J15 from CPU
P2 XMC MAP	x8d + x16s			
P1 CONTROL PLANE	10G Base-KR 1G Base-KX	10G Base-KR 1G Base-KX	10G Base-KR 1G Base-KX	
P1 2nd CONTROL PLANE	1G Base-KX			
P2 I/O	USB 2, USB 3, DP or HDMI, Storage (SATA or NVMe x4), 1G Base-T			DP or HDMI via specialty M.2 card

Backplane connectivity

ORDERING INFORMATION

ARTICLE	DESCRIPTION
VX3070-I16D32-SA	IceLake-D IO intensive, 16 cores, 32 Gbytes DDR4, Air Cooled, Operating temperature range 0 °C to 55 °C
VX3070-I16D32-RC	IceLake-D IO intensive, 16 cores, 32 Gbytes DDR4, Conduction Cooled build, CC3, Operating temperature range -40 °C to +70 °C

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