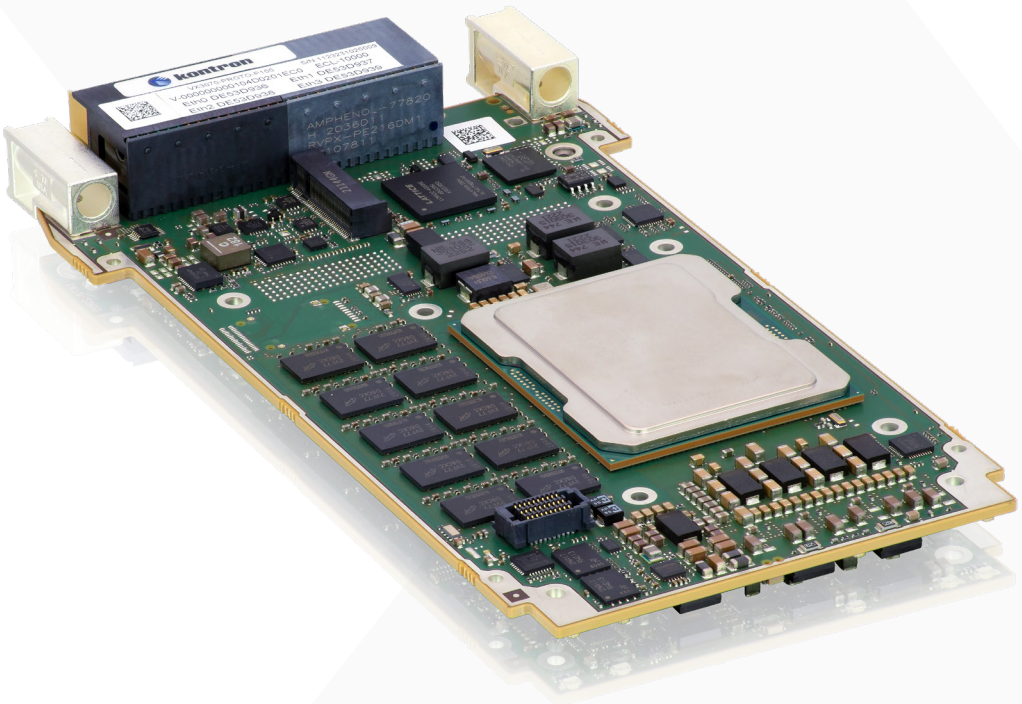
VX307H

3U VPX Plug-In Card



Intel® 10nm x86 Microserver 3U VPX Blade

- Intel® Xeon® D-2700/2800 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/CC4 support
- Designed in accordance with SOSA™ requirements

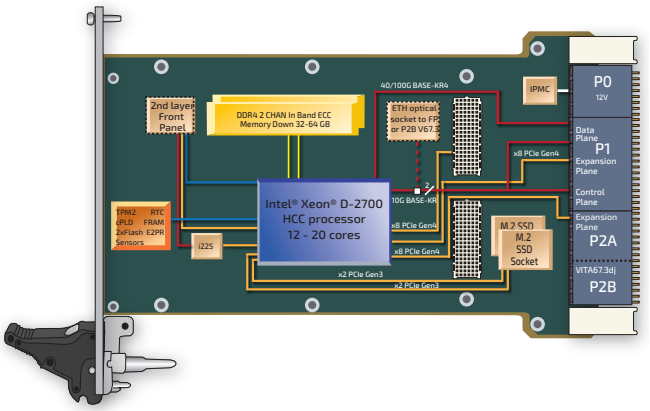
kontron

Product Highlights

The SOSA™ architecture booster

Kontron VX307H computing node provides an instant boost to the computing performance of existing HPEC architectures designed in accordance with SOSA™.
With the VX307H, 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.

VX307H block diagram



Backplane options differences

Leveraging the VX307H 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 I/O x12d
P2A: I/O block
P2B: XMC I/O x8dx16s or vita67.3dj

(*) - Compute intensive: based on
VITA65d1 mod3-16.6.13-1 or mod3-16.6.11-11
P1: PCIe x8 (no XMC I/O)
P2A: PCIe x8 or not equipped
P2B: vita67.3dj or not equipped

The Intel® Xeon® D-2700/2800 Platform

Outperforming the previous Intel® Xeon®-D 1500 SOC silicon, the 10nm Intel® Xeon® D-2700 SOC of the VX307H targets a new Intel® Xeon® D-2700generation of microserver and parallel computing node, with superb performance improved again with D-2800 processors family. Offering capabilities such as Ethernet 100G and PCIe gen4, with ROCE V2 RDMA protocol and on chip DMA engine, VX307H 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 VX307H 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 VX307H design is available with the following VITA65 OpenVPX I/O intensive and compute intensive profiles:

› Compute intensive slot profiles:
MOD3p-PAY-1F1U1S1S1U1U4F1J-16.6.13-1
MOD3p-PAY-1F1U1S1S1U1U2F1H-16.6.11-11

"Ask Kontron for I/O Intensive profile"

Compatibility with previous products

The VX307H is designed to replace Kontron computing nodes based on the Xeon D-1500 family of processors. Form fit function variants of the VX307H allow plug and play replacement in existing system architectures using 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.
VX307H Air cooled meets VITA 47 class EAC4 V2 and can operate in extended temperature environments up to of 0 °C/+55 °C.
VX307H 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

VX307H 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 **ApProtect** technology protects application code both in transit and at rest, and restricts program execution solely to boards hosting a valid license.

Product Highlights

VX307H architecture

The Kontron VX307H architecture is designed as a reusable building block offering the best SWaP-C 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. To facilitate board evaluation and simplify accessibility during maintenance, Kontron has developed a mezzanine board with front connectors such as USB2.0, RJ45 and RJ12. This tooling mezzanine attaches to the LY2 connector described in the board's block diagram.

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: VX307H top M.2 socket is also capable of hosting custom intelligent modules for independant security or safety intelligent controllers.

Fiber Optics: VX307H includes an on board optical transceiver socket option (on-demand) 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 I/O 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 VX307H 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

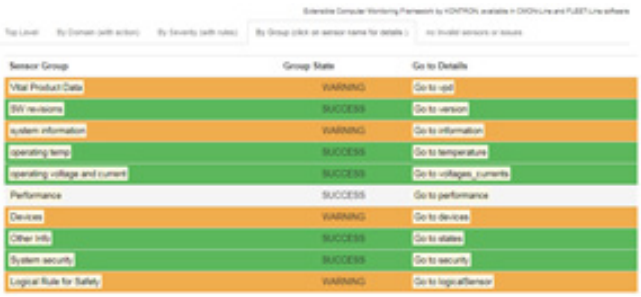
VX307H implements VITA46.11 IPMC Controller with dual redundant IPMB support.

PBIT: maximal coverage with no programming. VX307H 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 VX307H 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.



VX307H 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	VX307H Compute Intensive (16.6.11-11) Successor of VX305H	VX307H Compute Intensive (16.6.13-1)	VX307C I/O Intensive (16.2.15-4) Successor of VX305C-40G	COMMENTS
P1 DATA PLANE	40G Base-KR4 100G Base-KR4	40G Base-KR4 100G Base-KR4	40G Base-KR4 100G Base-KR4	ICL-D Ethernet 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	8 Lane PCIe up to Gen4	8 Lane PCIe up to Gen4	4 Lane PCIe up to Gen4	PCIe can be bifurcated to x4
P2 EXPANSION PLANE		8 Lane PCIe up to Gen4		PCIe can be bifurcated to x4
P1 XMC MAP			No XMC	8 lane PCIe Gen 4 to XMC J15 from CPU
P2 XMC MAP			No XMC	
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, Storage (SATA or NVMe x4), 1G Base-T	

Backplane connectivity

Environmental Specification

	AFT - RUGGED AIR-FLOW THROUGH VERSION (NO FRONT I/OS)	RC - RUGGED CONDUCTION-COOLED COMPLIANT WITH TYPE 1 PLUG-IN UNIT 2 LEVEL MAINTENANCE AS PER VITA48.0 AND VITA48.2 STANDARDS
CONFORMAL COATING	Standard	Standard
AIRFLOW	tbd	na.
COOLING METHOD	Convection	Conduction
OPERATING TEMPERATURE	-40 °C to +55 °C	RC3: -40 °C to +70 °C; RC4: -40 °C to +85 °C
STORAGE TEMPERATURE	-50 °C to +100 °C	-50 °C to +100 °C
VIBRATION SINE (OPERATING)	20-2000 Hz - 5 g	20-2000 Hz - 5 g
RANDOM	VITA 47-Class V3	VITA 47-Class V3
SHOCK (OPERATING)	40 g/11 ms Half Sine	40 g/11 ms Half Sine
ALTITUDE (OPERATING)	-1.500 to 60.000 ft	-1.500 to 60.000 ft
RELATIVE HUMIDITY	95% without condensation	95% without condensation

Ordering Information

ARTICLE	PART NO.	DESCRIPTION
VX307H-RC316G-000N000V1Q	1073-4433	3U Compute Intensive Single slot VPX Plug-In Card -1" Conduction-Cooled 'RC3' (-40°C to +70°C) conformal coating - Intel® Xeon-D2775TE Processor (25M Cache, up to 3.10 GHz) 100W TDP, 16 cores - 32 GB soldered SDRAM with ECC - No XMC mezzanine slot - no VITA 48 2LM covers - Rear module profile is MOD3p-PAY-1F1U1S1S1U1U4F1J-16.6.13-1: 100/40GbE +10GbE Data Planes, x16 PCIe up to Gen4 Expansion Plane, 1GbE Control Plane - No Front I/O connectors - Top 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - Bottom 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - RTC Power sourced from system VPX VBAT - VITA 46.11 Support - TPM 2.0 Secure element - PBIT and 256GB NVMe SSD with preloaded Linux for board evaluation
VX307H-RC316G-002N000V1Q	1073-4668	3U Compute Intensive Single slot VPX Plug-In Card -1" Conduction-Cooled'RC3' (-40°C to +70°C) conformal coating - Intel® Xeon-D2775TE Processor (25M Cache, up to 3.10 GHz) 100W TDP, 16 cores - 32 GB soldered SDRAM with ECC - No XMC mezzanine slot - no VITA 48 2LM covers - Rear module profile is MOD3p-PAY-1F1U1S1S1U1U2F1H-16.6.11-11: 100/40GbE + 10GbE Data Planes, x8 PCIe up to Gen4 Expansion Plane, 1GbE Control Plane No P2 connector - No Front I/O connectors - Top 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - Bottom 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - RTC Power sourced from system VPX VBAT - VITA 46.11 Support - TPM 2.0 Secure element - PBIT and NVME SSD preloaded with Linux for board evaluation
VX307H-RC320H-000N000V1P	1070-5304	3U Compute Intensive Single slot VPX Plug-In Card -1" Conduction-Cooled 'RC3' (-40°C to +70°C) conformal coating - Intel® Xeon-D2796TE Processor (30M Cache, up to 3.10 GHz) 118W TDP, 20 cores - 64 GB soldered SDRAM with ECC - No XMC mezzanine slot - no VITA 48 2LM covers - Rear module profile is MOD3p-PAY-1F1U1S1S1U1U4F1J-16.6.13-1: 100/40GbE + 10GbE Data Planes, x16 PCIe up to Gen4 Expansion Plane, 1GbE Control Plane - No Front I/O connectors - Top 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - Bottom 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - RTC Power sourced from system VPX VBAT - VITA 46.11 Support - TPM 2.0 Secure element - Power on Built In Test Run Time
VX307H-RC321H-000N000V1P	1073-4970	3U Compute Intensive Single slot VPX Plug-In Card -1" Conduction-Cooled 'RC3' (-40°C to +70°C) conformal coating - Intel® Xeon-D2896TER Processor (30M Cache, up to 3.20 GHz) 110W TDP, 20 cores - 64 GB soldered SDRAM with ECC - No XMC mezzanine slot - no VITA 48 2LM covers - Rear module profile is MOD3p-PAY-1F1U1S1S1U1U4F1J-16.6.13-1: 100/40GbE + 10GbE Data Planes, x16 PCIe up to Gen4 Expansion Plane, 1GbE Control Plane - No Front I/O connectors - Top 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - Bottom 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - RTC Power sourced from system VPX VBAT - VITA 46.11 Support - TPM 2.0 Secure element - Power on Built In Test Run Time
VX307H-RC320H-002N000V1Q	1073-4665	3U Compute Intensive Single slot VPX Plug-In Card -1" Conduction-Cooled 'RC3' (-40°C to +70°C) conformal coating - Intel® Xeon-D2796TE Processor (30M Cache, up to 3.10 GHz) 118W TDP, 20 cores - 64 GB soldered SDRAM with ECC - No XMC mezzanine slot - no VITA 48 2LM covers - Rear module profile is MOD3p-PAY-1F1U1S1S1U1U2F1H-16.6.11-11: 100/40GbE + 10GbE Data Planes, x8 PCIe up to Gen4 Expansion Plane, 1GbE Control Plane No P2 connector - No Front I/O connectors - Top 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - Bottom 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - RTC Power sourced from system VPX VBAT - VITA 46.11 Support - TPM 2.0 Secure element - PBIT and NVMe SSD with preloaded Linux for board evaluation
VX307H-RC321H-002N000V1Q	1073-4974	3U Compute Intensive Single slot VPX Plug-In Card -1" Conduction-Cooled 'RC3' (-40°C to +70°C) conformal coating - Intel® Xeon-D2896TER Processor (30M Cache, up to 3.10 GHz) 110W TDP, 20 cores - 64 GB soldered SDRAM with ECC - No XMC mezzanine slot - no VITA 48 2LM covers - Rear module profile is MOD3p-PAY-1F1U1S1S1U1U2F1H-16.6.11-11: 100/40GbE + 10GbE Data Planes, x8 PCIe up to Gen4 Expansion Plane, 1GbE Control Plane No P2 connector - No Front I/O connectors - Top 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - Bottom 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - RTC Power sourced from system VPX VBAT - VITA 46.11 Support - TPM 2.0 Secure element - PBIT and NVMe SSD with preloaded Linux for board evaluation
VX307H-RC421H-000N000V1P	1075-3116	3U Compute Intensive Single slot VPX Plug-In Card -1" Conduction-Cooled 'RC4' (-40°C to +85°C) conformal coating - Intel(r) Xeon-D2896TER Processor (30M Cache, up to 3.20 GHz) 110W TDP, 20 cores - 64 GB soldered SDRAM with ECC - No XMC mezzanine slot - no VITA 48 2LM covers - Rear module profile is MOD3p-PAY-1F1U1S1S1U1U4F1J-16.6.13-1: 40GbE + 10GbE Data Planes, x16 PCIe up to Gen4 Expansion Plane, 1GbE Control Plane - No Front I/O connectors - Top 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - Bottom 2242 M.2 slot : up to D5 and M Key with x2 PCIe up to Gen3 - RTC Power sourced from system VPX VBAT - VITA 46.11 Support - TPM 2.0 Secure element - Power on Built in Test Run Time

**All the product versions are also available without the M.2 SSD equipped, please ask Kontron for part number.*

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