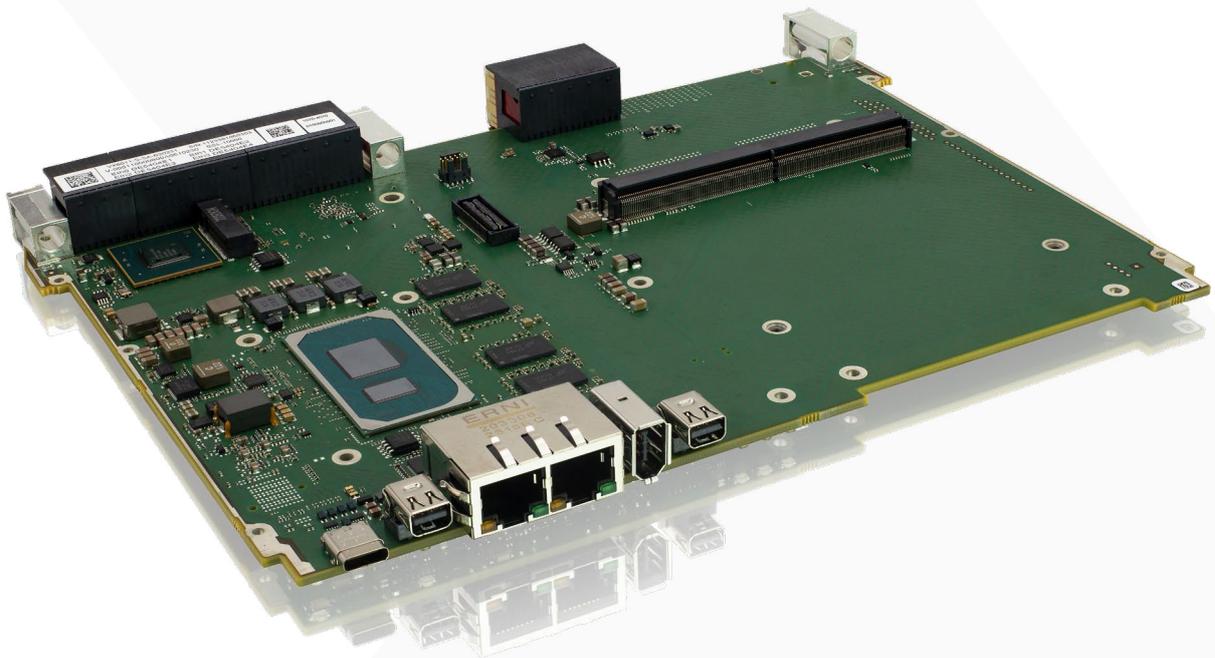# VX6011-S
6U VPX Plug-In Card

11th Gen Intel® Core™ processor for AI*, CVGIP*, DSP* workloads

❯ 12-28 W Quad Core™ processor, Enhanced AI, AVX-512, 32 GByte w ECC

❯ 8k Multi-Head display from Gen12 / 96 EUs high End GPU

❯ Versatile I/O: USB, M.2 socket, XMC option

❯ 1G/10G Ethernet Multi-port with 25G capability

❯ 15-year availability, PBIT, CBIT, SEC-Line support

*CVGIP: Computer Vision, Graphics, and Image Processing, AI: Artificial Intelligence, DSP: Digital Signal Processing

kontron

The ultimate single board PC

The new 10nm gen Intel® System On Chip (SOC) SKUs pack an unmatched feature set in a low power envelope enabling a solid foundation for almost all rugged computing use cases. Introduced with 15 years of availability, it is a serious candidate for long term deployments.

With the VX6011-S, Kontron takes this outstanding silicon architecture to the next level, in the form of a rugged single 6U VPX Plug-In card, boasting numerous innovations and extensions designed to fulfill the most demanding mission profiles.

Deploying with the VX6011-S that was developed in alignment with the SOSA™ Technical Standard 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.

The 11th Gen Intel® Core™ processor platform

Dawning the previous Intel® 10th generation silicon, the 10nm Intel® SOC of the VX6011-S offers superb performance in a reasonable power budget. Designed with capabilities such as PCIe gen4, it is also a perfect fit for blade computing with constrained mechanical enveloppe and power budget and growing software requirements to host demanding applications within a minimum number of boards.

The SKUs selected for VX6011-S are quad core units, with specialized instructions for Artificial Intelligence (VNNI) and Doubled Signal Processing performance (AVX512). Computer vision and media processing also enjoy twice the performance of the previous generation thanks to the Gen12 Gfx graphics engine. The featured 96 execution units benefit from a direct on-chip access to main memory, delivering outstanding performance per EU compared with traditional discrete graphics silicon with many more EUs.

Compatibility with Open VPX systems

The VX6011-S is compatible with the following VITA65 OpenVPX Profiles:

❯ MOD6-PAY-4F1Q1H4U1T1S1S1TU2U2T1H-12.6.3-6 | SLT6-PAY-4F1Q1H4U1T1S1S1TU2U2T1H-10.6.3-n

VX6011-S Block Diagram
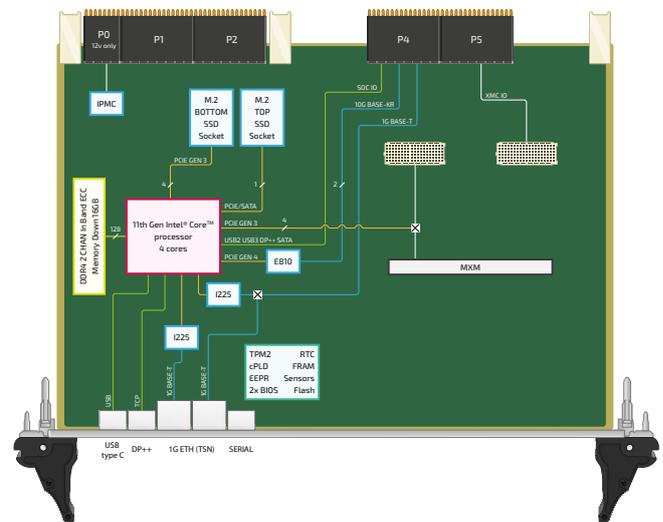
Reliability and Robustness

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

VX6011-S standard Air Cooled variant is designed to meet VITA 47 AC1 level and can operate from 0 °C to 55 °C

Built-In test capabilities enable effective local and remote maintenance:

❯ PBIT is OS independent. It is designed as a new EFI BIOS command.
❯ A CBIT engine is part of the Kontron Linux™ BSP.

See the software section for details.

Cyber Security, Secure deployments

VX6011-S design is compatible with the Kontron SEC-Line offering and featuring two secure elements: TPM and ApProtect TPM supports, measured boot and hardware protection of crypto keys. For secured application deployments, the ApProtect technology protects application code both in transit and at rest, and restricts program execution solely to boards hosting a valid li-

cense in the 2nd secure element.

The Kontron VX6011-S architecture is designed as a reusable building bloc offering the best SWAP-C ratio for a rugged computer. Designing it to fit first the 6U VPX standard computer blade use case, numerous capability options also make this computer the ideal candidate to build powerful and versatile board computer PCs.

TCC: The VX6011-S architecture has support for Time Coordinated Computing use cases with new **Time Aware GPIO** feature. The latter can be used to implement **nanoseconds synchronization between multiple CPUs**.

Network performance: Leveraging a server class multi MAC silicon and adequate connectors, a profile can reach up to 20 GbE control plane bandwidth in the form of two 10GBASE-KR ports on P4 connector.

NVMe Storage: Two M.2 sockets are available, one to connect legacy SATAIII or x1 PCIe gen3 SSD unit and another one to connect NVMe x4 PCIe Gen3 devices. With PCIe, NVMe OS device drivers offer lower latency and better management of existing FLASH based storage.

Fiber Optics: VX6011-S includes provisions to offer fiber optics connectivity for high performance networking, a key asset for internal box computers as well as 2nd layer routing with maximum signal quality.

XMC/MXM mezzanine slots: Linked to a x4 PCIe Gen3 port of the SOC, an exclusive XMC or MXM slot gives the ability to leverage expansion cards capabilities such as GPU cards.

VX6011-S Software

Kontron provides a rich Linux™ BSP to fully exercise the capabilities of VX6011-S. Instant evaluation and benchmarking is made possible thanks to a Fedora Live USB image. The image includes all the BSP source code to support the VX6011-S in any Linux distribution with the following features:

System Management: The CPLD does the central housekeeping of the computer blade: power supplies control and monitoring, SOC out-of-band i2c signals, RESET, LEDs, GPIO etc). System management resources such as inter blade control and monitoring registers routed via VPX SMB buses can also be managed via kernel driver and the *cpldtool* command. VITA46.11 IPMI is supported.

PBIT: maximal coverage with no programming. VX6011-S PBIT "Expert mode" Learn/Compare approach records all board settings and connections status for all peripherals into a reference in one step. At each power on PBIT can measure again and signal any difference suppressing the need to dive into complex application code investigations. The PBIT occurs before the boot sequence, it is thus independant of the OS used.

CBIT: a turnkey Linux™ service provides a continuous flow of health data (XML format). Local and remote monitoring agents access a synthetic vision of the computers health status, with detailed information for each measurement point: status, margins and stat. Fully extensible, the CBIT data format is compatible with allmodern high level APM solutions.

The CBIT service in each VX6011-S provides an interactive dashboard accessible with any browser (http://hostname/

// VX6011-S CBIT embedded dashboard

KEHM-Result.xml).

VX6011-S for Safety critical applications

Multiple features make VX6011-S the ideal choice for Safety Critical applications:

❭ power and temperature monitoring
❭ ferro magnetics RAM for permanent log
❭ multiple network and I/O ports on the front as well as the backplane side provide flexibility for connector choice
❭ integrated memory ECC
❭ Time Coordinated Computing: nanoseconds precision synchronization for multi board configurations

Intel® Software

Intel® designs solution-specifics libraries and toolkit to leverage the silicon dedicated instructions and co-processing engines. These are available for both Windows and Linux.

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 an internal accelerator for neural network processing based on the AVX512 vector unit.

For machine learning use cases, the optimal resource usage of platforms with 11th Gen Intel® Core™ processor is achieved by the use of both the Media SDK (for decode encore video flows) and OpenVino™ which leverages both the CPU and the graphics engine execution units for inferencing.

Environmental Specification

VX6011-S

	SA- STANDARD AIR COOLED
CONFORMAL COATING	Optional
AIRFLOW	tbd
COOLING METHOD	Convection
OPERATING TEMPERATURE	0 °C to +55 °C
STORAGE TEMPERATURE	-40 °C to +85 °C
VIBRATION SINE (OPERATING)	20-2000 Hz - 2 g
RANDOM	VITA 47-Class V1
SHOCK (OPERATING)	20 g/11 ms Half Sine
ALTITUDE (OPERATING)	-1.500 to 60.000 ft
RELATIVE HUMIDITY	90% without condensation

Ordering Information

ARTICLE	PART NO.	DESCRIPTION
VX6011-S-SA4F-000F121V1P	1073-3416	6U Single slot 5HP (1") VPX SBC -Air-Cooled 'SA' (0°C to 55°C) - Intel(r) Core(tm) I7-1185GRE Processor (TDP Software Configuration from 12W to 28W, 4 core @ 2.8 GHz) with 96 EU Intel® Iris® Xe Graphics - 16 GB soldered SDRAM with In-Band ECC - MXM mezzanine slot on x4 PCIe Gen3, no XMC mezzanine slot - no VITA 48 2LM covers - Slot profile : SLT6-PAY-4F1Q1H4U1T1S1S1TU2U2T1H-10.6.3-0 Module profile : MOD6-PAY-4F1Q1H4U1T1S1S1TU2U2T1H-12.6.3-2 - Front I/O : 2x 1000BASE-T, 1x mDP, 1x USB-C, Serial - Maintenance port with RS232 levels - PCIe/SATA on TOP 2242 M.2 slot (up to D5, M Key), no BOTTOM M.2 slot - RTC Power sourced from battery - VITA 46.11 Support - TPM 2.0 Secure element - Power on Built in Test Run Time

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