

VPX3U-XAVIER-CX6-HPC

Includes Xavier Industrial, ConnectX-6, Payload Profile

KEY FEATURES

- Embedded Volta GPU with 512 CUDA cores (1.4 TFLOPS) & 64 Tensor cores (20 TOPS Int8)
- Embedded 8-core NVIDIA Carmel ARM64 CPU, 2.26GHz
- 32 GB LPDDR4 256-bit memory, 137 GB/s, ECC support
- ConnectX-6, up to 100GbE Ethernet, PCIe Gen4
- Module power: configurable from 40W - 70W

ADDITIONAL AGX XAVIER FEATURES

- 2x Deep Learning Accelerator (DLA) engines for inference operations, 10 TOPS (Int8)
- 2x Vision Accelerator engines for 7-way VLIW Vision Processor, 1.7 TOPS Int8
- Dedicated programmable audio processor
- HEVC (H.265) and AVC (H.264) Volta NVENC and NVDEC supports 4K and 8K video encode/decode
- CUDA® 10, OpenGL® 4.6, OpenGL ES 3.2, Vulkan™ 1.0
- Storage: 64 GB eMMC 5.1
- USB 2.0 (up to 480 Mb/s); optional front panel port

CONNECTIVITY / SYSTEM MANAGEMENT

- Storage: NVMe 1TB
- PCI Express Gen4
- Backplane Ethernet with 10/40/100 GBASE-KR4 and 10GBASE-KR data planes; supports GPUDirect RDMA
- Block-level hardware encryption and the use of dedicated encryption keys per user
- Switching is offloaded from the CPU and run on the ConnectX hardware with NVIDIA ASAP² technology
- On-board IPMI controller for system management
- Windows, Linux or ARM root complex

MECHANICAL / OPEN SYSTEMS ARCHITECTURE

- High level of ruggedization:
 - Operating temperature: -40° to +85°C
 - Vibration (sine wave): 10G peak, 5 - 2000Hz
 - Shock: 40G peak for conduction-cooled
- Dimensions: 160mm x 100mm x 25.4mm
- Weight: To be Announced
- ANSI/VITA 48, 65 (VPX REDI, OpenVPX)
- SOSA Aligned Payload slot profile 14.6.11-0 (with P2 depopulated) or 14.6.13-0 (with P2B depopulated)

PRELIMINARY INFORMATION

OVERVIEW

The VPX3U-XAVIER-CX6-HPC module provides the data processing capability needed for a variety of HPC tasks such as sensor data processing, machine vision, and other C4ISR tasks. This SOSA aligned payload slot module includes an NVIDIA Jetson AGX Xavier Industrial and an NVIDIA ConnectX-6 SmartNIC.

The NVIDIA Xavier SoC's embedded Volta GPU provides the CUDA cores and Tensor cores for data processing, deep learning inference, machine vision, audio processing and video encoding/decoding. The 512 CUDA cores provides 1.4 TFLOPS for processing, while the 64 Tensor cores provides the underlying architecture required for an efficient inference engine which can achieve up to 20 TOPS (INT8) of deep learning inference computing. The Xavier Industrial model also includes new safety, reliability, and security features.

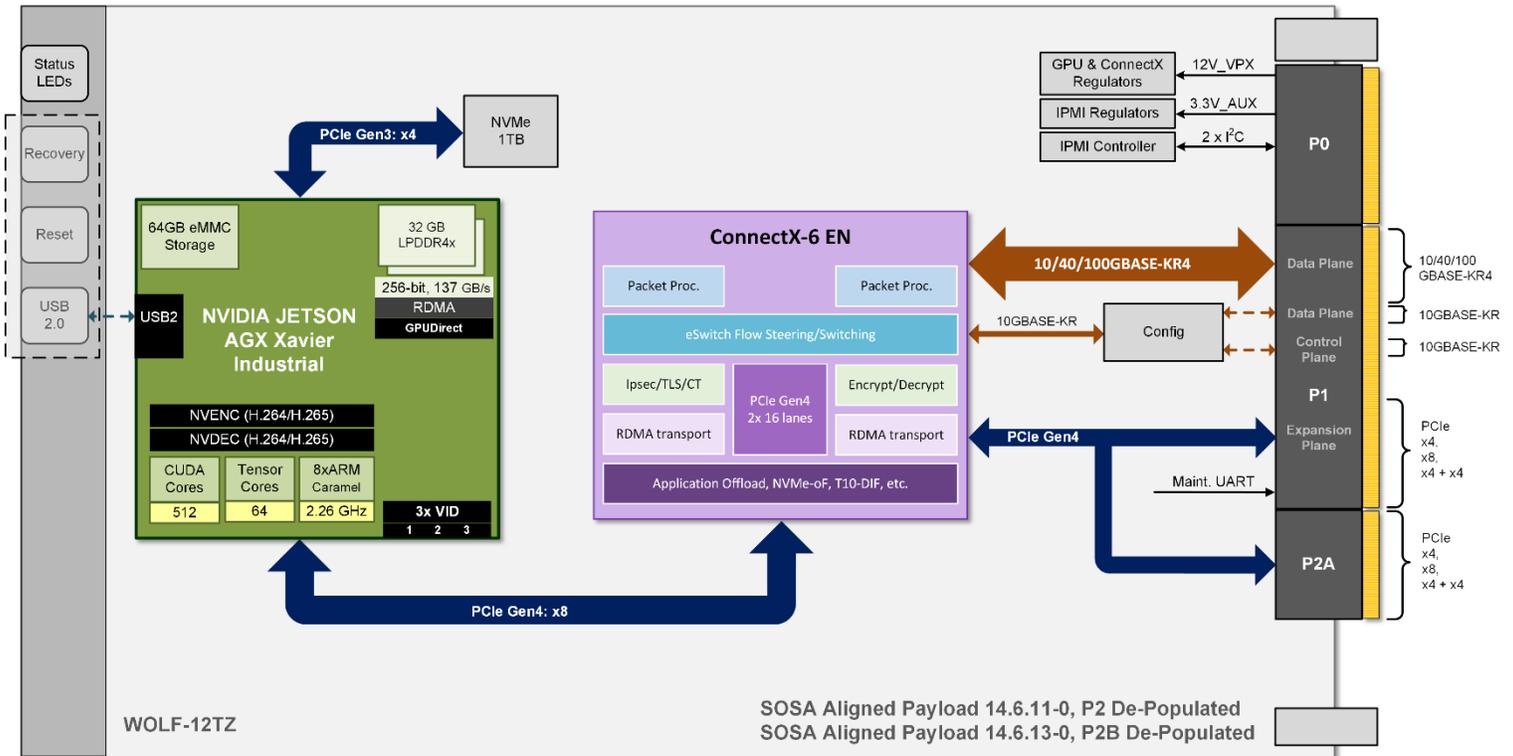
The NVIDIA ConnectX-6 SmartNIC provides secure, high-speed network data transfer and a configurable PCIe Gen4 switch. ConnectX-6 is ideal to meet the data transfer requirements for tasks such as sensor data processing and other C4ISR tasks. The ConnectX-6 also provides support for RDMA over Converged Ethernet (RoCE) and support for NVIDIA GPUDirect, enabling the fastest method for transferring data across the network to the GPU.

Unlocking the best performance requires the best cooling capability. WOLF's advanced cooling technology is designed to move heat using a low weight, high efficiency path from the SoC die to the wedgelocks.



This datasheet is preliminary and is subject to change

PRELIMINARY INFORMATION



NVIDIA JETSON AGX XAVIER INDUSTRIAL

Jetson AGX Xavier Industrial features an embedded NVIDIA Volta GPU with 512 CUDA Cores and 64 Tensor Cores, two NVIDIA deep learning accelerators, two vision accelerators, an eight-core NVIDIA Carmel Arm CPU, and a video encoder and decoder. The NVIDIA CUDA-X accelerated computing stack and JetPack SDK support enables the Jetson AGX Xavier Industrial to be a fully software-defined platform.

The Jetson AGX Xavier Industrial combines the processing capabilities of the Xavier System-on-a-Module (SoM) with new reliability, safety and security features. These include error correction codes, single error correction, double error detection and parity protection to deliver internal RAM resilience, address and data bus error detection and correction and IP resiliency in harsh environment applications. It also includes hardware-verified secure boot, hardware-accelerated cryptography, support for encrypted storage, memory, and other security features to protect customer software.

CONNECTX-6 PCIe GEN4 AND ETHERNET 100GbE

Getting large amounts of data into and out of an HPC module is an important system design consideration. The WOLF-12TZ module includes a ConnectX-6 SmartNIC, which provides a configurable PCIe Gen4 interface. It provides the module with up to 100GBASE-KR4 on the data plane, RDMA over Converged Ethernet (RoCE) with support for NVIDIA GPUDirect RDMA, and enhanced security features such as hardware-verified secure boot, hardware-accelerated cryptography, and encrypted storage.

TENSOR CORES FOR ARTIFICIAL INTELLIGENCE AND HPEC

Tensor Cores are designed to speed up the tensor / matrix computations used for deep learning neural network training and inferencing operations. The Xavier Industrial SoC provides up to 30 TOPS of AI performance. Xavier Industrial SoC AI accelerators include two Deep Learning accelerators and two Vision accelerators.

NVIDIA provides CUDA-X AI and CUDA-X HPEC libraries which have been designed to work with NVIDIA Tensor Core GPUs to provide the tools needed to accelerate development of applications for AI and HPEC.

HARDWARE ACCELERATED VIDEO ENCODE / DECODE

The Xavier Industrial SoC includes the NVENC video encode (version 5) and NVENC decode (version 4) hardware acceleration engine. Using the embedded GPU for video encoding provides an efficient, high quality method to achieve real time H.264 (AVC) or H.265 (HEVC) 8K and 4K encoding without burdening the system CPU. The NVIDIA Video Codec SDK provides a complete set of APIs, samples and documentation for hardware accelerated video encode and decode.

SOSA SLOT PROFILE SUPPORT

The Sensor Open Systems Architecture (SOSA) Consortium grew out of a U.S. Department of Defense (DoD) initiative to define open standard electronic architectures to ensure component interoperability, reduce costs, encourage innovation, and help to ensure a supply of needed products.

This module supports SOSA aligned payload slot profiles. The default profile is:

- SLT3-PAY-1F1U1S1S1U1U2F1H-14.6.11-0 Payload Slot Profile, P2 depopulated
- SLT3-PAY-1F1U1S1S1U1U4F1J-14.6.13-0 Payload Slot Profile, P2B depopulated

WOLF also offers a related module which supports the SOSA aligned SBC slot profile, VPX3U-XAVIER-CX6-SBC.

PRELIMINARY INFORMATION

ORDERING CODES

The following table defines series of common order codes for the VPX3U-XAVIER-SBC module. The asterisks denote characters of the part number that are defined based on common configuration options. Some common configuration options for this module are:

- Default Power Threshold
- Conformal Coatings
- PCIe Configuration Options
- Network Security Options
- Variant Locked
- Optional NVMe

Ordering Number	Description
3U VPX Single Slot Configurations	
12TZ33-F**0-***VPX3v10	3U VPX, Conduction Cooled, 1", NVIDIA Xavier, ConnectX-6, SOSA Aligned Slot Profile 14.6.11-0 P2 depopulated
12TZ33-F**1-***VPX3v10	3U VPX, Conduction Cooled, 1", NVIDIA Xavier, ConnectX-6, SOSA Aligned Slot Profile 14.6.13-0 P2B depopulated

Contact Sales for the latest Ordering Numbers and available options

MANUFACTURING AND QUALITY ASSURANCE

WOLF designs modules to pass the following environmental standards:

- MIL-STD-810 (United States Military Standard for Environmental Engineering Considerations and Laboratory Tests)
- MIL-HDBK-217 (Reliability Prediction of Electronic Equipment)
- RTCA DO-160 (Environmental Conditions and Test Procedures for Airborne Equipment) on request

WOLF complies with the following management systems:

- AS9100D: Quality Management System - Requirements for Aviation, Space and Defense Organizations (certified)
- ISO 9001:2015: Quality management systems (certified)
- AS5553: Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition (compliant)
- NIST SP 800-171: Protecting Controlled Unclassified Information in Nonfederal Systems (compliant)

Boards are manufactured to meet the following standards:

- IPC-A-610 CLASS 3 (Acceptability of Electronic Assemblies)
- IPC 6012 CLASS 3 (Qualification and Performance Specification for Rigid Printed Boards, Class 3 for High Reliability Electronic Products)
- IPC J-STD-001 (Requirements for Soldered Electrical and Electronic Assemblies)

Caveat: integrated third party modules may not meet the same standards as WOLF manufactured modules.



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