VPX3U-ORIN-SBC

NVIDIA Orin, PCIe Gen4 Switch, SBC Profile

Key Features

- Orin 64GB with embedded Ampere GPU: 2048 CUDA cores (5.3 TFLOPS) & 64 Tensor cores (275 TOPS Int8)
- Embedded 12-core NVIDIA Cortex ARM64 CPU, 2.2GHz
- PCIe Gen4 Switch
- 1TB NVMe on board, SATA Gen2 interface
- Module power: configurable from 50W - 90W

Additional AGX Orin Features

- MST DisplayPort or HDMI output
- 2x Deep Learning Accelerator (DLA) v2 engines
- Vision Accelerator engine for 7-way VLIW Vision Processor v2
- Dedicated programmable audio processor
- 2x HEVC (H.265) and AVC (H.264) NVENC and NVDEC with up to 4K-UHD encode resolution
- 64 GB LPDDR5, 256-bit, up to 205 GB/s
- CUDA® 12, OpenGL® 4.6, OpenGL ES 3.2, Vulkan™ 1.3

Connectivity / System Management

- Storage: NVMe 1TB on board, SATA Gen2 (3 Gbps) interface on P2
- PCIe Gen4 Switch, configurable, x8 or bifurcate down to x4 + x4, or down to x2
- 10GBASE-KR control plane support
- 1000BASE-T Ethernet
- USB 3.2 and USB 2.0
- Advanced Jetson Orin security features
- On-board IPMI controller for system management
- Optional removable front panel for setup/test/debug
- WOLF BSP with Jetson Linux and JetPack SDK

Mechanical / Open Systems Architecture

- High level of ruggedization:
  - ☐ Operating temperature: -40° to +85°C
  - ☐ Vibration (sine wave): 10G peak, 5 - 2000Hz
  - ☐ Shock: 40G peak
- Dimensions: 160mm x 100mm x 25.4mm
- Weight: To be Announced
- ANSI/VITA 48, 65 (VPX REDI, OpenVPX)
- SOSA Aligned SBC slot profile 14.2.16

Overview

The VPX3U-ORIN-SBC module meets the needs of demanding C5ISR applications, providing a secure compute node which provides advanced AI and HPC processing capabilities, PCIe Gen4 and network data transfer, and cyber security features to ensure data is being protected. This autonomous SOSA aligned module includes an NVIDIA Jetson AGX Orin and a PCIe Gen4 switch.

The NVIDIA Orin's embedded Ampere GPU provides the CUDA cores and Tensor cores for data processing, deep learning inference, machine vision, audio processing and video encoding/decoding. The 2048 CUDA cores provides 5.3 TFLOPS for processing, while the 64 Gen3 Tensor cores provides the underlying architecture required for an efficient inference engine which can achieve up to 275 TOPS (INT8) of deep learning inference computing.

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 hot chip's die to the wedgelocks.

NVIDIA ELITE PARTNER

This information is subject to change

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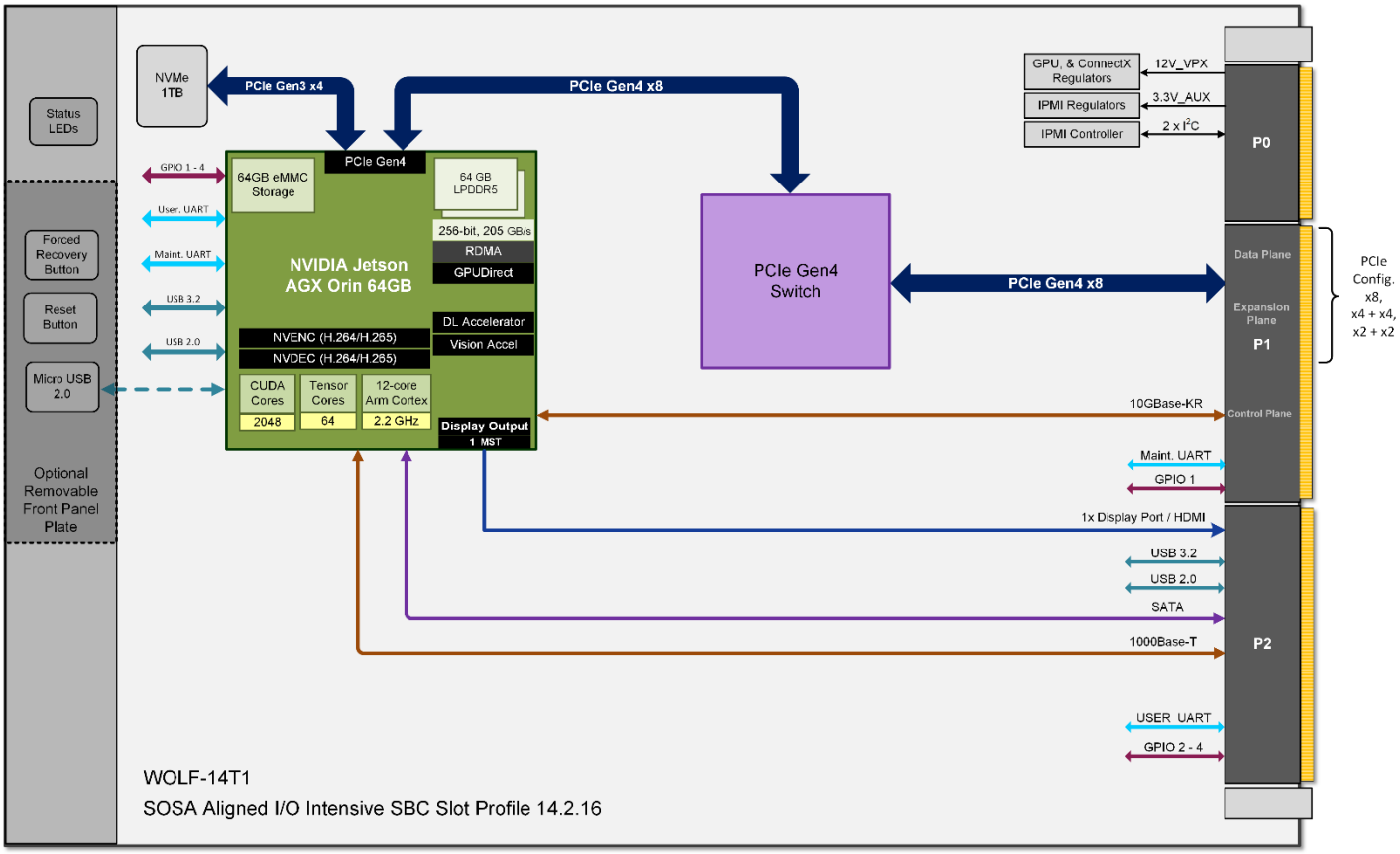
The WOLF-14T1 includes an NVIDIA Jetson AGX Orin and a configurable PCIe Gen4 Switch which can be configured for PCIe x8 or for bifurcation down to x4 or x2 to meet application requirements.

The Orin functionality is mapped to the SOSA Aligned I/O Intensive SBC Slot Profile.



The WOLF module includes a pre-installed Board Support Package (BSP) based on the NVIDIA Linux for Tegra (L4T) distribution. The WOLF BSP has been modified to include support for additional components found on the WOLF module, including drivers and applications as needed. The BSP can be modified to meet specific application requirements.

A typical Jetson BSP will include:

- Bootloader: Boot software for initializing the system on the chip
- Linux Kernel: An OS system kernel
- Sample Root Filesystem derived from the Ubuntu distribution
- Toolchain: A set of development tools chained together
- Source code for kernel and multimedia applications
- NVIDIA® Jetson™ User Space Drivers
- Flashing Support Scripts and Tools
- Sample source code for developing embedded applications for the Jetson platform

NVIDIA Jetson AGX Orin with Ampere GPU and 12-Core ARM CPU

Jetson AGX Orin features an embedded NVIDIA Ampere GPU with 2048 CUDA Cores and 64 Gen3 Tensor Cores, two NVIDIA deep learning accelerators, a vision accelerator, a twelve-core NVIDIA Cortex Arm CPU, and a video encoder and decoder. The NVIDIA CUDA-X accelerated computing stack and JetPack SDK support enables the Jetson AGX Orin to be a fully software-defined platform.

The Jetson AGX Orin 64GB delivers up to eight times the performance compared to the previous generation Jetson AGX Xavier. Orin can deliver up to 4 times more TFLOPS, eight times more AI TOPS, and higher memory bandwidth. Second generation NVIDIA Deep Learning Accelerators (NVDLA) can deliver up to 9 times more TOPS, while the second generation Vision Accelerator can also offer performance improvements. Connectivity has also been improved with more PCIe lanes and more available Ethernet interfaces at higher speeds. All of these performance improvements only require a modest power increase, with power settings from 15W to 75W.

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. NVIDIA Ampere architecture GPUs include the third-generation Tensor Core design which supports many new data types for improved performance, efficiency, and programming flexibility, including a new sparsity feature and a new Tensor Float 32 (TF32) precision mode.

NVIDIA provides CUDA-X AI and CUDA-X HPEC libraires 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 Ampere GPU includes the NVENC video encode (version 7.2) and NVENC decode (version 5) hardware acceleration engine. Using the Ampere GPU for video encoding provides an efficient, high quality method to achieve real time 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 SBC slot profiles. The default profile is:

- SLT3-PAY-1F1F2U1TU1T1U1T-14.2.16

WOLF also offers an Orin module which supports the SOSA aligned Payload slot profiles 14.6.11 or 14.6.13.

Ordering Codes

The following table defines series of common order codes for the VPX3U-ORIN-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 Coating Options
- PCIe Configuration Options
- Network Configuration Options
- Variant Locked
- Display Output Format

Ordering Number	Description
3U VPX Single Slot Configurations	
14T133-F***-***VPX3vA0	3U VPX, Conduction Cooled, 1", NVIDIA Orin, one 10GBASE-KR, one 1000BASE-T, PCIe Gen4 x8, 1x MST DP Output, 1TB NVMe, USB 3.2 and USB 2.0, SATA port, GPIO

* 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.

AS9100 • ISO 9001 CERTIFICATION Intertek

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