

Dual NVIDIA Ada, 9728 CUDA Cores per GPU, 8 Video Outputs

KEY FEATURES

- Two NVIDIA RTX™ 5000 (AD103) GPUs, each with 9728 CUDA Cores, 304 Tensor Cores, 76 RT Cores
- 16 GB GDDR6 256-bit VRAM per GPU with EEC support
- Up to 8 DisplayPort outputs, options for HDMI
- Module power: 150W to 280W, configurable

GPU FEATURES

- Ada GPGPU parallel processing:
 - CUDA Toolkit 12, CUDA Compute capability 8.9
 - CUDA-X AI and CUDA-X HPEC libraires
 - OpenCL™ 3.0, DirectX® 12 Ultimate, OpenGL 4.6, OpenGL ES 3.2, Vulkan™ 1.2
- 304 Tensor Cores (4th Gen) per GPU
- 76 Ray Tracing cores (3rd Gen) per GPU
- NVENC (8th Gen) and NVDEC (5th Gen) with up to 8K video encoding and hardware decoding support

CONNECTIVITY / SYSTEM MANAGEMENT

- IPMI system management
- NVIDIA GPUDirect RDMA support
- Configurable PCIe Gen4 switch
- Linux and Windows drivers
- NVIDIA driver support requires the following host CPU: Intel H/HX/P/PX/S Class, AMD H/HS Class

MECHANICAL / OPEN SYSTEMS

ARCHITECTURE

- High level of ruggedization:
 - Rugged conduction cooled (CC), air cooled (AC), or liquid flow through (LFT)
 - Operating temperature (system dependent):
 - CC: -40°C to +85°C, optimized to 70°C
 - AC: -40°C to +71°C, optimized to 60°C
 - LFT: -40°C to +70°C
 - Vibration (sine wave): 10G peak, 5 - 2000Hz
 - Operational Shock: 40G peak
- Dimensions: 160mm x 233mm x 25.4mm
- Weight: AC: 1.46 kg, CC: 2.49 kg, LFT: 1.62 kg
- ANSI/VITA 48, 65 (VPX-REDI, OpenVPX)
- SOSA Aligned profile support 10.6.4

OVERVIEW

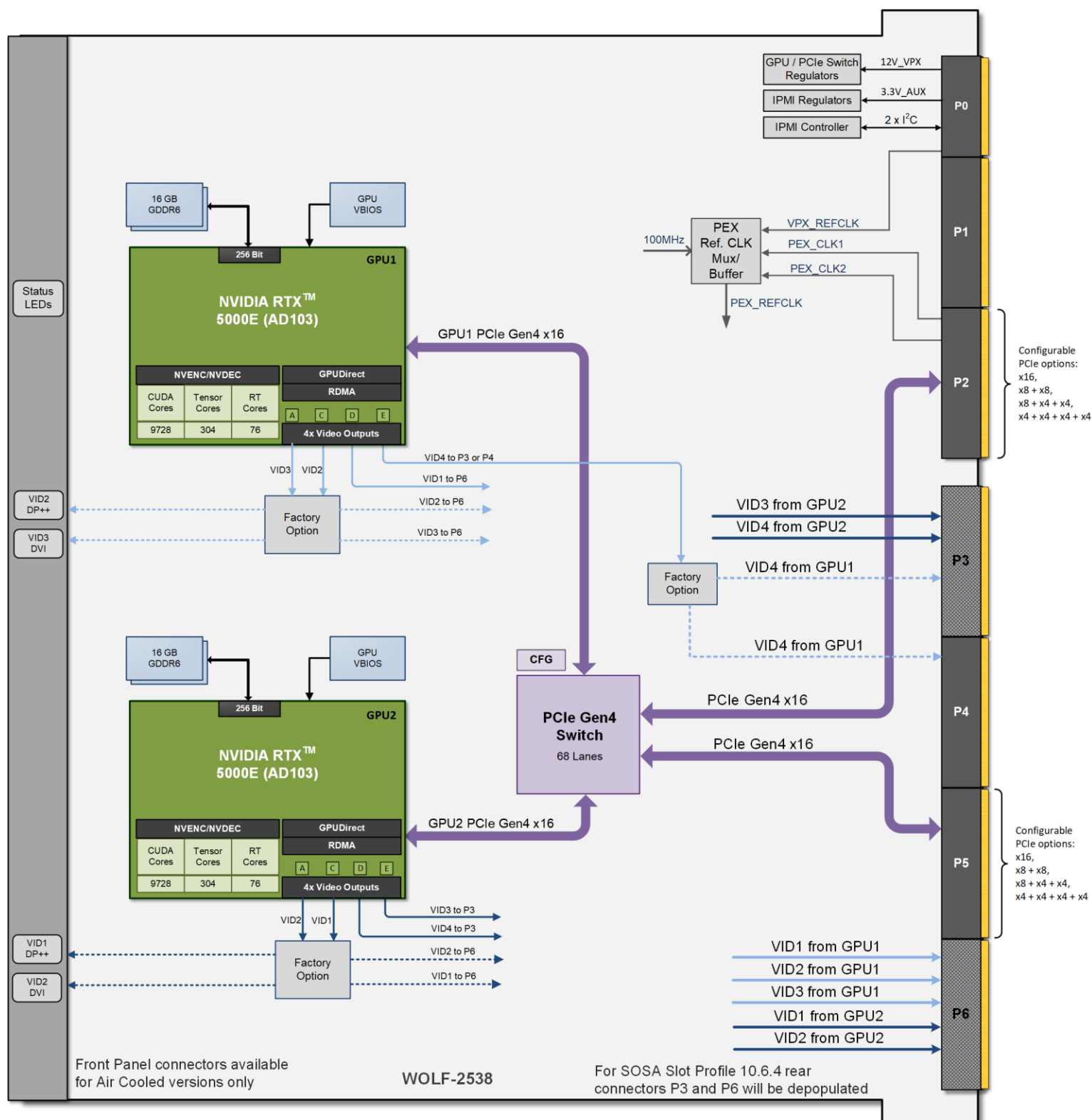
The VPX6U-AD5000E-DUAL-VO module includes two NVIDIA RTX™ 5000 Ada embedded GPUs and a PCIe Gen4 switch in a rugged 6U VPX module. The NVIDIA RTX5000 embedded GPU provides advanced processing capabilities for high performance embedded computing (HPEC) and artificial intelligence (AI) data processing.

The NVIDIA Ada architecture includes CUDA cores for HPEC, 4th generation Tensor cores for AI and data science computations, and 3rd generation Ray Tracing (RT) cores for visually accurate rendering. The Ada GPU uses a new TSMC 4N NVIDIA Custom Manufacturing Process which to increased efficiency. The denser Ada GPUs have more CUDA and Tensor cores operating at higher clock frequencies at the same power, delivering significantly more performance per watt compared to the previous generation GPUs. For example, the RTX5000 Ada GPU can achieve up to four times the GFLOPS/W compared to the RTX5000 Turing GPU used in the WOLF-2348.

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 GPU die to the wedgelocks.



This information is subject to change



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POWER AND PERFORMANCE

An NVIDIA GPU will operate at the GPU clock speed available at the set TGP (total GPU subsystem power). The highest clock speeds are available at the highest TGP power allowed by the GPU. When the TGP setting is decreased the clock speed will also decrease resulting in a decrease in processing speed. The GPU base clock speed will also decrease if the GPU temperature exceeds 89°C to protect the GPU from heat damage. If the GPU temperature is below 87°C the GPU can operate at full boost clock speeds when higher processing is required.

The Ada AD103 GPU typically operates at TGP power levels from 80W to 115W. At 115W the base clock of 1425 MHz provides 27.7 TFLOPS FP32 performance while the boost clock of 2115 MHz provides 41.1 TFLOPS. At 80W the base clock of 930 MHz provides 18.1 TFLOPS while the boost clock of 1680 MHz provides 32.7 TFLOPS.

NVIDIA Ada GPU

NVIDIA Ada GPUs are manufactured using a new TSMC 4N NVIDIA Custom Manufacturing Process, an enhanced version of the N5 (5nm) node process. This allows a higher transistor density and lower voltage requirements, which provides increased efficiency. As a result, Ada GPUs have many more CUDA cores at the same die size as the previous generation, and higher clock speeds at the same power level, which leads to greatly increased processing/watt compared to the previous generation. The new Ada architecture also provides a big increase in the GPU's memory cache size, providing a boost to memory subsystem handling at the same bandwidth. With the increased performance and memory handling abilities, and improved next gen Tensor cores and RT Cores, the Ada GPUs are able provide significant performance increases compared to the previous generation.

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 Ada architecture GPUs include the fourth-generation Tensor Core design which supports many data types for improved performance, efficiency, and programming flexibility, including a sparsity feature, a Tensor Float 32 (TF32) precision mode, and a new FP8 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 Ada GPU includes the NVENC video encode and NVENC decode hardware acceleration engine. Using the GPU for video encoding provides an efficient, high quality method to achieve real time 8K and 4K encoding without burdening the system CPU. The Ada encoding engine includes support for several popular codecs and is the first GPU to include AV1 hardware encoding and decoding support. 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

This module's configurable switch provides support for SOSA aligned slot profiles. The module can be configured with pin mappings that are compatible with previous generation WOLF-2348/2448 modules, which allows the WOLF-2538 to be a plug-in upgrade for previous WOLF products.

The following SOSA aligned profile is supported:

- 10.6.4 Payload Slot Profile, P3 and P6 depopulated

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ORDERING CODES

The following table defines series of common order codes for the VPX6U-AD5000E-DUAL-VO 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:

- Display Interfaces
- COTS, MCOTS or Locked
- OpenVPX or SOSA Aligned configuration
- Conformal Coating Type
- PCIe Switch Configuration

Ordering Number	Description
6U VPX Ada RTX5000 Single Slot Configurations	
253823-F***-***VPX6vA0	6U VPX, Air Cooled, 1", Dual NVIDIA RTX5000 Ada, 8x video outputs
253833-F***-***VPX6vA0	6U VPX, Conduction Cooled, 1", Dual NVIDIA RTX5000 Ada, 8x video outputs
2538L3-F***-***VPX6vA0	6U VPX, Liquid Flow-Through, 1", Dual NVIDIA RTX5000 Ada, 8x video outputs
253823-F***-***VPX6vA0	6U VPX, Air Cooled, 1", Single NVIDIA RTX5000 Ada, 4x video outputs
253833-F***-***VPX6vA0	6U VPX, Conduction Cooled, 1", Single NVIDIA RTX5000 Ada, 4x video outputs
2538L3-F***-***VPX6vA0	6U VPX, Liquid Flow-Through, 1", Single NVIDIA RTX5000 Ada, 4x video outputs

* 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)



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