XMC-AD2000E-VO

NVIDIA RTX 2000 Ada with 3 Video Outputs

Key Features

- NVIDIA RTX™ 2000 (AD107) GPU
- 8 GB GDDR6 128-bit memory, up to 256 GB/s
- Up to 3 video outputs, options for DP++, HDMI, or DVI
- Default configurable operating power, 25W to 50W
- PCIe Gen4 x8

GPU Features

- Up to 3 simultaneous video outputs
  - ☐ DisplayPort++ 1.4 (Default)
  - ☐ 4K at 120Hz/5K at 60Hz, with 10-bit color depth
  - ☐ Support for HDMI or DVI
- Ada GPGPU parallel processing support:
  - ☐ 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
- 3072 CUDA cores
- 96 Tensor Cores (4th Gen)
- 24 Ray Tracing cores (3rd Gen)
- NVENC (8th Gen) and NVDEC (5th Gen) with up to 8K video encoding and hardware decoding support

Connectivity/System Management

- Linux and Windows drivers available
- NVIDIA driver support requires the following host CPU: Intel E/S/H/H35 Class, AMD H/HS Class

Mechanical/Architecture

- Designed for Harsh Environments:
  - ☐ Rugged conduction cooled (CC)
  - ☐ Operating temperature: -40° to +70°C standard, operational to TBD
  - ☐ Vibration (sine wave): 10G peak, 5 - 2000Hz
- Shock: 40G peak for conduction cooled
- Dimensions (mm): CC: 143.75x74x13.5
- Weight (g): TBD
- VITA 46.9 VPX I/O mapping patterns supported: X12d, X8d, X16s

Overview

This XMC module includes an advanced NVIDIA RTX™ 2000 Ada embedded GPU. Data can be routed to the high-performance NVIDIA Ada architecture GPU for processing, encoding, or AI inference, and then be output via DisplayPort, HDMI, DVI or PCIe x8.

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 to increase 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 WOLF's previous generation product.

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 to move heat away from the GPU.

NVIDIA RTX

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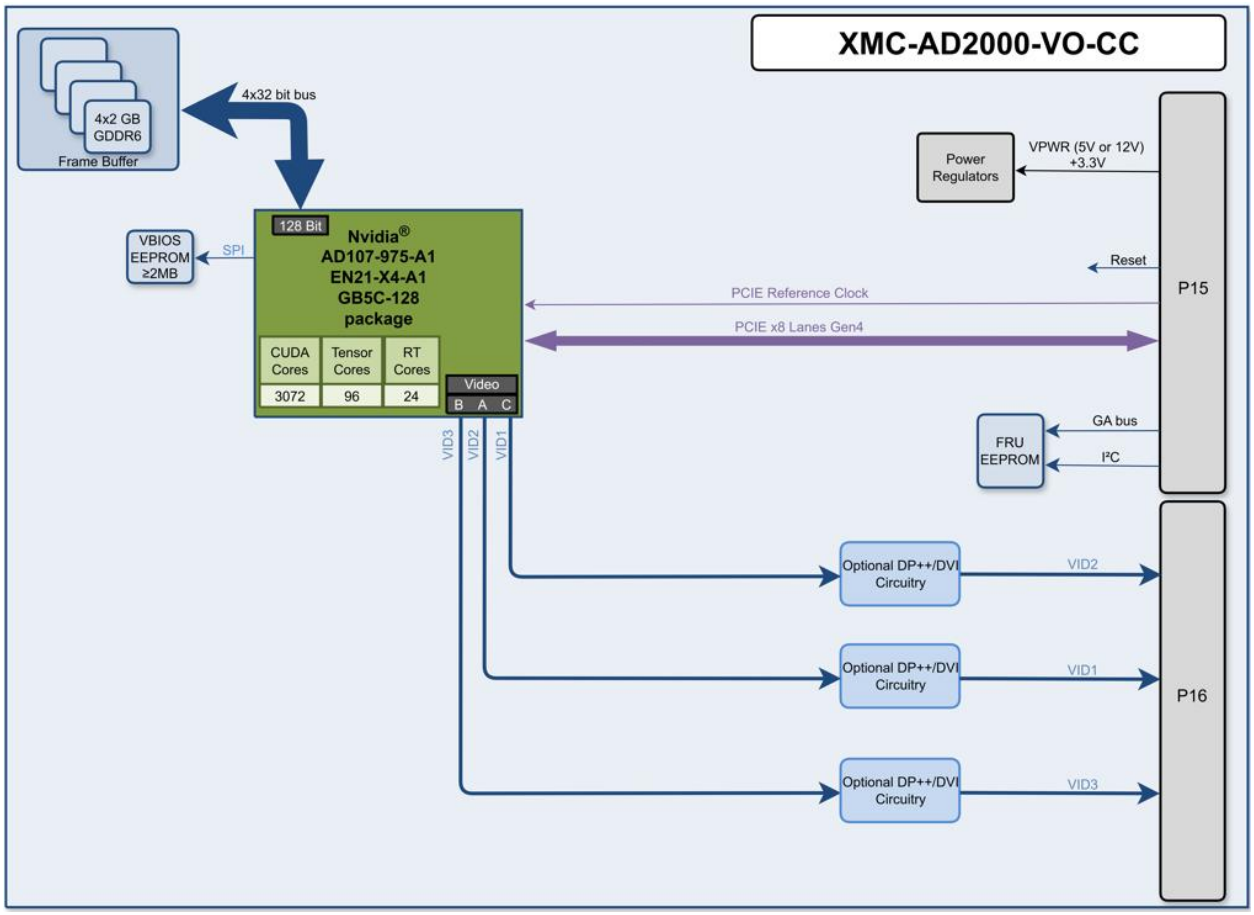

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Power and Performance

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 allowed by the GPU. When the TGP setting is decreased the clock speed will also decrease resulting in a decrease in processing speed. If the GPU temperature remains below 86.5°C, the GPU can operate at full boost clock speeds. If the GPU temperature exceeds 86.5°C and does not return to a temperature below 86.5°C, the GPU base clock speed will begin to decrease. If the GPU temp exceeds 89°C, the GPU base clock speed will drop to its lowest available setting (210 MHz) to protect the GPU from heat damage.

Depending on the efficiency of the system's cooling solution, the Ada AD107 GPU at 50W and a base clock of 1485 MHz provides 9.1 TFLOPS FP32 performance, and at a boost clock speed of 1950 MHz, it provides 11.9 TFLOPS FP32 performance. At 35W and a base clock speed of 930 MHz, the GPU provides 5.7 TFLOPS, and at a boost clock speed of 1455 MHz, it provides 8.9 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.

Fast GDDR6 Memory

Getting data into and out of a high performance GPU requires fast graphics memory to ensure that the memory does not become a system bottleneck. In moving from GDDR5 to GDDR6 the number of data transfers per clock cycle doubled from two to four, and memory chips can be read in dual-channel modes rather than just single channel modes. The newer GDDR6 memory does all of this while also slightly reducing the memory's average power consumption compared to using GDDR5 memory.

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.

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Configuration Options

Some common configuration options for this module include:

- Display Interfaces
- Conformal Coatings
- XMC 1.0, 2.0 or XMC+ (ANSI/VITA 88)
- Air or Conduction Cooled
- Maximum Power config
- Variant Locked

* Contact WOLF to determine the appropriate configuration for your system.

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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ITAR Free

GOVERNMENT-INDUSTRY DATA EXCHANGE PROGRAM GIDEP

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