

XMC-AD2000E-FGX2-IO

NVIDIA RTX2000 Ada, up to 4K I/O, SDI, DP, CVBS

KEY FEATURES

- NVIDIA RTX™ 2000 Ada, 3072 CUDA Cores, 96 Tensor Cores, 24 RT Cores
- Up to 4x SDI inputs and 4x SDI outputs
- Up to 2x DP/HDMI/DVI outputs
- 2x CVBS Inputs
- Configurable operating power, 30W to 50W

GPU AND FGX2 FEATURES

- Support for 12G-SDI and 3G-SDI
- MCOTS options for additional video format support
- MCOTS options for analog stereo audio inputs
- WOLF FGX2 supports NVIDIA GPUDirect, providing an efficient CPU offload
- Ada GPGPU parallel processing support:
 - CUDA Toolkit 12, CUDA Compute capability 8.9
 - OpenCL™ 3.0, DirectX® 12 Ultimate, OpenGL 4.6, OpenGL ES 3.2, Vulkan™ 1.2
- 96 Tensor Cores (4th Gen)
- 24 Ray Tracing cores (3rd Gen)
- 8GB GDDR6 128-bit memory
- NVENC (8th Gen) and NVDEC (5th Gen) with up to 8K video encoding and hardware decoding support

CONNECTIVITY/SYSTEM MANAGEMENT

- PCIe Gen3 switch with x8 to the XMC connector
- Linux and Windows drivers
- NVIDIA driver support requires the following host CPU: Intel E/S/H/H35 Class, AMD H/HS Class

MECHANICAL/ARCHITECTURE

- High level of ruggedization:
 - Rugged conduction cooled or air cooled
 - Operating temperature: conduction cooled -40° to +85°C, air cooled -40° to +71°C
 - Vibration (sine wave): 10G peak, 5 - 2000Hz
 - Shock: 40G peak for conduction cooled, 30G peak for air cooled
- Dimensions: TBD
- Weight (approximately): TBD
- VITA 46.9 VPX I/O mapping patterns supported: X12d, X8d, X16s

OVERVIEW

This versatile I/O module includes both an advanced NVIDIA RTX™ 2000 Ada embedded GPU and WOLF's Frame Grabber eXtreme (FGX2) with up to 4K support. This board accepts multiple simultaneous SDI inputs. The captured inputs can be routed to the high-performance NVIDIA GPU for processing and be output in several formats, including SDI, DisplayPort, HDMI, and others by request.

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 WOLF's previous generation product.

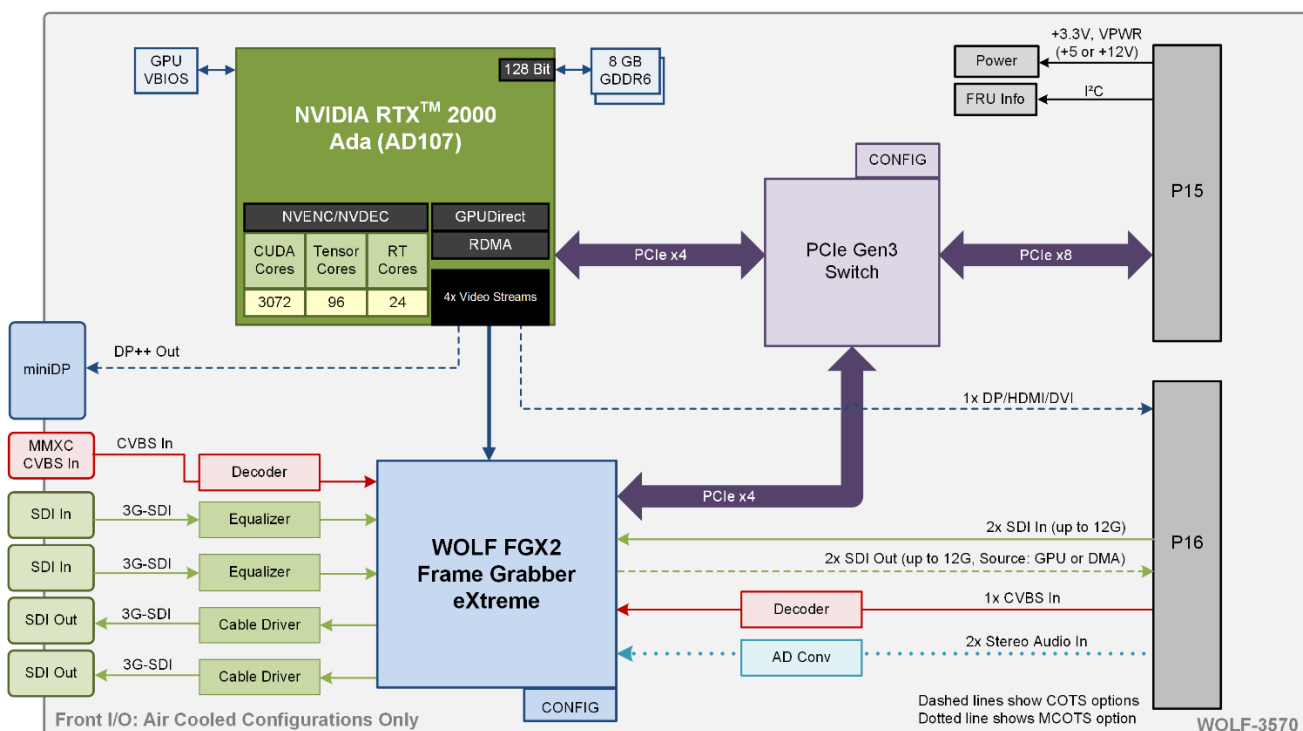
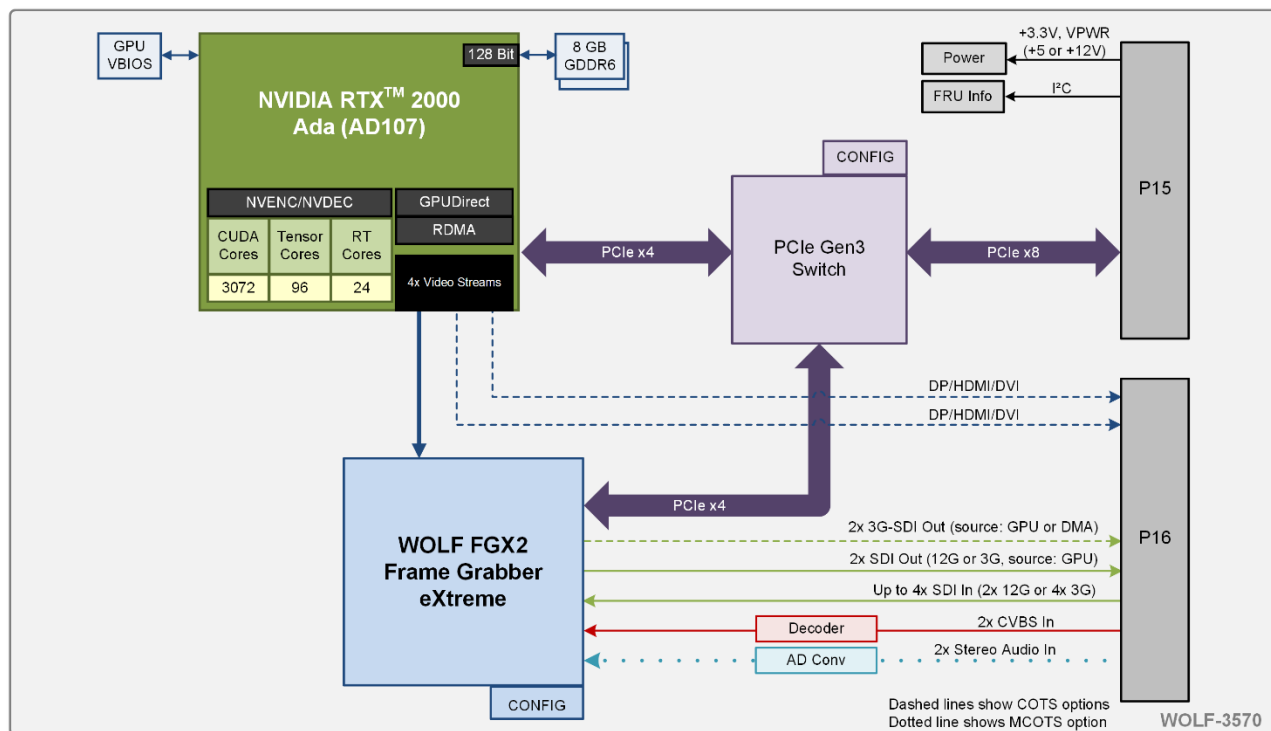
The WOLF Frame Grabber eXtreme (FGX2) provides the board with data conversion from one standard to another, with a wide array of video input and output options for both cutting-edge digital I/O and legacy analog I/O. The FGX2 supports NVIDIA GPUDirect which allows direct access to the GPU memory for processing and analysis.

WOLF's advanced cooling technology is designed to move heat using a low weight, high efficiency path to conduct heat away from the GPU.



Information is subject to change.

This versatile XMC module provides numerous COTS options to system designers. The GPU supports 4 video output streams which can be output as 2 native DP/HDMI/DVI and two SDI, or all 4 can be routed to the FGX2 to be output as SDI. The FGX2 can also accept SDI sources directly from the host system, routing the data via PCIe to the FGX2 to be output via the XMC rear connector. MCOTS options include two analog stereo inputs and additional video format support, including RGB, ARINC 818, CoaXPress, and others.



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POWER AND PERFORMANCE

Powering the XMC board with a 5V source will provide up to a TBP (total board power) of 40W. Powering the XMC board with a 12V source will provide up to a TBP of up to 80W and will allow the GPU to run at up to 50W.

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 AD107 GPU typically operates at TGP power levels from 35W to 115W. At 35W the base clock of 930 MHz provides 5.7 TFLOPS while the boost clock of 1445 MHz provides 8.9 TFLOPS. At 80W the base clock of 1905 MHz provides 11.7 TFLOPS FP32 performance while the boost clock of 2340 MHz provides 14.4 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.

This information is subject to change.

ORDERING CODES

The following table defines series of common order codes for the XMC-AD2000E-FGX2-IO 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
- XMC 1.0, 2.0 or XMC+ connectors
- Max power setting
- Conformal coatings
- Air or conduction cooled
- Analog audio inputs

Ordering Number	Description
XMC-AD2000E-FGX2-IO Sample Configurations	
357022-F***-***vA0	XMC 2.0, Air Cooled, Ada RTX2000, WOLF FGX2; Front: 2x 3G-SDI In, 2x 3G-SDI Out, 1x DP++ Out, 1x CVBS In; Rear: 1x CVBS In, 1x DP Out
357032-F***-***vA0	XMC 2.0, Conduction Cooled, Ada RTX2000, WOLF FGX2, Rear: 2x 12G-SDI In, 2x 12G-SDI Out, 2x DP Out
357031-F***-***vA0	XMC 1.0, Conduction Cooled, Ada RTX2000, WOLF FGX2; Rear: 2x 3G-SDI In, 2x 3G-SDI Out, 2x DVI Out, 2x CVBS In

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

MANUFACTURING AND QUALITY ASSURANCE

WOLF designs modules to pass the following environmental standards:

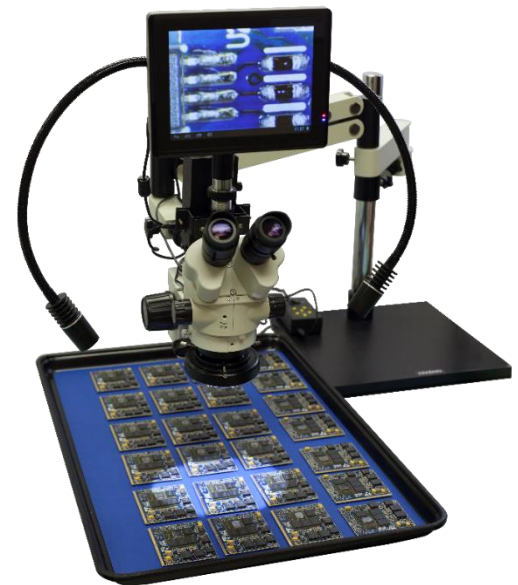
- MIL-STD-810 (United States Military Standard for Environmental Engineering Considerations and Laboratory Tests)
- MIL-HDBK-217 (Reliability Prediction of Electronic Equipment)
- RTCA DO-160 (Environmental Conditions and Test Procedures for Airborne Equipment) on request

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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Datasheet Rev.3