

S-A2300 | Lyra

Radiation-Characterized Space AI GPGPU



Picture for reference

POWERED BY



- **SWaP Optimized Rugged AI Space System**
- **Small Form Factor**
- **NVIDIA® Jetson™ AGX Orin Industrial System-on-Module 64GB RAM with ECC**
 - ▶ Ampere™ Architecture GPU 2048 CUDA® Cores
 - ▶ 12-Core ARM® v8.2 64-bit CPU
 - ▶ AI performance: 248 TOPS (Tera Operations Per Second)
 - ▶ H.264/H.265 Hardware Encoder
- **Cold Plate Cooling**
- **NVMe SSD**
- **64 GB LPDDR5 with ECC**

The S-A2300 Lyra stands out as the most powerful Rugged-GPGPU AI supercomputer. Ideally suited for distributed systems, it features the powerful NVIDIA Jetson AGX Orin Industrial System-on-Module for LEO space platforms.

Its Ampere GPU boasts up to 2048 CUDA cores and 64 Tensor cores, delivering up to 248 TOPS with exceptional energy efficiency for AI-based local processing right where you need it, next to your sensors. Additionally, the system includes two dedicated NVDLA (NVIDIA Deep-Learning Accelerator) engines, optimized for deep learning applications.

Despite its compact size, the S-A2300 Lyra sets the standard as the most advanced solution for AI, deep learning, and video and signal processing in next-generation short-duration spaceflight, as well as NEO and LEO satellites applications.

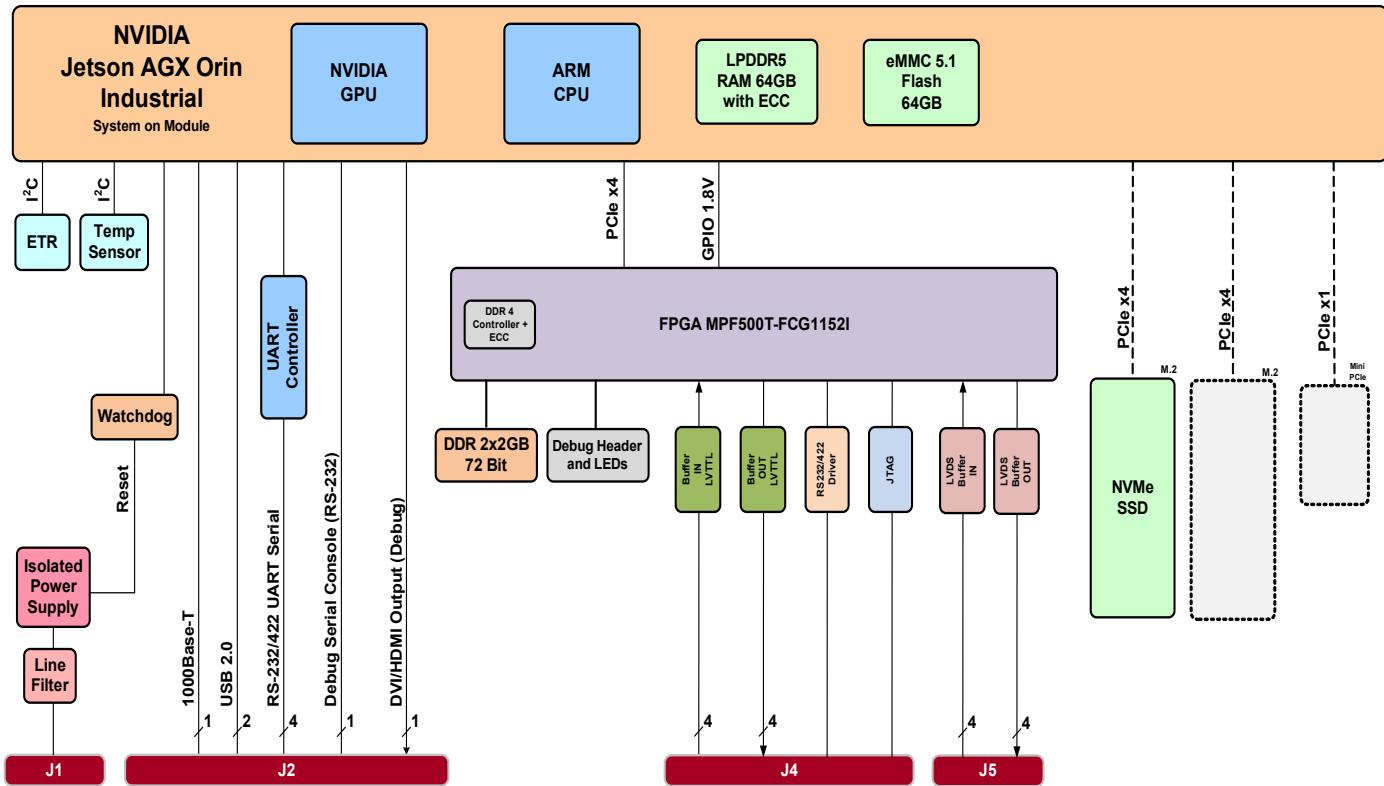
RuggedAI™ is Aitech

- **FPGA**
 - ▶ Flexible FPGA platform supporting customer IP integration, high-performance processing, video frame grabbing and robust cybersecurity solutions.
- **I/O**
 - ▶ Gigabit Ethernet
 - ▶ Discretes
 - ▶ USB
 - ▶ DVI/HDMI Out
 - ▶ UART Serial
- **CUDA®, OpenGL, OpenGL ES, Vulkan**
- **Low Power Consumption**
- **Radiation Characterized**
- **Development Platforms Available**



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S-A2300 Block Diagram

System Architecture

System on Module	<ul style="list-style-type: none"> NVIDIA Jetson AGX Orin Industrial - 64GB RAM with ECC
GPU	<ul style="list-style-type: none"> NVIDIA Ampere GPU architecture 2048 CUDA cores 64 Tensor cores AI performance 248 TOPS Supports CUDA, OpenGL, OpenGL ES, Vulkan
CPU	<ul style="list-style-type: none"> ARM v8.2 (64-bit) heterogeneous multi-processing (HMP) CPU 12-core NVIDIA ARM Cortex A78AE v8.2 64-bit CPU 3MB L2 + 6MB L3 Operates at up to 1.2 GHz (depending on power mode)
System Resources	<ul style="list-style-type: none"> Multi-standard video/JPEG decoder/encoder, hardware encoding for H.264/H.265 Dynamic voltage and frequency scaling Temperature sensors Elapsed time recorder Status indicator LED Rad-hard watchdog

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- **FPGA (Optional)** - Flexible FPGA platform supporting customer IP integration, high-performance processing, video frame grabbing and robust cybersecurity solutions.
The FPGA is provided as an open infrastructure for customer-developed IP core integration. It is connected to the AGX Orin via a PCIe x4 interface and is accessible from Linux through the standard PCIe framework.
Available I/O includes:
 - 4 x LVTTI input and output signals (100kHz)
 - 4 x GPIO interfaces (1.8V) connected to the AGX Orin SoM
 - 1 x RS-232/422 UART interface (for optional integration with customer IP)
 - JTAG signals (for programming and updating the FPGA with customer code)
 - 4 x LVDS inputs and 4 x outputs signals (1.25 GHz)

Memory Resources

RAM	64 GB LPDDR5 with ECC, operates at up to 204.8GB/s (depending on power mode), 256-bit interface
eMMC	64 GB eMMC 5.1 (boot source)
NVMe SSD	Optional NVMe SSD. For standard options, see the Ordering Information section. Additional options may be available per customer request. Contact an Aitech representative for more information.

I/O

I/O Variant	00
Gigabit Ethernet (10/100/1000Base-T)	1
DVI (single-link) / HDMI Output (Debug) Supports resolutions of up to 1920x1080 [60p]	1
USB 2.0	2
Serial Ports (RS-232/422 UART) Software configurable as RS-232/422	2
Debug Serial Console (RS-232 UART)	1
Discrete I/O (Single-Ended, 1.8V to FPGA)	4

Software

Operating System	Linux OS pre-installed – L4T (Linux for Tegra), a lightly modified Ubuntu-based distribution
Drivers	Sample applications and development tools are pre-installed

Mechanical

Cooling	Cold plate
Dimensions (L x W x H)	Preliminary: 250 mm x 95 mm x 200 mm
Weight	< 5 kg

Power

Input Power	<ul style="list-style-type: none">• Wide input voltage range: 22 – 33 V_{DC} steady state operation
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	<ul style="list-style-type: none">• Input reverse polarity protection• EMI/RFI input filter• On-board supplies isolated from external supply• MIL-STD-704A and MIL-STD-1275D compliant (no hold-up)
Power Consumption	<ul style="list-style-type: none">• AGX Orin Industrial SoM – 15-60W (default mode is 35W, mode ID 2)• Users can create customized presets, specifying clocks and online cores• The total power consumption depends on system configuration and expansion options

Environmental

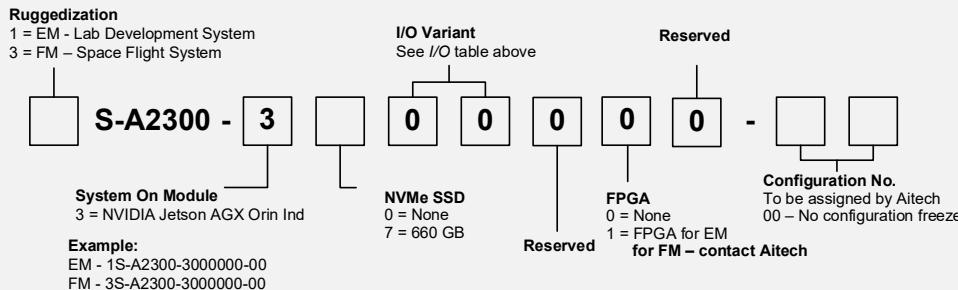
	FM (Flight Model)	EM (Lab Development System)
EM/FM		
Operating Temp.	-40 to +55 °C @ cold plate	0 to +40 °C @ ambient
Non-Operating Temp.	-40 to +85 °C	0 to +40 °C @ ambient
Vibration	GSFC-STD-7000B (14.1g)	N/A
Operating Shock	GSFC-STD-7000B (500g)	N/A
Vacuum	GSFC-STD-7000B (10 ⁻⁵ Torr)	N/A
Relative Humidity	95%	10-90%
Conformal Coating	Urethane (except NVIDIA Jetson SoM)	Conformal coating
Bench Handling	MIL-STD-810F, Method 516.5, Procedure VI	N/A
Total Ionizing Dose	20 krad (Si)	N/A
Single Event Effects	<ul style="list-style-type: none">- 1E+10 proton/cm² fluence (40 - 200 MeV)- No destructive SEL- Self-reset capability (by watchdog)- Power cycle recovers functional interrupts (by watchdog)	N/A
EMI	Designed for MIL-STD-461G (CS101, RE102)	N/A

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Ordering Information



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Optional Accessories

EM System

TCA230-00-SK	Starter kit: Cables and external power supply
MCS230-1-00	Mating connectors set



FM System

TC-S-A2300-00-SK	Starter kit: Electroless nickel connectors Cables and external power supply
MC-S-A2300-00	Electroless nickel mating connectors

Contact Aitech

Contact your Aitech sales representative for additional product information, and for inquiries regarding customized configurations of the S-A2300, as well as additional software support.



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