



7SL-3500 - L2L - L2A

3U VPX Liquid Cooling ATR

- ▶ The 7SL-3500 VPX System is a modular Military Rugged ATR enclosure, geared for 3U OpenVPX designs. The versatile design allows multiple customizable configurations based on proven components and design techniques. 7SL-3500 Hybrid conduction cold plate
- ▶ assisted by liquid cooling sets with aggregate power to 500W
- ▶ Custom and standard 3 slot backplanes with VPX and SOSA aligned slot profiles in combinations supporting high speed signal processing applications.
- ▶ Scalable to multi CPU-GPU requirements

Features

- ▶ 3 Slot -3 Payload
- ▶ Design to Meet MIL-STD 810
- ▶ NVIDIA® Quadro® 5000 Ada (9728CUDA) or NVIDIA MXM RTX™ A4500 (5888CUDA)
- ▶ 500W Payload By Liquid Cooled
- ▶ Custom backplanes with VPX and SOSA aligned slot profiles
- ▶ Custom I/O options including MIL-STD Wiring & Connectors
- ▶ Intel i7-1185GRE
- ▶ 28V DC Input

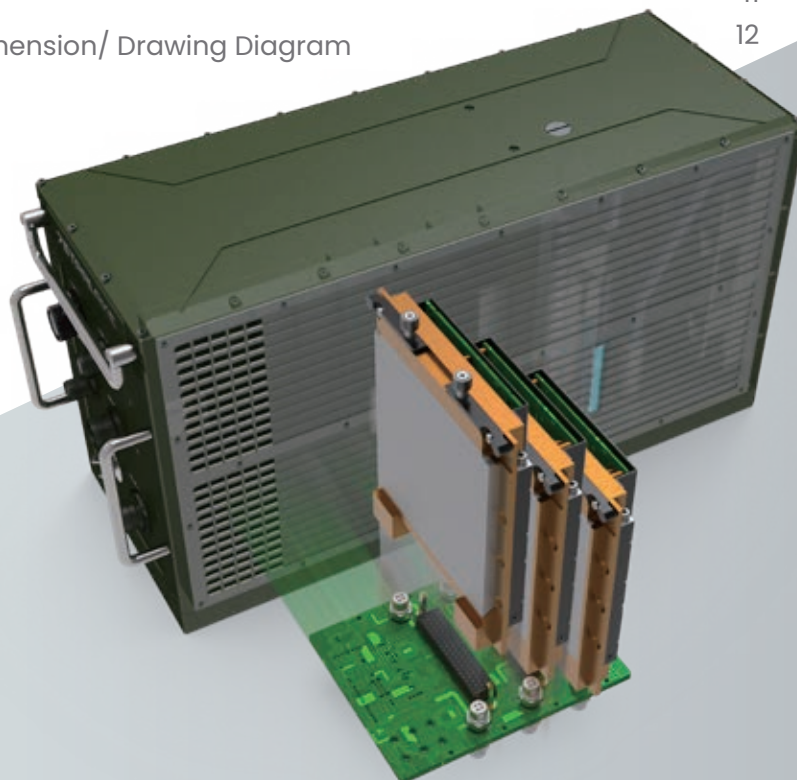
Model No	Liquid Cooling Type	Payloads	Max Power
7SL-3500-L2L	Liquid to Liquid	1CPU 2GPU	500W
7SL-3500-L2A	Liquid to Air	1CPU 2GPU	500W



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7SL-3500

7SL-3500 3U-VPX Liquid Cooled

7STARLAKE scalable and customizable, rugged VPX ATR System enables compute-intensive, SWaP constrained mission-critical applications for deployment in the world's most demanding military and aerospace environments

Advantages of Liquid-Cooled Technologies

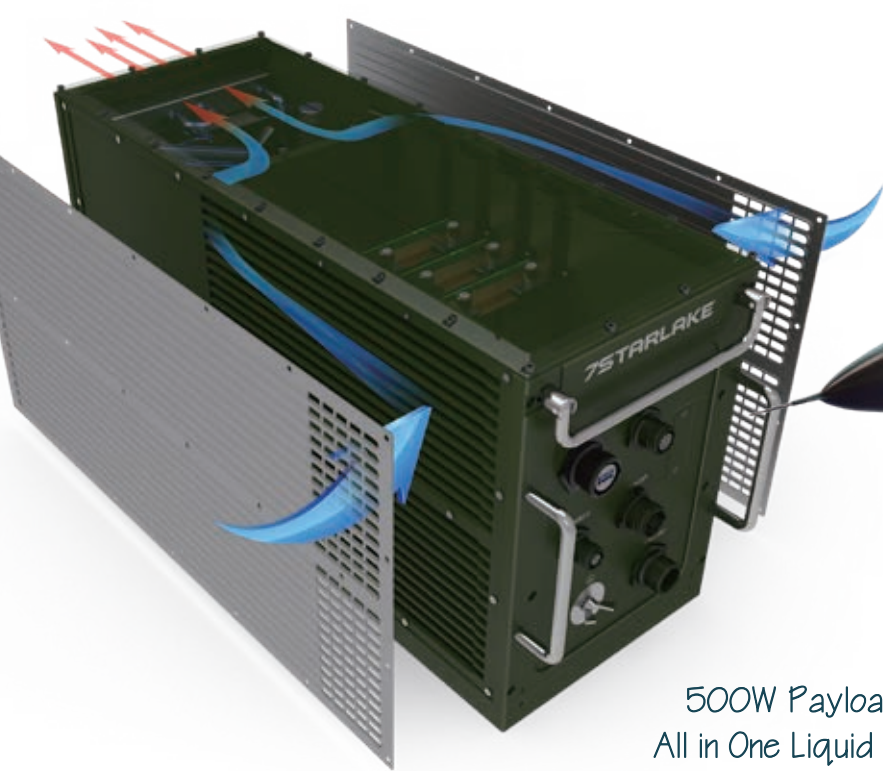


L2L_Liquid-to-Liquid Cooling

- **High Efficiency:**
Offers superior cooling performance due to direct heat exchange with facility-chilled water.
- **Scalability:**
Suitable for large-scale data centers and industrial setups.
- **Energy Savings:**
Reduces the need for air conditioning, lowering operational costs.
- **Compact Design:**
Allows for smaller equipment footprints due to efficient heat removal.

L2A_Liquid-to-Air Cooling

- **Ease of Installation:**
Requires less complex infrastructure compared to liquid-to-liquid systems.
- **Cost-Effective:**
Lower initial investment, making it suitable for personal and small-scale systems.
- **Portability:**
Ideal for environments where facility-level water cooling isn't available.
- **Versatility:**
Widely used in mobile environment, consoles, and smaller electronics.



500W Payload by
All in One Liquid Cooled



Advanced Thermal Solutions Advantage for close loop:

Precise temperature regulation :

The sensitive nature of processes and equipment means that being able to regulate the temperature of the coolant (and thereby ensure the ability to effectively absorb heat from the coolant) is essential. Closed-loop cooling systems are better at keeping the coolant temperature constant, which improves cooling efficiency.

Reduced water consumption :

By recirculating the coolant rather than using it just once (as in single-pass cooling systems), the amount of water used for cooling can be reduced.

Reduced environmental impact :

Because closed-loop chillers are sealed systems, they minimize the chance of environmental contamination from bacteria, dirt, dust and other contaminants that can occur with open-loop chiller systems. And because closed-loop systems don't discharge coolant into the environment, they also avoid the costs of storm water and wastewater treatment.

What is Liquid Cooled

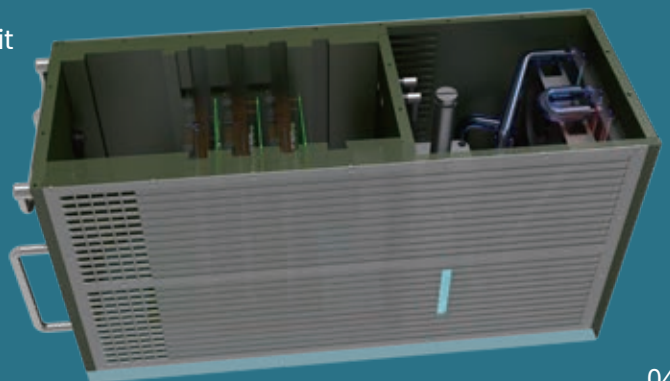
A cooling system that uses a liquid coolant (water/water-based coolant or oil/oil-based coolant) to exchange heat from an industrial process in a closed loop setting.

In a closed loop chiller, the coolant is first chilled in a coolant tank and then circulated throughout the process/equipment. During this circulation, the coolant absorbs heat from the application and equipment. When the coolant reaches the evaporator, this absorbed heat is evaporated and the liquid coolant returns to the coolant tank to be re-cooled and re-circulated throughout the system.

Closed-loop dry system. This type of closed-loop system utilizes an air-cooled heat exchanger to reject the heat absorbed by the refrigerant into the atmosphere.

Closed-loop evaporative system. This cooling system employs an evaporative heat exchanger and evaporation to remove the heat absorbed by the refrigerant.

Liquid-to-liquid cooling system. As the name suggests, a liquid-to-liquid cooling system uses a heat exchanger to transfer heat from one refrigerant to another. Typically, as the refrigerant cycles through a process, it travels to a heat exchanger where the heat is transferred to a liquid, such as a cooling tower or a body of water.

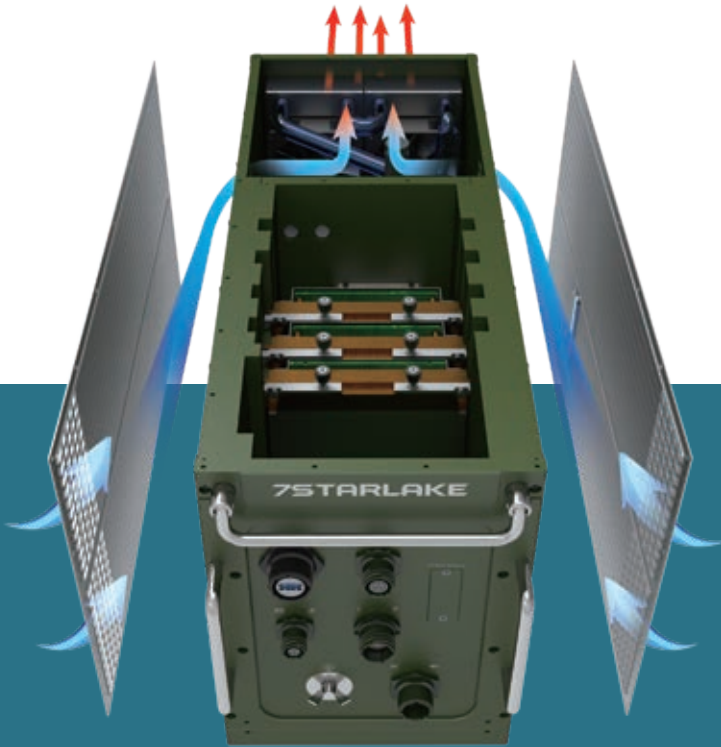


7SL-3500 All in One Liquid to Air

7SL-3500-L2A

3 Payload (1-CPU, 2-GPU)

500W



Thermal	Passive	Liquid Cooled
Payload	3	1 x CPU + 2 x GPU
GPU	2	2x RTX™ A4500
NIC	1	1 x 1G
Backplane	3	3- Payload
Max PSU	500W	28VDC

Liquid Cooled to Air

- ▶ 7SL-3500 Hybrid conduction cold plate assisted by Liquid cooling sets with aggregate power demands over 500W
- ▶ Internal recirculation fans ensure liquid cooling set is across conduction cooled payload modules, minimizing hot-spots and dissipating heat homogeneously

- ◆ NVIDIA Ampere Architecture
- ◆ PCIe Gen4x16 interface
- ◆ 16GB GDDR6 Memory, 256-bit Bandwidth
- ◆ 5888 CUDA Cores, 17.66 TFLOPS SP Peak



Specification

Physical

Dimensions: 10.6" (H), 7.6 (W) x 19.5" (D) incl. handles and connectors 269mm x 190mm x 496mm including connectors and mounting plate Machined aluminum alloy 6061-T6, bolt together construction Weight: Approximately 30kg, with payload boards

I/O Capabilities

Custom I/O panel supporting high speed connectivity High density MIL-STD 38999 circular connectors.

Payload Compatibility

3U VPX multi-core single board computers, high speed GPGPU modules, video processing and Ethernet switching

Backplane

VPX aligned slot profiles VITA 48.8

Environmental

Designed to meet MIL-STD-810, Vibration, Shock

Power Supply

Input voltage: 18 to 36 VDC Output: up to 500W total



7SL-3500 External Liquid to Liquid

7SL-3500-L2L

3 Payload (1-CPU, 2-GPU)

500W



Thermal	Passive	Liquid Cooled
Payload	3	1 x CPU + 2 x GPU
GPU	2	2x Quadro® 5000 Ada
NIC	1	1 x 1G
Backplane	3	3- Payload
Max PSU	500W	28VDC

Specification

Liquid Cooled to Liquid

- ▶ 7SL-3500 Hybrid conduction cold plate assisted by Liquid cooling sets with aggregate power demands over 500W
- ▶ A liquid-to-liquid cooling system cools below ambient temperature and offers similar temperature stability to a recirculating chiller. Instead of rejecting the waste heat to the room, it transfers it to chilled facility water via a liquid-to-liquid heat exchanger

- ◆ NVIDIA Ada Lovelace Architecture
- ◆ PCIe Gen4x16 interface
- ◆ 16GB GDDR6 Memory, 256-bit Bandwidth
- ◆ 9728 CUDA Cores, 41.15 TFLOPS SP Peak

Physical

Dimensions: 10.6" (H), 7.6 (W) x 19.5" (D) incl. handles and connectors 269mm x 190mm x 496mm including connectors and mounting plate Machined aluminum alloy 6061-T6, bolt together construction Weight: Approximately 28kg, with payload boards

I/O Capabilities

Custom I/O panel supporting high speed connectivity High density MIL-STD 38999 circular connectors.

Payload Compatibility

3U VPX multi-core single board computers, high speed GPGPU modules, video processing and Ethernet switching

Backplane

VPX aligned slot profiles VITA 48.8

Environmental

Designed to meet MIL-STD-810

Power Supply

Input voltage: 18 to 36 VDC Output: up to 500W total

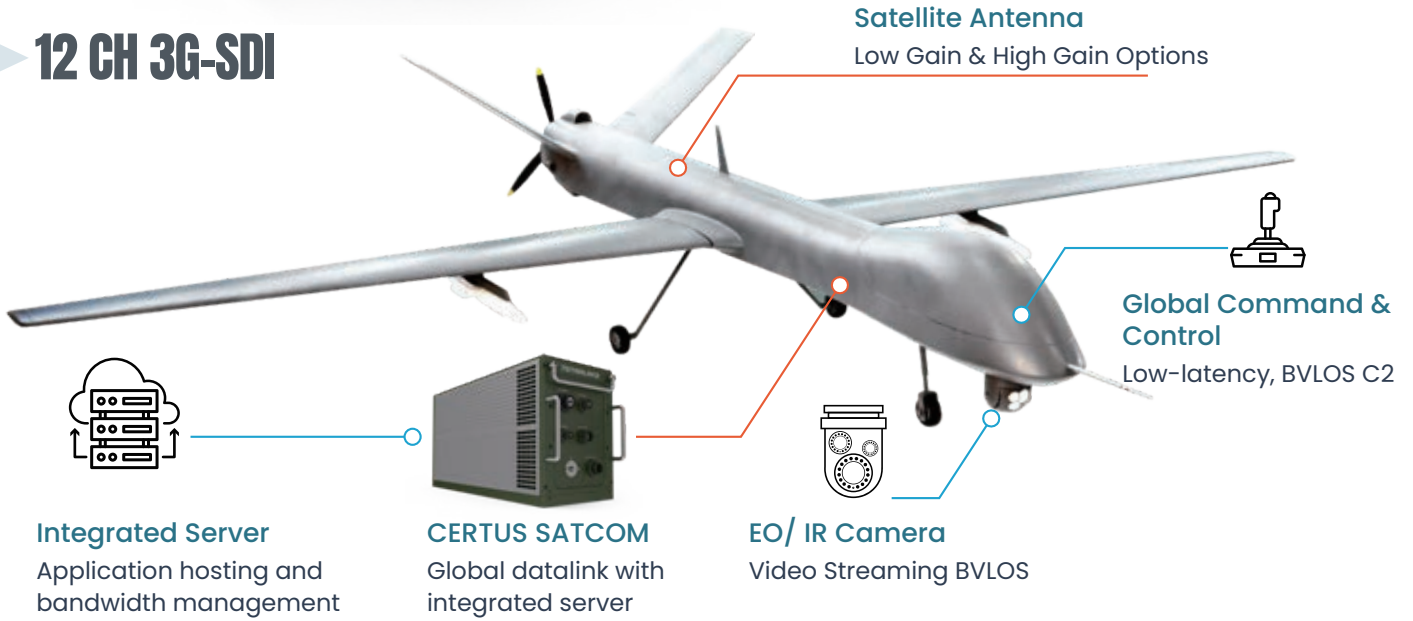


Typical Application

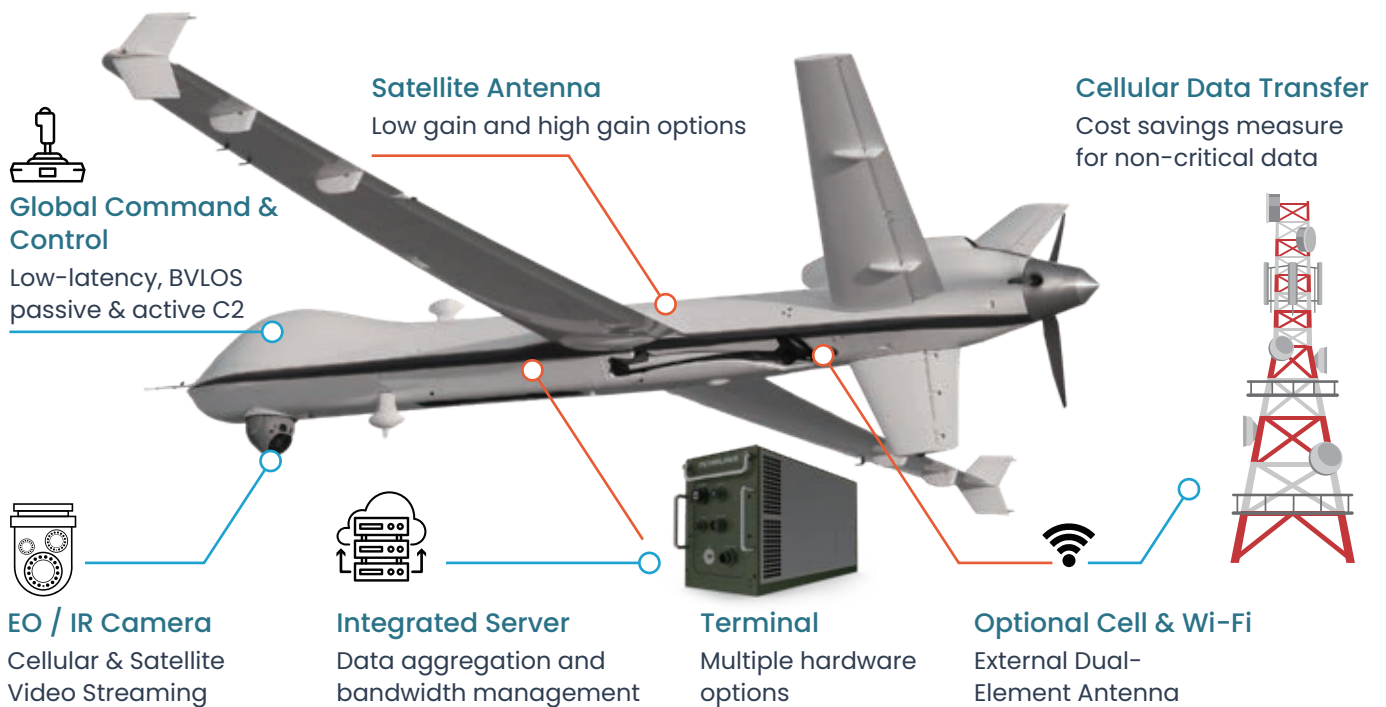


- Equipment
- Capabilities

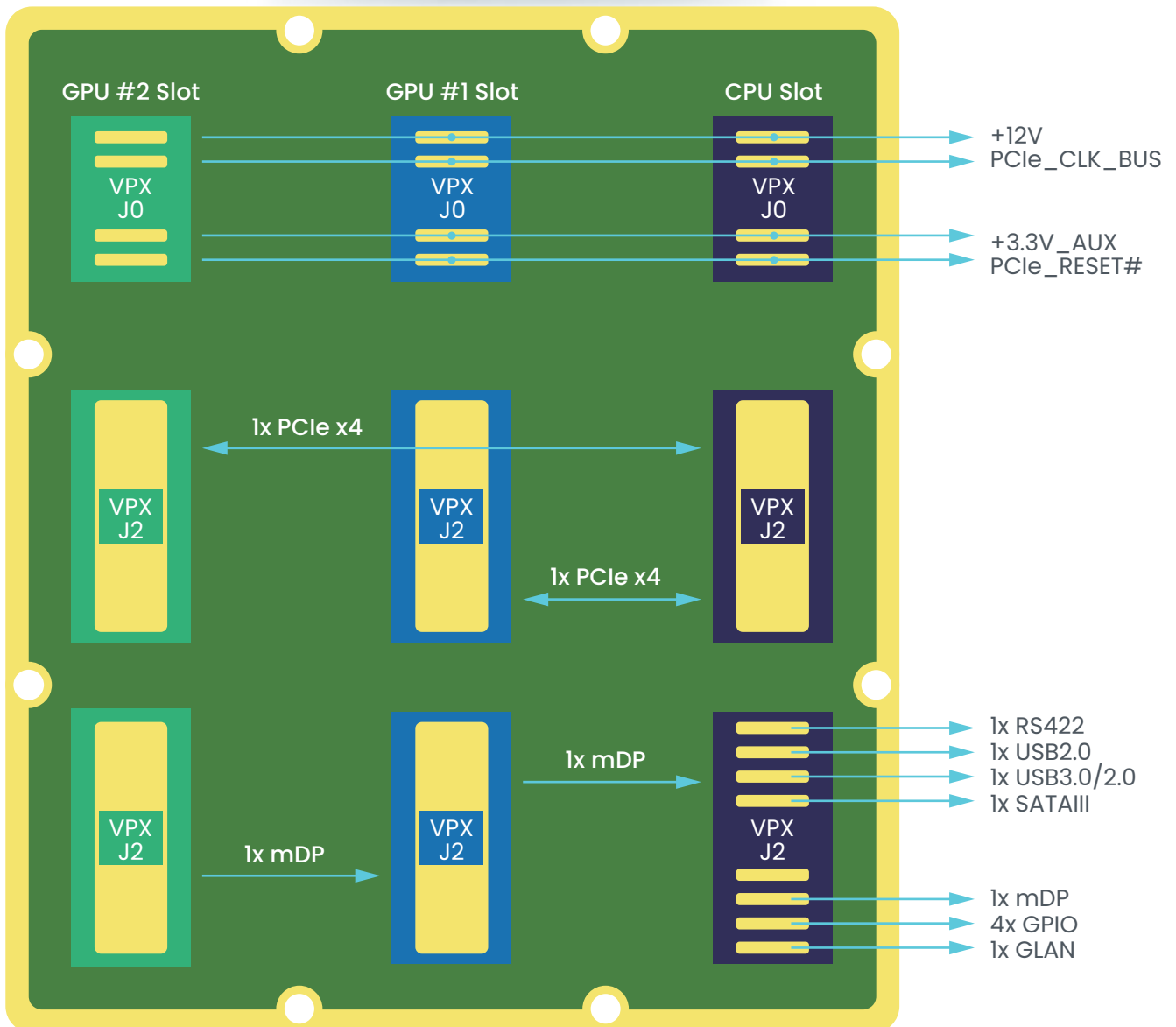
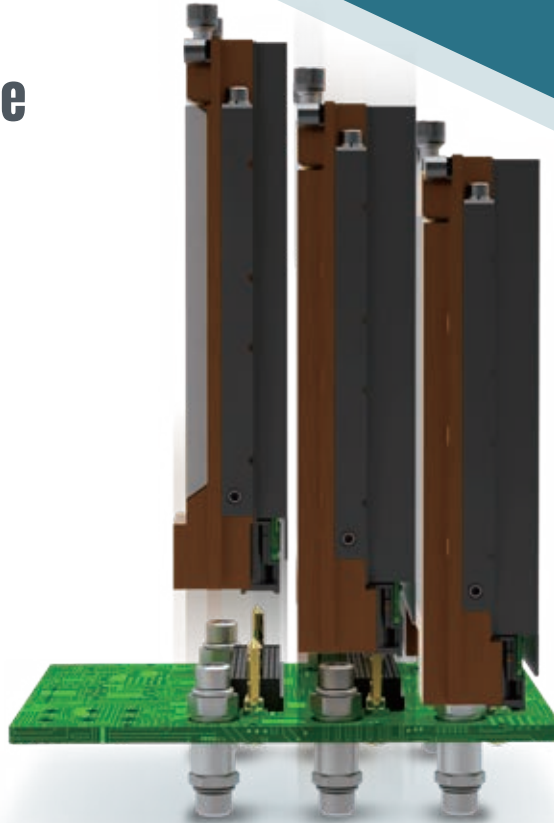
12 CH 3G-SDI



Software Defined Radio System



3 Slot Backplane



3U VPX GPU List

SK901-AD5000 Spec & Block Diagram

VPX GPGPU CARD

VPX GPU

NVIDIA RTX 5000Ada GPU: Ada Lovelace Architecture

Interface

- ◆ 3U VPX Form Factor
- ◆ 1" Pitch (Conduction Cooled)
- ◆ PCIe Gen 4 (x4 or x8 support)

Graphics Processor

- ◆ NVIDIA RTX 5000 Ada GPU DirectX 12, OpenGL 4.6, Vulkan 1.3

Graphics Memory

- ◆ 16GB GDDR6 with ECC
- ◆ 256-bit Memory Interface
- ◆ 576GB/s Memory Bandwidth

GPU Capabilities

- ◆ 9,728 CUDA Cores, 304 Tensor Cores, 76RT Cores.
- ◆ Up to 41.15 TFLOPS SFP32 Single Floating Point Performance
- ◆ Support CUDA, CUDA-X, OpenCL™ and Shader Model 6.7

HIGH-SPEED DATA TRANSFER

VPX GPU

9,728 CUDA Core, 304 Tensor & 76RT Cores

Shock (MIL-STD-810)

40g

Vibration (MIL-STD-810)

3g rms

Power

3.3Vaux, 12V VSS
(115W)

Humidity (MIL-STD-810)

95% without
Condensation

SOSA ALIGNED SOLUTION

VPX GPU

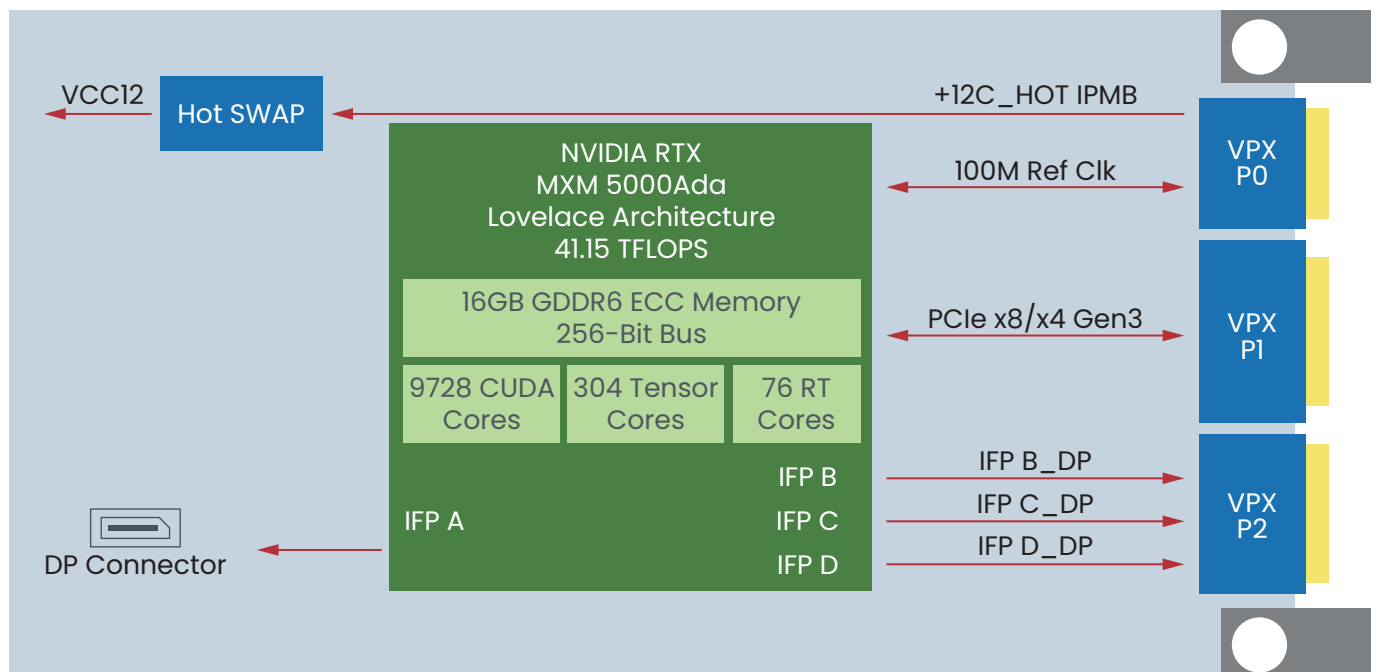
Available with SOSA™-aligned Slot profiles and vita standard

Display Outputs

- ◆ One Display Port internal
- ◆ Three Display Ports active output

Software & Platform Support

- ◆ Windows or Linux on X86



3U VPX GPU List

SK901 – A4500

SK901-A4500 Spec & Block Diagram

VPX GPGPU CARD

VPX GPU

NVIDIA Ampere™ Architecture: RTX A4500 GPU

Interface

- ◆ 3U VPX Form Factor
- ◆ 1" Pitch (Conduction Cooled)
- ◆ PCIe Gen 4 (x4 or x8 support)

Graphics Processor

- ◆ NVIDIA RTX A4500 GPU
- ◆ DirectX 12, OpenGL 4.5, and Vulkan 1.2

Graphics Memory

- ◆ 16GB GDDR6 with ECC
- ◆ 256-bit Memory Interface
- ◆ 512GB/s Memory Bandwidth

GPU Capabilities

- ◆ 5,888 CUDA Cores, 184 Tensor Cores, 46RT Cores.
- ◆ Up to 17.66 TFLOPS SFP32 Single Floating Point Performance
- ◆ Support CUDA, CUDA-X, OpenCL™ and Shader Model 5.1

AI & DEEP LEARNING

VPX GPU

5,888 CUDA cores, 184 Tensor & 46RT Cores

Vibration (MIL-STD-810)

3g rms

Shock (MIL-STD-810)

40g

Power

3.3V, 5V, and 12V
(80 – 115W)

Humidity (MIL-STD-810)

95% without
Condensation

HIGH PERFORMANCE EMBEDDED COMPUTING

VPX GPU

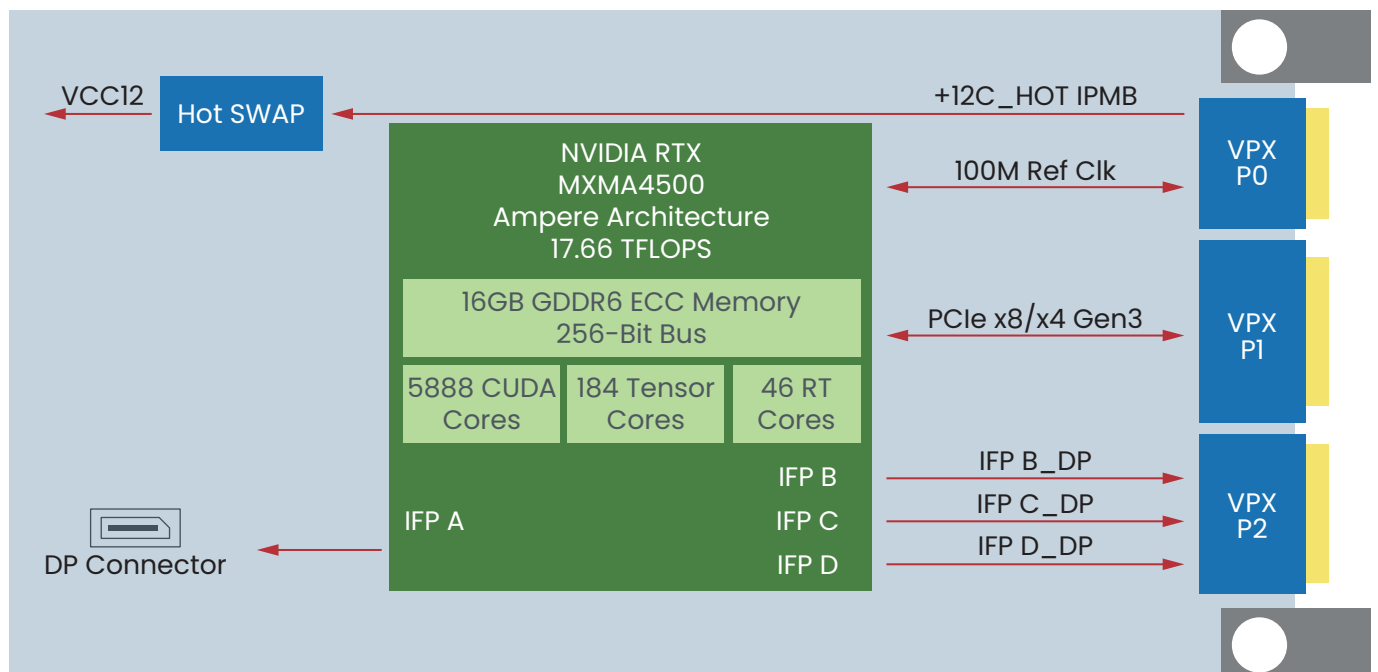
AI inferencing, deep learning

Display Outputs

- ◆ One Display Port internal
- ◆ Three Display Ports active output

Software & Platform Support

- ◆ Windows or Linux on X86



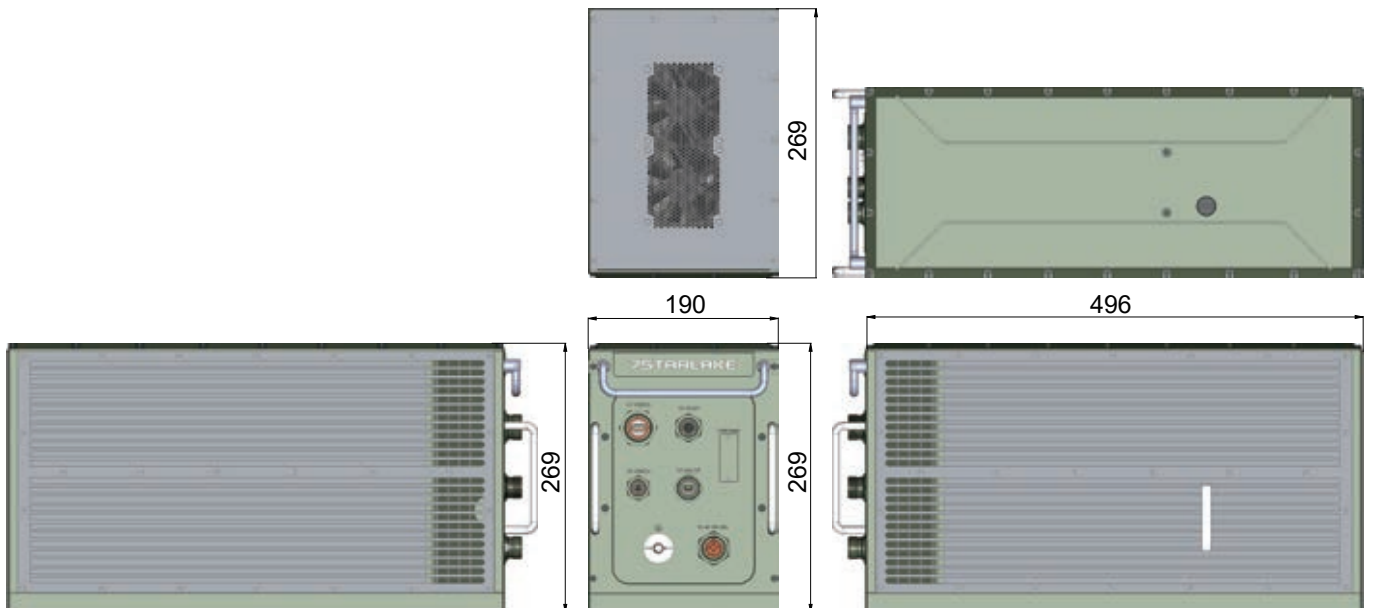


System SPEC



Memory	Up to 32 GB DDR4-2666 soldered with IB ECC		
CPU	Intel® i7-1185GRE processor (formerly Tiger Lake-U), Up to 4 cores (TDP 28W)		
GPU option 1	2x NVIDIA RTX A4500, 16GB GDDR6, 5888 CUDA		
GPU Option 2	2x NVIDIA Quadro 5000 Ada, 16GB GDDR6, 9728 CUDA		
BIOS	Dual 256Mbit SPI flash		
OS	Windows 10 64bit (180921H2), Linux (RHEL 8.6U 20.04.4)		
Application	Military Platforms Requiring Compliance MIL-STD-810G Embedded Computing and applications subject to Harsh Temperature, Shock, Vibration, Altitude, Dust and EMI Conditions.		
Storage	1x M.2 2242 on top side (M-key)		
Environment	Front I/O (D38999)	X1	1x USB3.0
Power Requirement	18V-36V DC-IN	X2	1x GLAN
Dimension	190 x 269 x 496mm	X3	1x USB2.0
Weight	30kg	X4	1x Mini-DP
Storage Temp	-40°C to 85°C	DC-IN	1x
Relative Humidity	5% to 95%, non-condensing	GND	1x
MIL-STD-810 Test	<ul style="list-style-type: none"> ▶ Method 501.5, Procedure I (Storage/High Temperature) ▶ Method 502.5, Procedure I (Storage/Low Temperature) ▶ Method 503.5, Procedure I (Temperature shock) ▶ Method 509.7 Salt Spray (50±5)g/L ▶ Method 501.5, Procedure II (Operation/High Temperature) ▶ Method 502.5, Procedure II (Operation/Low Temperature) ▶ Method 507.5, Procedure II (Temperature & Humidity) ▶ Method 500.5, Procedures I and II (Altitude, Operation) 12,192M, (40,000 ft) for the initial cabin altitude (18.8Kpa or 2.73 Psia) ▶ Method 500.5, Procedures III and IV (Altitude, Non-Operation): 15,240, (50,000 ft) for the initial cabin altitude (14.9Kpa or 2.16 Psia) 		


Appearance/ Dimension/ Drawing Diagram






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