

Real-Time C4ISR and Tactical Decision

TABLE OF CONTENTS

1_Introduction	04	
2_Overview of Military Rugged Edge Syste	ems	
2- 1_IV320	05	
2-2_AV710	06	
2-3_NV200 \ NV300	07	
3_Technical Specifications		
3-1_CPU		08
3-2_GPU		08
3-3_Video Input/ Output		09
3-4_Frame Grabber Card		09
4_High-Performance GPU Computing		10-11
5_Applications and Use Cases		12
6_Conclusion		13
7_Product Lists		13-15
8_COMe T6/T7		
8- 1_SFF COMe T7_SK517		16
8-2_SFF COMe T6_SK513/SK515P		16
9_Highlights		
9- 1_MIL-STD-810		17
9-2_MIL-STD-461/ 1275 Certified	17	
9-3_MIL-STD 461	18	
10_Product Specifications		
10- 1_IV320	19	
10-2_AV710	20-21	
10-3 NV200 \ NV300	_22-23	

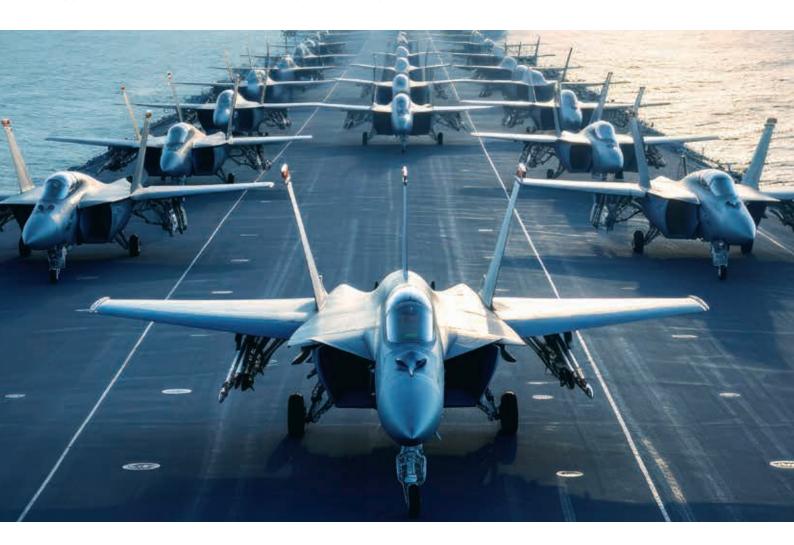


1_INTRODUCTION

Purpose

This white paper provides an in-depth analysis of the IV320 and AV710, NV200 and NV300 HPC systems, highlighting their advanced technical capabilities and performance across various demanding applications.

In response to the evolving landscape of Al-driven asymmetric warfare, military integrators are continuously seeking robust computational systems that offer superior multifaceted-computing capabilities and can endure harsh environmental conditions, such as shock, vibration, and extreme temperature variations. 7StarLake's IV320, AV710, NV200, and NV300 HPC systems combine Intel® and NVIDIA® Al accelerators within rugged MIL-STD-810/461-certified enclosures, purpose-built for C4ISR, autonomous control, and real-time battlefield data fusion. These systems provide unmatched computational density and reliability across land, air, and naval missions.



These systems cater to diverse applications requiring high computing power and ruggedness, ranging from ground surveillance and reconnaissance to mobile navigation and vehicle monitoring. The IV320, AV710, NV200 and NV300 are engineered to consolidate ISR (Intelligence, Surveillance, and Reconnaissance) platforms, heralding a new era of

edge Al computing.

This paper delves into the technological advancements and capabilities of the IV320, AV710, NV200 and NV300, demonstrating how they enhance situational awareness, optimize decision-making, and provide a strategic advantage on the battlefield.

04 **7STARLAKE**

2_OVERVIEW OF MILITARY RUGGED EDGE SYSTEMS



The IV320 is a high-performance, rugged HPC system designed for applications requiring robust computational power and real-time data processing in harsh environments.



Key Features

Intel® 13th Gen. Raptor Lake-H Processor

Core i7-13800HE/HRE, featuring 14 cores and 20 threads with clock speeds up to 5.0 GHz, ensuring exceptional computational throughput.

8xChannel 3G-SDI Frame Grabber

Enables low-latency video capture and processing, creating a 360-degree protection screen for comprehensive situational awareness.

NVIDIA® Quadro MXM RTX A4500

Equipped with 16GB GDDR6 and 5888 CUDA cores, This GPU Computer excels in Al inference, 3D rendering, and processing high-resolution visual data.

Full IP65 Sealed Enclosure

Provides protection against dust, water, and extreme weather conditions, ensuring reliable operation in harsh environments.

MIL-STD-810 Compliance

Ensures resistance to shock and vibration, suitable for deployment in military and industrial settings.

2_OVERVIEW OF MILITARY RUGGED EDGE SYSTEMS



NVIDIA® Jetson AGX Orin

Offers up to 275 TOPS of Al performance, making it ideal for Al and machine learning workloads, including autonomous systems, robotics, and smart city applications.

4CH 3G-SDI Frame Grabber

Supports capturing high-definition 1920x1080p video at 60/50fps from up to four 3G-SDI inputs, providing high-quality video streams for tactical decision-making.

MIL-STD-810 Compliance

Robust performance under thermal, shock, vibration, and humidity conditions, with IP65 classification for environmental protection.

Compact Design

Dimensions of 250 x 220 x 100mm, making it suitable for space-constrained installations.

Extended Temperature Range

Operates reliably in temperatures ranging from -20 to +55°C, ensuring functionality in extreme conditions.

2_OVERVIEW OF MILITARY RUGGED EDGE SYSTEMS



NVIDIA® Jetson AGX Orin

Up to 275 TOPS of AI performance, configurable power consumption 15W - 60W, designed for the demanding AI projects, like autonomous systems, robotics, and smart city applications.

Ultra Compact Design

Ultra-compact for edge AI deployment, SWaP-optimized for integration in highly space-constrained platforms

NVIDIA® Jetson Orin NX

Offering up to 100 TOPS of AI performance, configurable between 10W and 25W, Jetson Orin NX is a balanced option for power consumption and computing performance, targeting the market of drones, robotics and other embedded AI system.

Support GMSL2 Camera Input

The systems supports, to carry high-speed video, bidirectional control data, and power over a single coaxial cable.

Extended Temperature Range

Operates reliably in temperatures ranging from -20 to +55°C, ensuring functionality in extreme conditions.

CPU

IV320 CPU

The Intel® 13th Gen. Raptor Lake-H, Core i7-13800HE/HRE features 14 cores and 20 threads, with clock speeds reaching up to 5.0 GHz. This processor is supported by up to 96 GB of DDR5 memory, delivering exceptional computational performance for

Al targeting, scientific computations, and object detection tasks.







IV320 GPU

The NVIDIA Quadro RTX A4500, with 16GB GDDR6 VRAM and 5888 CUDA cores, excels in transforming high-resolution visual data into actionable insights, supporting applications such as EO/IR, thermal cameras

and 3D radar.



AV710 CPU

Utilizes the NVIDIA® Jetson AGX Orin, which integrates a 12-core Arm® Cortex®-A78AE v8.2 64-bit CPU with 3MB L2 and 6MB L3 cache, the system is tailored for real-time AI inference, sensor fusion, and

high-performance computing applications.



JETSON AGX Orin



The NVIDIA Jetson AGX Orin module provides robust AI processing capabilities with up to 275 TOPS. This high-performance module is optimized for complex AI tasks, including image recognition and object detection,

making it ideal for edge Al applications.



JETSON AGX Orin





3_TECHNICAL SPECIFICATIONS

Video Input/ Output

3G-SDI is a broadcast-grade digital video interface standard that supports video resolutions up to 1080p at 60 frames per second. It enables high-speed, uncompressed digital video transmission over coaxial cables, providing superior image quality and minimal latency. This technology is crucial in professional video environments where maintaining signal integrity and high resolution is paramount.



IV320

Equipped with an 8-channel 3G-SDI configuration, the IV320 is designed for demanding video applications that require simultaneous input from multiple video sources. This capability ensures comprehensive coverage and monitoring, essential for complex operations.

AV710

Featuring advanced video processing capabilities, the AV710 supports up to 4 channels 3G-SDI, making it ideal for environments where space and power efficiency are critical without compromising on video quality.

NV200 and NV300

Both models are equipped with 4-channel 3G-SDI configurations, providing robust and reliable video transmission for various applications. These systems are optimized for scenarios requiring multiple video feeds with high fidelity and low latency.





Frame Grabber Card

This component is vital for real-time data analysis and integration with central command systems for comprehensive ISR operations

Mini-PCIe Frame Grabber Card

《for HD-SDI & PAL in/out put》





M.2 M-Key 2280 Frame Grabber Card

《for 3G-SDI & PAL in/out put》



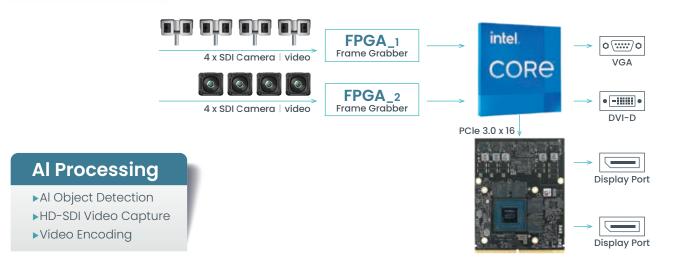
4_HIGH-PERFORMANCE GPU COMPUTING

GPU computing is essential for high-performance computing (HPC) applications, enabling accelerated data processing and complex computational tasks.



IV320 GPU Computing

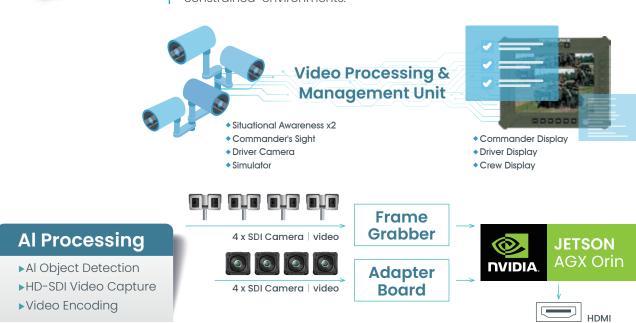
The NVIDIA Quadro RTX A4500 supports advanced GPU computing capabilities with libraries such as CUDA and OpenCL. This GPU excels in AI inferencing, scientific simulations, and rendering tasks, providing substantial performance improvements in HPC workloads.





AV710 GPU Computing

The NVIDIA Jetson AGX Orin module is optimized for AI and machine learning workloads, featuring powerful CUDA cores for neural network computations. This enables efficient execution of tasks like image recognition and object detection, making it ideal for edge AI applications in constrained environments.



4_HIGH-PERFORMANCE GPU COMPUTING



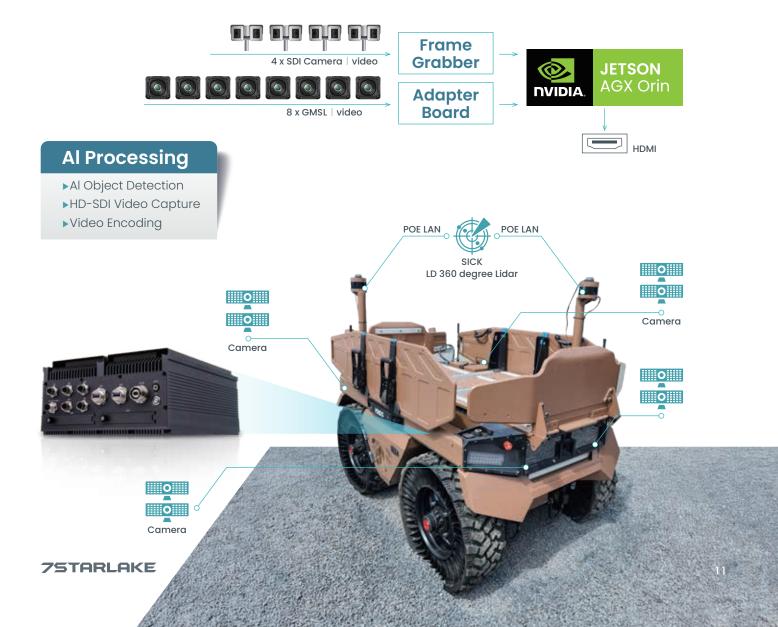
NV300 GPU Computing

The NVIDIA Jetson AGX Orin module offers top-tier performance for AI applications, featuring an Ampere GPU with 2048 CUDA and 64 Tensor cores, a 12-core ARM CPU, 32GB LPDDR5, and 64GB eMMC storage. It supports real-time AI inference, sensor fusion, and high-performance computing for demanding workloads.



NV200 GPU Computing

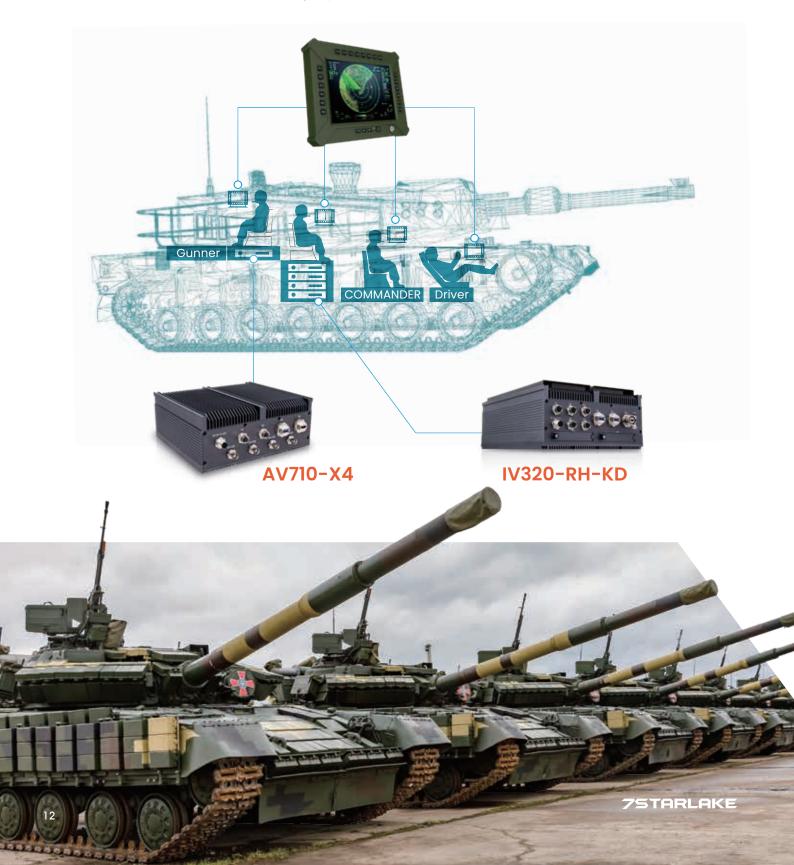
The NVIDIA Jetson Orin NX module is optimized for AI and machine learning workloads, featuring powerful CUDA cores for neural network computations. This enables efficient execution of tasks like image recognition and object detection, making it ideal for edge AI applications in constrained environments. It powers applications such as autonomous robots, smart cameras, drones, and IoT devices, providing advanced AI capabilities while maintaining energy efficiency and compact form factor.



5_APPLICATIONS AND USE CASES

Armored Vehicle Security

Implementing a 360-degree panoramic defensive bubble with the IV320's 8x 3G-SDI channels and GPGPU integration, these systems provide early detection and tracking of air and surface targets, enhancing vehicle protection and decision-making capabilities in combat scenarios.



6_CONCLUSION

Summary

The IV320, AV710, NV200 and NV300 HPC systems, powered by Intel and NVIDIA technologies, integrate advanced 3G-SDI and frame grabber capabilities to deliver high-performance computing solutions for defense and industrial applications. These systems enhance ISR capabilities, enable quick decision-making, and provide robust computational power in harsh environments.

7_PRODUCT LISTS_IV320



IV320 Series



IV320-RH-KD

- ▶ Intel ®13th Gen. Raptor Lake-H, Core i7-13800HRE/HE
- ► NVIDIA®Quadro RTX A4500(16GB GDDR6, 5,888 CUDA)
- ▶ 8 x Channel 3G-SDI Input Frame Grabber



IV320-RH

- ▶ Intel® 13th Gen. Raptor Lake-H, Core i7-13800HE/HRE
- ▶ NVIDIA® Quadro MXM RTX A4500 (16GB GDDR6, 5888 CUDA)

IV320-RS

- ▶ Intel ®14/13/12 Gen. Raptor Lake-R/S, Alder Lake-S, Core i9/i7
- NVIDIA® Quadro RTX A4500(16GB GDDR6, 5,888 CUDA)
- ▶ 4 x POE (2 x POE for 30W; 2 x POE for 60W)





7_PRODUCT LISTS_AV710

Future developments and enhancements for the AV710 will focus on increasing computational performance, expanding AI capabilities, and further ruggedizing these systems to meet evolving defense and industrial needs.

AV710 Series



AV710

- ► Intel® Core™ i7-6822EQ
- ► NVIDIA®1050Ti CUDA 768 GDDR5-4GB/Quadro® RTX3000 CUDA 1920 GDDR6-6GB



- Carmel Arm®, 32 TOPs
- ▶ 512-core NVIDIA Volta architecture GPU with 64 Tensor Cores
 - ▶ 1CH HD-SDI



AV710-X3

- ▶ Intel® Xeon® D-1577, 45W, Broadwell, Freq. 1.3/2.1GHz, 16C, 24M Cache
- ► NVIDIA® Quadro® RTX5000 CUDA 3072



AV710-X4

- ► AGX Orin 32GB with 8-core Arm® Cortex®, 200 TOPs
- ▶ 1792-core NVIDIA Ampere with 56 **Tensor Cores**
- ▶ 4CH 3G-SDI



AV710-VM-E

- ► Intel® Xeon® W-11865MRE, 8 Cores, 24M Cache, 2.6GHz (4.7GHz), 45W (RM590E)
- NVidia® RTX A2000, 4G/8G 2560 CUDA Cores, PCIe Gen3.0 x164
- ▶ 4 x 3G-SDI video channels and 8 x composite (PAL) channels.



7_PRODUCT LISTS_N200 & NV300

The NV200 and NV300 series

represent a robust and versatile range of video transmission solutions designed to meet the demanding requirements of various applications. These series are engineered to deliver high-performance, reliability, and advanced features for seamless integration into any professional video setup.

NV300 Series



NV300-2L32

- ► AGX Orin 32GB with 8-core Arm® Cortex®, 200 TOPs
- ▶ 1792-core NVIDIA Ampere with 56 Tensor Cores



NV300-2LS64

- AGX Orin 64GB with 12-core Arm®
 Cortex®, 275 TOPs
- ➤ 2048-core NVIDIA Ampere with 64 Tensor Cores
- ▶ 4CH 3G-SDI



NV300-2LGS64

- ► AGX Orin 64GB with 12-core Arm® Cortex®, 275 TOPs
- ➤ 2048-core NVIDIA Ampere with 64 Tensor Cores
- ▶ 4CH 3G-SDI
- ▶ 4CH GMSL

NV200 Series



NV200-2L16

- Orin NX 16GB with 8-core Arm®
 Cortex®, 100 TOPs
- ► 1024 NVIDIA® CUDA® cores with 32 Tensor cores



NV200-2LS16

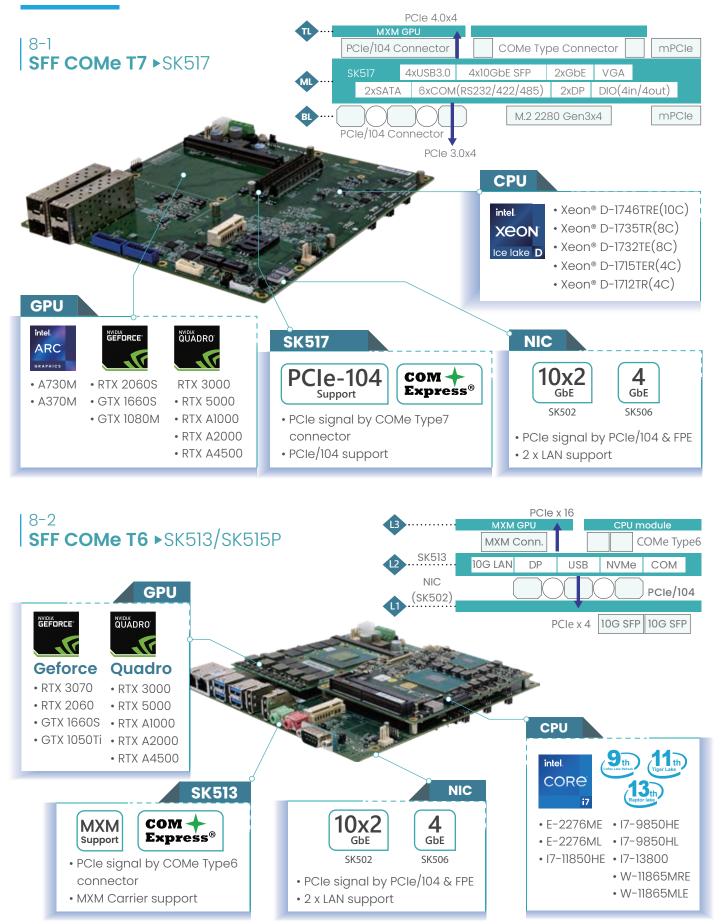
- Orin NX 16GB with 8-core Arm®
 Cortex®, 100 TOPs
- ► 1024 NVIDIA® CUDA® cores with 32 Tensor cores



NV200-2LGS16

- Orin NX 16GB with 8-core Arm®
 Cortex®, 100 TOPs
- ▶ 1024 NVIDIA® CUDA® cores with 32 Tensor cores
- ▶ 4CH 3G-SDI
- ▶ 4CH GMSL

8_COMe T6/T7



9_HIGHLIGHTS_MIL-STD-810

High Temperature

►MIL-STD-810G Test Method 501.5 high Temp (96 hours@75°C non-operating + 72 hours @ 75°C operating)





This testing method is broken down into two procedures.

- Procedure I (storage) exposes the system to high temperatures while it is turned off, and its purpose is to test the durability of the materials that make up the system. The chamber temperature is 75°C and the test duration is 96 hours.
- Procedure II (operation) is to test how the device puts up with heat while having it turned on and used.
- The chamber temperatures used in an operational cyclical test is 75°C, and the test duration is 72 hours. The temperature needs to cycle from one end to the other a minimum of three times while testing that the device functions at every point in the test.

Low Temperature

►MIL-STD-810G Test Method 502.5 Low Temp (96 hours@-40°C non-operating +72 hours@-40°C operating)





There are two parts in this test to determine whether the system can persevere in extremely cold environment.

- Procedure I (storage) exposes the system to low temperatures while it is turned off, and its purpose is to test the durability of the materials that make up the system. The chamber temperature is -40°C and the test duration is 96 hours.
- Procedure II (operation) testing involves slowly cooling the device to the low temperature and leaving it at that temperature for at least two hours, checking to see that it is still functioning during that time. The chamber temperature is -40°C and the test duration is 72 hours.

9_HIGHLIGHTS_MIL-STD-461/ 1275 Certified

Electronic Warfare (EW) has become more and more common in battlefield, and maintaining Electromagnetic Spectrum Superiority is one of the key goals. AV600/SR700 Series is certified with MIL-STD-461/1275, which ensure to withstand Voltage Spikes, control electromagnetic interference (EMI) emissions and maintain electromagnetic compatibility (EMC).



Ensures function properly within electromagnetic (EM) environments and avoid releasing EM energy cause EM interference (EMI) with nearby devices.

CE 102 ►► 10 kHz-30 MHz

Conducted Emissions, Radio Frequency Potentials & Power Leads, basic curve RE 102 ►►30 MHz-5 GHz Radiated Emissions, Electric Field RE 103 ►> 80 MHz-3 GHz Radiated susceptibility, Electric Field

when powered from a 28V supply, ensuring that electronics survive in the field when faced with input voltage spikes and surges.

Surge High 100V / 500ms

Surge Low | 18V / 500ms

Steady State | 18V~33V



7STARLAKE

17

9_HIGHLIGHTS_MIL-STD 461

	MIL-STD 461 (Ground Vehicle)	MIL-STD 461/ (Aircraft)			
CE102	CE102 basic curve, 10kHz - 30 N	MHz			
	N/A	RE102-4, (10 KHz)-2.0 MHz			
RE102-4	RE102-4, (1.5 MHz) -30.0 MHz	RE102-4, (1.5 MHz)-30.0 MHz			
REIU2-4	RE102-4, (30.0 MHz) - 5.0 GHz	RE102-4, (30.0 MHz)-5.0 GHz			
	N/A	RE102-4, (5 (9Hz)-18 GHz		
	RS103, (200 MHz) - 3 GHz,				
RS103	RS103, (1.5 MHz) - 200 MHz, 50 \	//m equal for	all frequencies		
	RS 103,(3.0 GHZ) - 5.0 GHz 50V/	m equal for c	Il frequencies		
	EN 61000-4-2: Air discharge: 8	kV,Contact di	scharge: 6kV		
ENG1000	EN 61000-4-3: 10V/m				
EN61000	EN 61000-4-4: Signal and DC-I	Net: 1 kV			
	EN 61000-4-5: Leads vs. groun	d potential 1k\	/, Signal und DC-Net: 0.5		
EN55022	EN 55022, Class A				
	CS101 (30HZ~150KHZ)				
22	CS114 (10kHz~200MHz)				
CS	CS11550v/m				
	CS116 50v/m				
		Steady Stat	e - 20V~33V,		
		Surge Low -	Surge Low - 18V/500ms,		
		Surge High	- 100V/500ms		
		Emitted Spikes			
MIL-STD-1275	N/A	Injected Voltage Surges			
WIIL-31D-12/5		Emitted Voltage Surges			
		Voltage Ripple (2V)			
		Voltage Spikes			
		Starting Operation			
		Reverse Pol	arity		
	N/A		Load Measurements (LDC101)		
			Steady State Limits for Voltage(LDC102)		
			Voltage Distortion Spectrum (LDC103)		
			Total Ripple (LDC104)		
			Normal Voltage Transients (LDC105)		
N. OTD 704			Power Interrupt (LDC201)		
MIL-STD-704		N/A	Abnormal Steady State Limits forVoltage (LDC301)		
			Abnormal Voltage Transients (LDC302)		
			Emergency Steady State Limits for Voltage (LDC401)		
			Starting Voltage Transients (LDC501)		
			Power Failure (LDC601)		
			Phase Reversal (LDC602)		









	IV320-RH-KD	IV320-RS	IV320-RH
Architecture	COM Express	Single Board	COM Express
Cooling	Conduction Cooling With External Turbo Fan	Conduction Cooling With External Turbo Fan	Conduction Cooling With External Turbo Fan
CPU	i7-13800HRE	i9-14900T	i7-13800HRE
GPU	MXM A4500	MXM A4500	MXM A4500
RAM	Up to 64GB	Up to 128GB	Up to 64GB
Capture Card	2 x 3G-SDI	N/A	N/A
Storage(Internal)	1 x M.2 NVMe	1 x M.2 NVMe	1 x M.2 SATA
AES (H/W) Key	N/A	N/A	N/A
Swappable CMOS	N/A	N/A	N/A
POWER	12V~36V DC-IN	12V DC-IN	12V DC-IN
Graphic Output	MiniDP	VGA	VGA
Dimensions	250 x 325 x 138 mm	250 x 325 x 100 mm	250 x 325 x 100 mm
MIL-STD-461	N/A	N/A	N/A
MIL-STD-810	compliance	compliance	compliance
CE	compliance	compliance	compliance

7STARLAKE

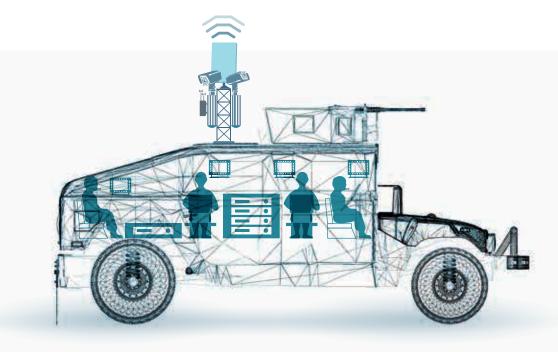
AV710 Series







	AV710	AV710-X2
Architecture	EBX	Jetson
Cooling	Conduction Cooling	Conduction Cooling
CPU	i7-6822EQ	ARM® v8.2 64-Bit
GPU	MXM GTX1050Ti	AGX Xavier
RAM	Up to 32GB	Up to 32GB
Capture Card	N/A	Option
Storage(Internal)	1 x mSATA	1 x M.2 NVMe
AES (H/W) Key	N/A	N/A
Swappable CMOS	N/A	N/A
POWER	9V~36V DC-IN	18V~36V DC-IN
Graphic Output	DVI	DVI
Dimension	280 x 320 x 122 mm	230 x 280 x 83 mm
MIL-STD-461	compliance	compliance
MIL-STD-810	compliance	compliance
CE	compliance	compliance









AV710-X3	AV710-X4	AV710-VM-E
COM Express	Jetson	COM Express
Conduction Cooling With External Turbo Fan	Conduction Cooling	Conduction Cooling
D-1577	Cortex®-A78AE	W-11865MRE
MXM RTX5000	AGX Orin	MXM A2000
Up to 32GB	Up to 64GB	Up to 96GB
N/A	1 x 3G-SDI	4 x 3G-SDI
1 x M.2 NVMe	1 x M.2 NVMe	1 x M.2 SATA
N/A	N/A	N/A
N/A	N/A	N/A
9V~36V DC-IN	12V~36V DC-IN	9V~36V DC-IN
DVI	HDMI	MiniDP
280 x 230 x 122 mm	250 x 220 x 100 mm	250 x 350 x 100 mm
compliance	N/A	N/A
compliance	compliance	compliance
compliance	compliance	compliance

7STARLAKE

NV200 & NV300 Series





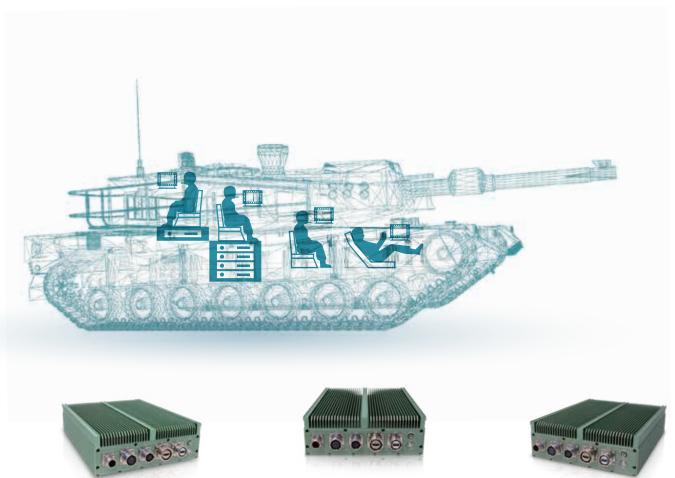






	NV200-2L16	NV200-2LS16	NV200-2LGS16
Architecture	Jetson	Jetson	Jetson
Cooling	Conduction Cooling	Conduction Cooling	Conduction Cooling
CPU	Arm Cortex-A78AE CPU	Arm Cortex-A78AE CPU	Arm Cortex-A78AE CPU
GPU	Orin NX	Orin NX	Orin NX
RAM	16GB	16GB	16GB
Capture Card	No	4x 3G-SDI	4x 3G-SDI + 4x GMSL
Storage(Internal)	2x M.2 NVMe	1x M.2 NVMe	lx M.2 NVMe
AES (H/W) Key	NA	NA	NA
Swappable CMOS	NA	NA	NA
POWER	18V~36V	18V~36V	18V~36V
Graphic Output	HDMI	HDMI	HDMI
Dimension	220 x 300 x 88mm	220 x 300 x 88mm	220 x 300 x 88mm
MIL-STD-461	compliance	compliance	compliance
MIL-STD-810	compliance	compliance	compliance
CE	compliance	compliance	compliance

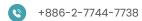
22 **7STARLAKE**

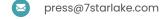


NV300-2L32	NV300-2LS64	NV300-2LGS64
Jetson	Jetson	Jetson
Conduction Cooling	Conduction Cooling	Conduction Cooling
Arm Cortex-A78AE CPU	Arm Cortex-A78AE CPU	Arm Cortex-A78AE CPU
AGX Orin	AGX Orin	AGX Orin
32GB	64GB	64GB
No	4x 3G-SDI	4x 3G-SDI + 4x GMSL
2x M.2 NVMe+ 64GB eMMC 5.1 Flash	1x M.2 NVMe+ 64GB eMMC 5.1 Flash	1x M.2 NVMe+ 64GB eMMC 5.1 Flash
NA	NA	NA
NA	NA	NA
18V~36V	18V~36V	18V~36V
HDMI	HDMI	HDMI
250 x 325 x 84 mm	250 x 325 x 84 mm	250 x 325 x 84 mm
compliance	compliance	compliance
compliance	compliance	compliance
compliance	compliance	compliance



7Starlake Co., Ltd.





2F., No.190, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 23146, Taiwan (R.O.C.)

