



# SFF GPU Computer

## THOR200/AV600/SR700 Series

### Solution Guide



**7STARLAKE**

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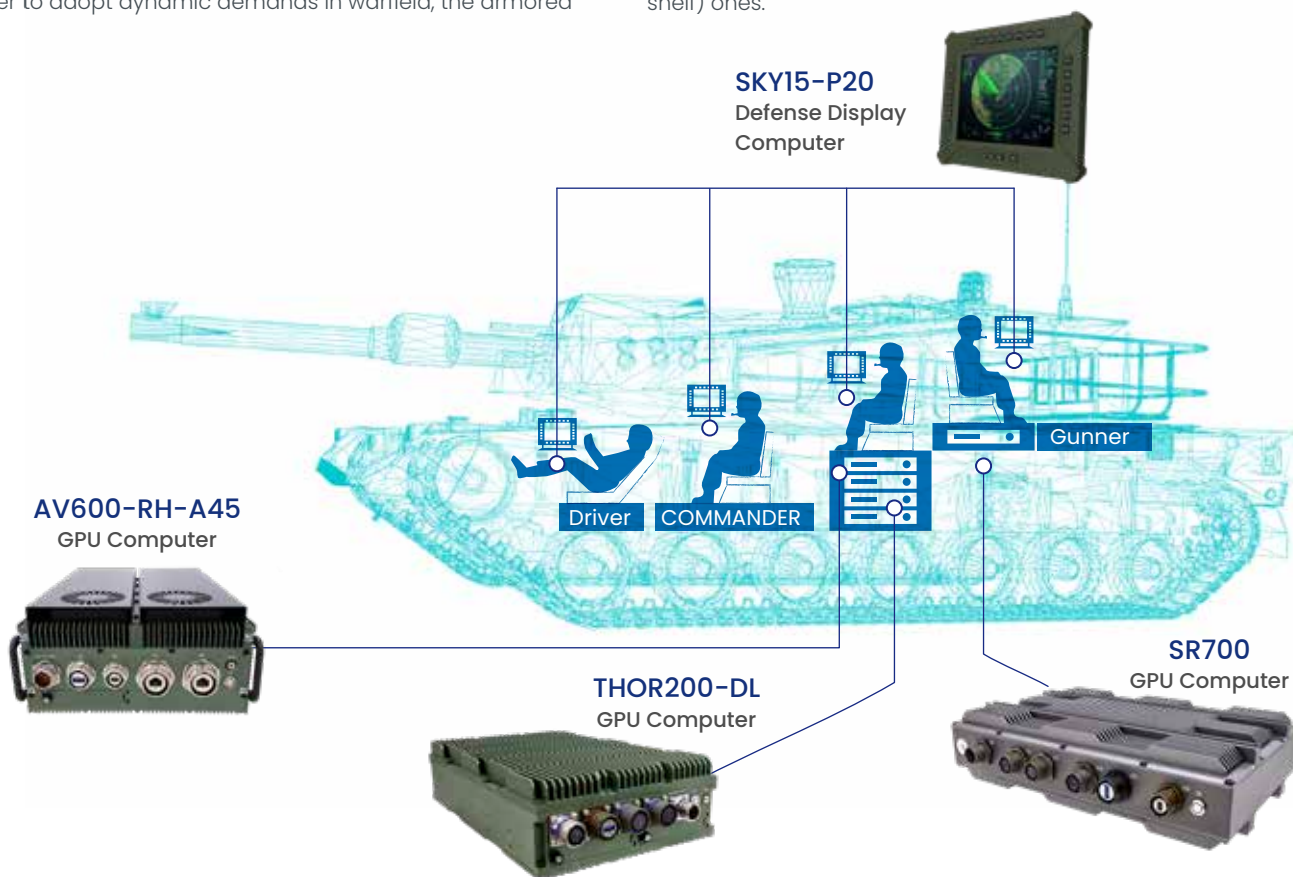
# HIGHLIGHTS

## COTs and MOTs

Technology not just changes our daily lives, it has fundamentally shifted the pattern of future battlefield as well. As our world is entering Six-generation Warfare, every piece of information is as important as a single bullet. In order to deploy tactical and precise allocation of manpower and resources, establishing an intelligent and integrated C5ISR (military command, control, communications, computing, cyber, intelligence, surveillance, and reconnaissance) system has become the main priority for every commander.

In order to adopt dynamic demands in warfield, the armored

vehicle was specifically designed to be integrated with a variety of LiDAR, weapon systems and communications platforms so it can perform a range of mission-specific tasks with modern IT backbone, which could morph COTs(Commercial-off-the-Shelf) products into MOTs(modified off-the-shelf or military off-the-shelf) ones.



MOTs which offer rapidly customized modular military grade computers majority focus on system development combined with "SFF"(Small Form Factors) architecture including COMe, PCIe/ 104, VPX in the global industry trend, enhance a wide variety of applications that require SWaP-optimized systems with edge compute capabilities.

Under the architecture of COMe Type 6,Type 7 and PCIe/ 104, 7StarLake develop two major series "AV600" and "SR700" to

certified to the most complex military standards and requirements such as MIL-STD 810/ 461, also can expose to critical environment , extreme shock, vibration, temperatures, and humidity while effectively resisting water, dust, dirt, and debris.

# HIGHLIGHTS

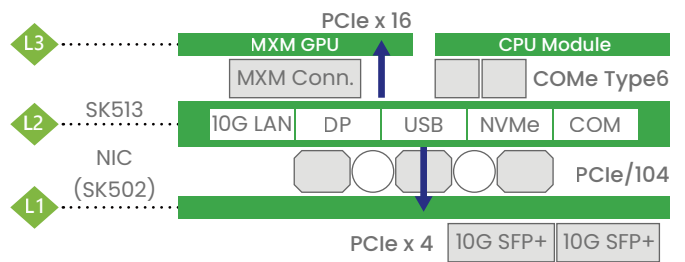
## Small Form Factor (SFF)

Much Lower SWaP-C (Size, Weight, Power and Cost) has always been a critical standard in defense industries. In order to minimize SWaP-C, The series is designed to be SFF (small form factor) embedded computing system. SFF enables The series to maximize onboard functional density and maintain high-end performance with minimized motherboard, which takes less physical space, lighter weight. More importantly, with fanless design, the series generates far less power consumption and less heat, which dramatically increases the durability and reliability and expand the lifespan of the series.

## Open Scalable Modular Architecture (COMe + MXM)

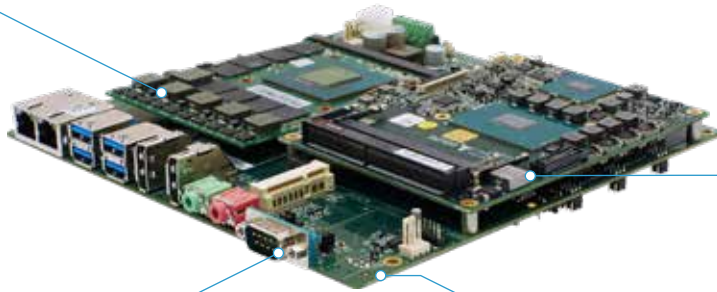
Flexibility and interchangeability are the crux of managing the rapid-changing situation in battlefield. In order to cope with diverse I/O requirements, expansion function and potential replacement demand from battlefield, AV600/SR700 Series is specially built under Open Scalable Modular Architecture. The two main roles in Open Scalable Modular Architecture are Computer-On-Module (COM) and PCIe/104.

## SFF COMe T6/T7



### GPU

NVIDIA GEFORCE	NVIDIA QUADRO
<b>Geforce</b> <ul style="list-style-type: none"> <li>• RTX2060S</li> <li>• RTX3070</li> <li>• RTX3080</li> <li>• RTX3090</li> </ul>	<b>Quadro</b> <ul style="list-style-type: none"> <li>• A1000</li> <li>• A2000</li> <li>• A4500</li> <li>• A5000</li> </ul>



### SK513, SK515, SK517

<b>MXM Support</b>	<b>COM Express®</b>
<ul style="list-style-type: none"> <li>• PCIe signal by COMe Type6 connector</li> <li>• MXM Carrier support</li> </ul>	

### NIC

<b>4x1 GbE</b>	<b>4x10 GbE</b>	<b>2x25 GbE</b>
<ul style="list-style-type: none"> <li>• PCIe signal by PCIe/104 &amp; FPE</li> </ul>		

### CPU

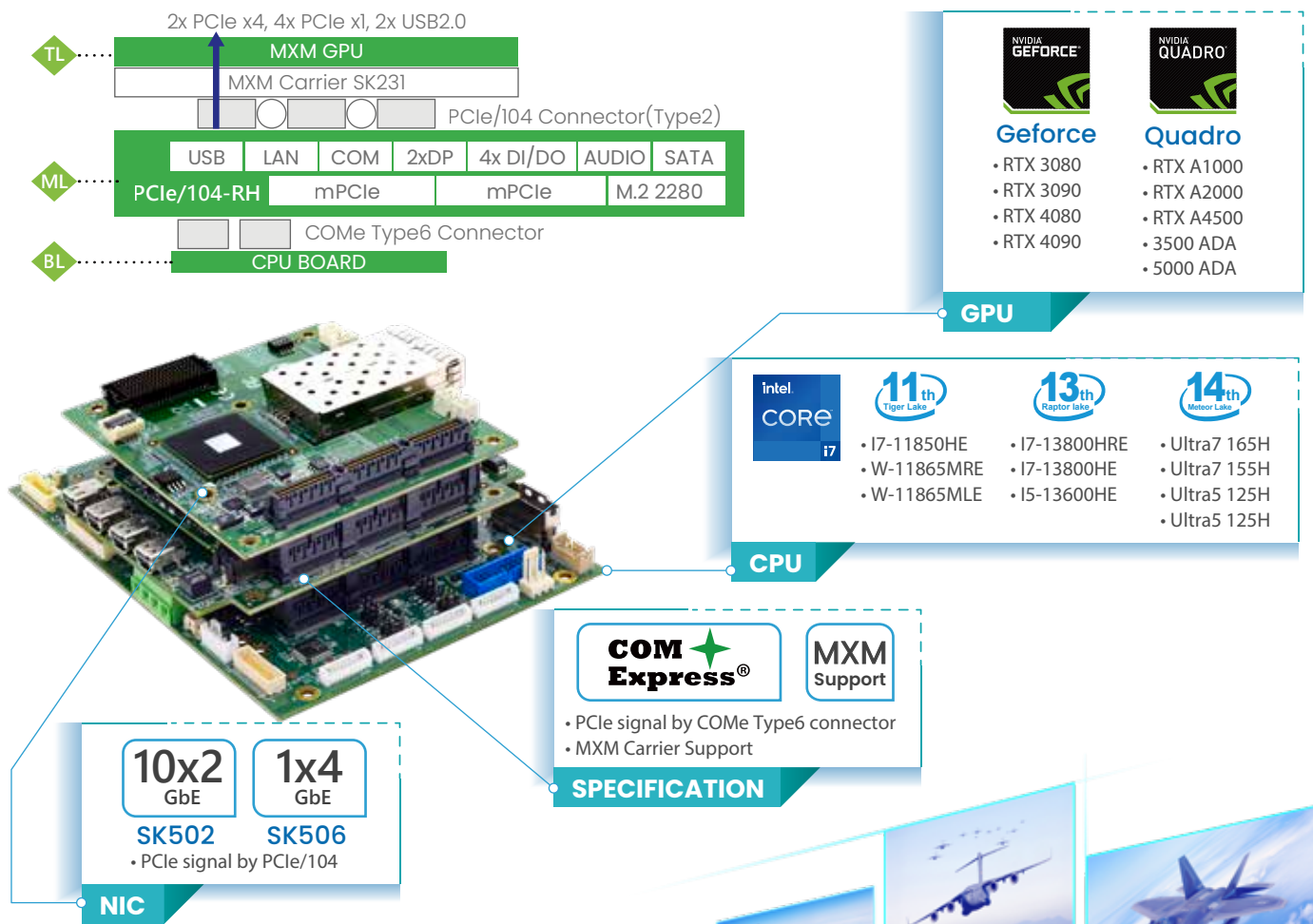
intel CORE i7		
<b>9<sup>th</sup></b> <small>Core i7</small>	<b>11<sup>th</sup></b> <small>Tiger Lake</small>	<b>13<sup>th</sup></b> <small>Raptor lake</small>
E-2276ME E-2276ML i7-9850HE	i7-11850HE W-11865MRE W-11865MLE	i7-13800HE i5-13600HE i3-13300HE

# PCIe/104

The PCIe/104 which builds a standard to use high speed PCI Express bus in stackable, modular embedded applications can adopt full PC market needs, performance, scalability, and growing silicon availability worldwide and provides a high-performance physical interface while retaining software compatibility with existing PCI infrastructure.

Integrating the PCI Express bus within the industry proven PC/104 architecture brings many advantages for embedded applications including fast data transfer, low cost due to PCIe/104's unique self-stacking bus, high reliability due to PCIe/104's inherent ruggedness, and long term sustainability.

## SFF PCI/e 104 RH



# SFF Mission Computer

## MIL-STD-810 Certified

In battlefield, it is critical that whether systems can withstand every possible harsh environment. AV600/SR700 Series is certified with MIL-STD-810, which allow it to operate smoothly when exposed to wide temperature (-20~+55°C), high humidity, vibration and shock.

## 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).

### MIL-STD-461



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

### MIL-STD-1275



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



# SFF MISSION COMPUTER

## MAIN FEATURES

### Security

Security is one of the most crucial functions for defense system. First, with build-in Intel® Secure Guard Extensions (SGX), Coffee Lake (H) Xeon® E processor is the solution for data protection. SGX offers hardware-based memory encryption and allows user-level code to allocate private regions of memory, which are designed to be protected from processes running at higher privilege levels, and achieve granular level of control and protection.

Second, Intel® vPro™ platform can delivers

hardware-enhanced security features, identity protection technologies, and remote manageability. With build-in Intel® Hardware Shield and ECC memory, the comprehensive and multilayer security can help protect all the sensitive data and prevent any potential crashes.

Last, Integrated with Intel® Active Management Technology and Intel® Endpoint Management Assistant (Intel® EMA), Intel® vPro™ platform can increase the efficiency and accuracy during remotely controlling operation.

### Rich I/O & Connectivity

One of the cutting-edge functions of AV600Ch is supporting diverse I/O and maintaining real-time connectivity. By using Open Scalable Modular Architecture, AV600CH is able to support 1x DVI/VGA/DP (by request), 2 x COM, 1x USB2.0, 2xUSB3.0, 4 x Giga LAN, 1 x DC-in, 2 x Mini PCIe Full size (USB / PCIe and 1 x micro SIM Card) for diversified I/O requirement.

More importantly, the series is designed with 1x M.2 M-Key 2280 slot (SATA/PCIe 3.0 x 4 NVMe) and 1 x PCIe/104, 1 x FPE, which expand multi-threaded workload ability and provide ultra-fast I/O bandwidth.

The series contains two three boards, one is COMe Type 6, 7 carrier board integrated with Intel Coffee Lake(H), Xeon®E, Ice Lake, Xeon®D, Tiger Lake, Xeon® W, Raptor Lake Processor, Raptor Lake processor, CM246 chipset, 4 x SO-DIMM DDR4 2400MHz (up to 128GB). Another is custom-designed board that supports rich I/O (including VGA, COM, USB3.0, Giga LAN, DC-in). Last one is stackable NVIDIA RTX™ RTX™ A1000, A2000, A4500 embedded graphics (Standard MXM 3.1 Type A). With the help of PCIe/104, the series is able to stretch its capabilities of achieving high-end computing performance and graphics-intensive analysis under constrained space.

### SWaP-C

Under Open Scalable Modular Architecture, the combination of SFF and COMe helps the series to integrate all the essential and custom-designed functions on smaller system while achieve industry-grade performance at the same time, which embodies the concept of "Smaller is better". Besides,

when it comes to upgrading or replacing one of the elements, the replaceable COMe modules will save groundbreaking cost and time, which is the impeccable solution for achieving lower SWaP-C.

# AV600 MAIN FEATURES



## Swappable CMOS Battery

Generally, to exchange the battery from a rugged solution is complicated and has the possibility to affect the original function of water and dust resistance. AV600-ser(by request) has an easy swappable battery tray allowing users to directly replace. A coin-cell battery can be seen when pulling the tray fully out of the computer; users just need to change with CR2032 battery and push the tray back and lock screw, then the replacement is completed.



## Anti-Drop SSD Tray

The removable SSD (Solid-state Disk) provides a compact self-contained system to store and retrieve data from ruggedized and removable 2.5" Flash Disks and have been qualified to meet the most demanding MIL-STD-810 environments. The removable SSD Disk System is the perfect DTU for military, aerospace, avionics and ground vehicle systems. These systems include flight management, cockpit instrument display, terrain awareness and warning, map systems, radar systems, cockpit/ground communications, navigation positioning, and satellite communications.



## AES Key Hardware Secure Erase

Under emergency situation, when written data is required to be erased immediately, a Secure Erase Button is extremely indispensable. Instant Erase is a particular feature for SED ( Self Encryption Drive ) drive. It's faster than Quick Erase to make all written data invalid. The encryption and decryption is controlled by an AES key on the path; once the AES key is replaced by a new one, the data becomes unrecognizable.

## 4 Channel Capture Card

AV600 series supports 4-channel simultaneous capture and broadcast. Professional video processing function, high-quality military-grade chip production, stable and reliable for streaming.



Digital HD-SDI video input



Analogic PAL video input



Analogic PAL video output



# SR700 MAIN FEATURES

SR700 Series is built extremely rugged and robust to withstand extreme environment including touch shock and constant vibration. Vibration-proof SR 700 series is capable of resisting vibrations of up to 10 Grms, 20-2000 Hz, 30 mins/ axis in vibration, and up to 75Gs, half sine, 11ms in shock.

## Resistance to 10Grms Vibration

TEST SPECIFICATION : (1)Random vibration test (Operating)

Frequency : 20 Hz. to 2000 Hz

Acceleration : 10 g rms

P.S.D. : 0.0675566 g/Hz(20Hz)

0.0675566 g/Hz(1000Hz)

0.0168891 g/Hz (2000 Hz)

Test Axis : X, Y axis

Test Time : 30 mins (Each axis)

Total Test Time : 60 mins

## Resistance to 75G Shock

TEST SPECIFICATION : Shock test (Non-Operating)

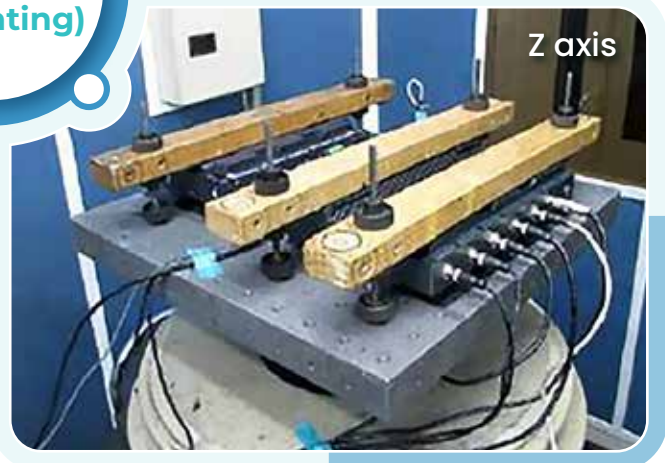
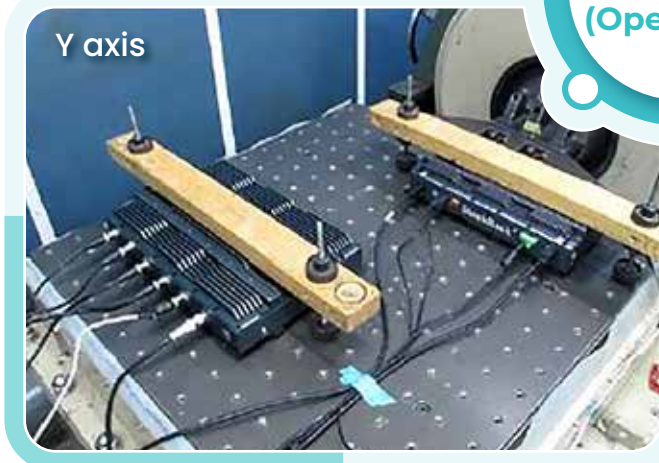
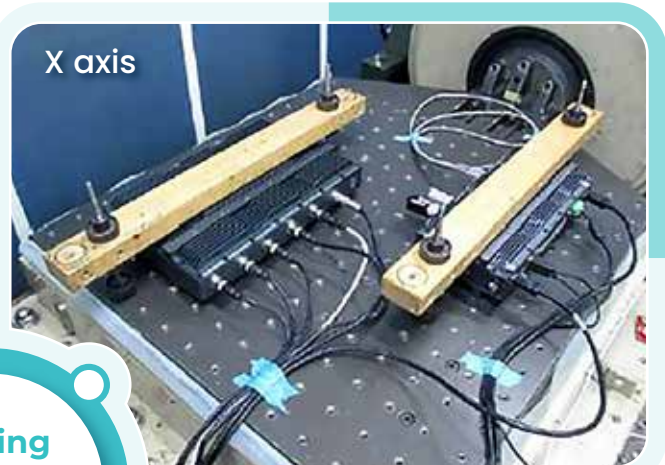
Wave Form : Sawtooth wave

Acceleration : 75g

Duration Time : 6 mS

No. of Shock : 3 times (Each axis)

Shock Direction : ±X, ±Y, ±Z axis



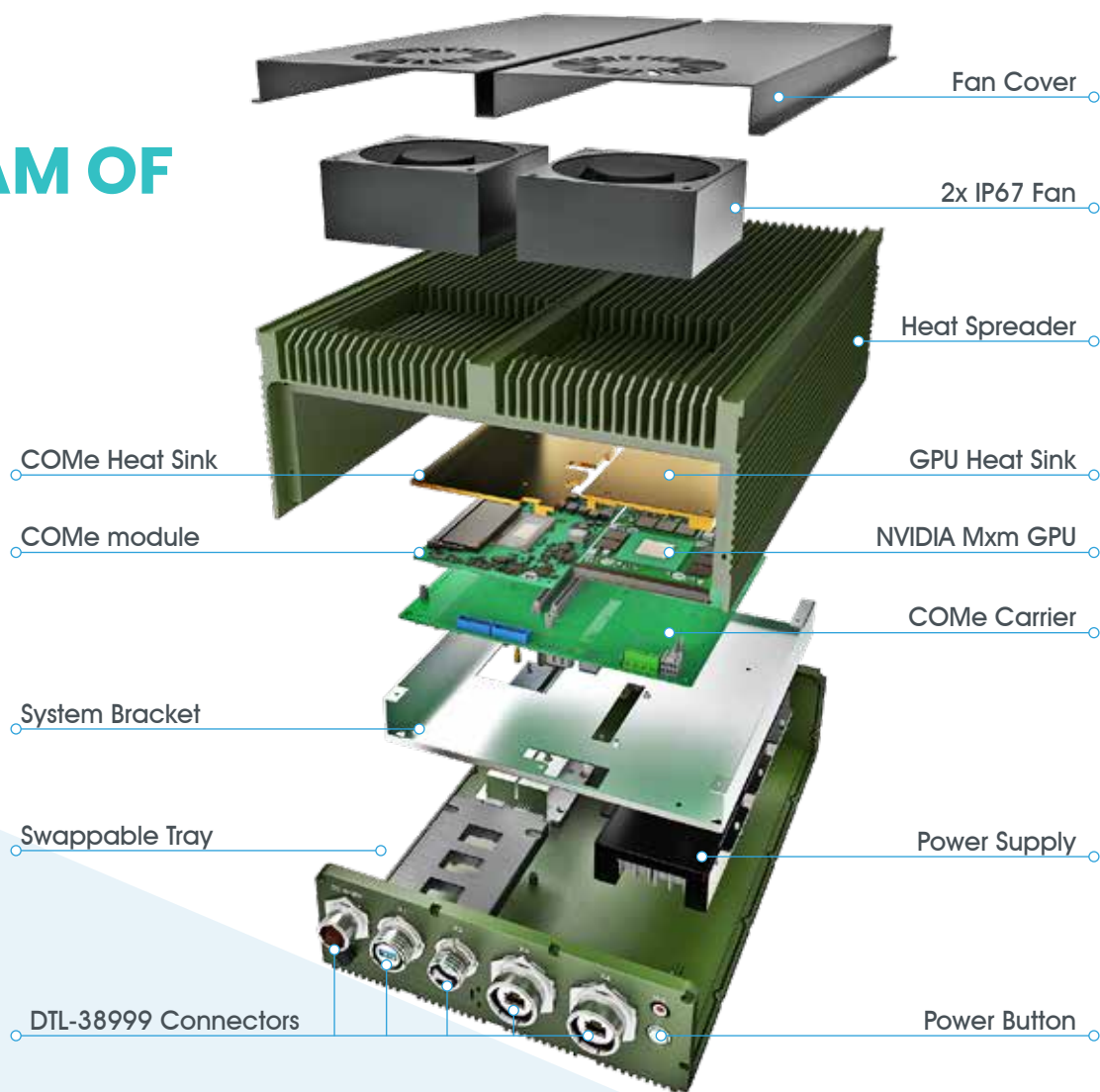
Testing  
Photos  
(Operating)

# SYSTEM SPECIFICATIONS FOR AV600 SERIES



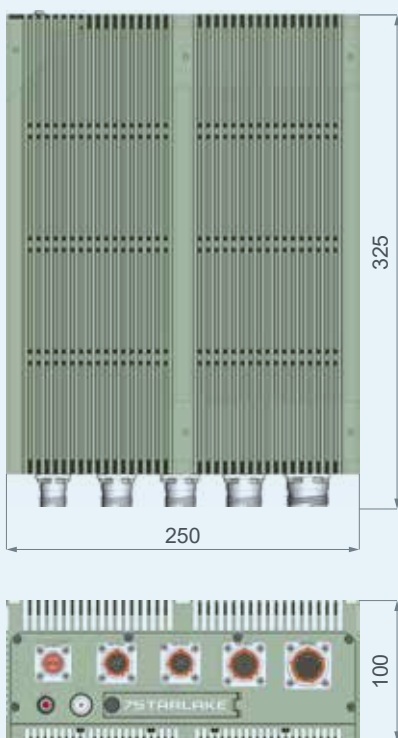
Model	AV600-TH-A10H	AV600-RH-A45	AV600-CU-A20
Architecture	COMe T6	COMe T6	COMe T6
Cooling	Conduction Cooling	Conduction Cooling	Conduction Cooling with IP67 Cooling Kit
CPU	Xeon W-11865MLE	i7-13800HRE	i7-13800HRE
GPU	MXM A1000	MXM A4500	MXM A2000
RAM	Up to 96GB	Up to 96GB	Up to 96GB
3G-SDI	N/A	N/A	4 Channel
Storage	1x 2.5" SATA 1x M.2 NVMe	1x 2.5" SATA 1x M.2 NVMe	1x 2.5" SATA 1x M.2 NVMe
AES	Optional	Optional	Optional
CMOS	Optional	Optional	Optional
POWER	18V-36V DC-IN	18V-36V DC-IN	18V-36V DC-IN
Graphic Output	VGA	mDP	VGA
Dimensions	250 x 325 x 100 mm	250 x 350 x 100 mm	250 x 325 x 100 mm
MIL-STD-461	Compliance	Certified	Compliance
MIL-STD-810	Compliance	Certified	Compliance

# DIAGRAM OF AV600

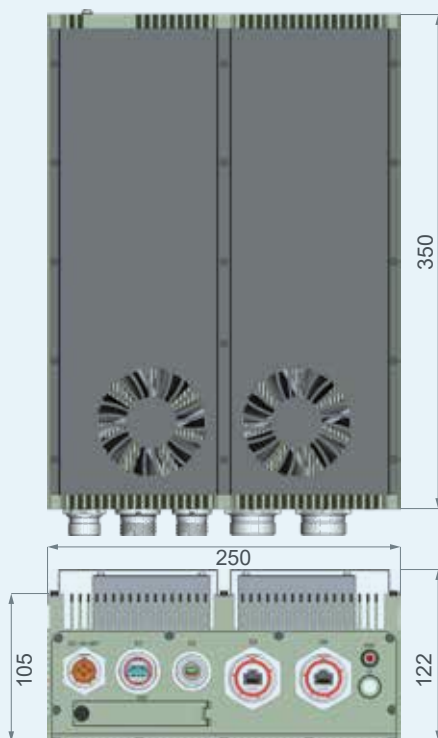


## ► Dimensions

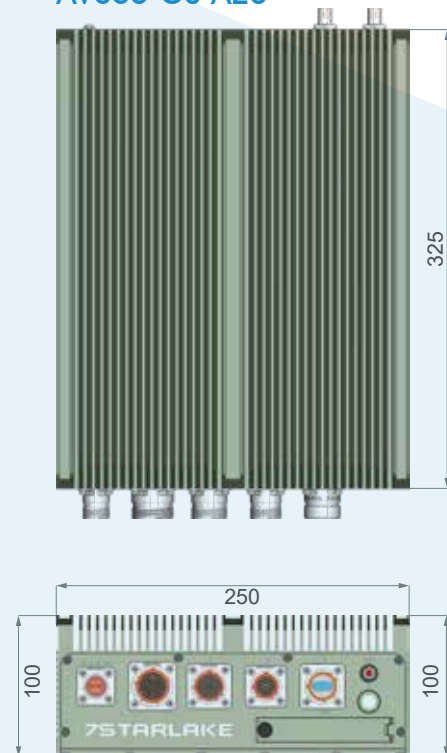
AV600-TH-A10H



AV600-RH-A45



AV600-CU-A20



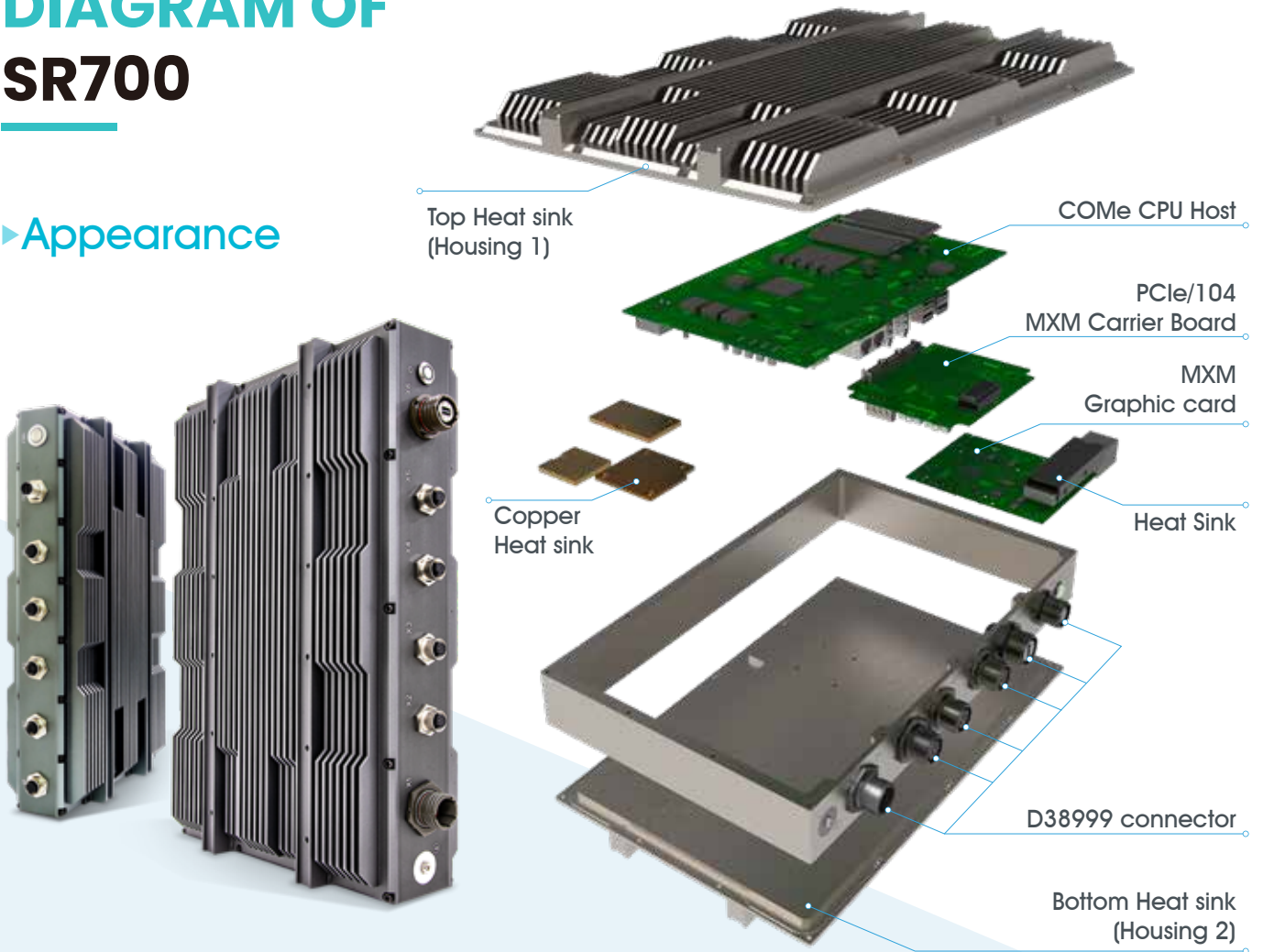
# SYSTEM SPECIFICATIONS FOR SR700 SERIES



Model	SR700-X14M	SR700-X14	SR700-X14D
Architecture	PCIe/104	PCIe/104	PCIe/104
Cooling	Conduction Cooling	Conduction Cooling	Conduction Cooling
CPU	Ultra 7 165H	Ultra 7 165H	Ultra 7 165H
GPU	MXM A2000	MXM A2000	MXM A2000
RAM	Up to 96GB	Up to 96GB	Up to 96GB
Connectors	M12	M12+D38999	D38999
Storage	1 x M.2 NVMe	1 x M.2 NVMe	1 x M.2 NVMe
SG-SDI	Optional	Optional	Optional
CMOS	Optional	Optional	Optional
Power	9V~36V DC-IN	9V~36V DC-IN	9V~36V DC-IN
Graphic Output	VGA (M12)	mDP	mDP
Dimensions	360 x 230 x 86 mm	360 x 230 x 86 mm	360 x 230 x 86 mm
MIL-STD-461	N/A	N/A	Optional
MIL-STD-810	Compliance	Compliance	Compliance

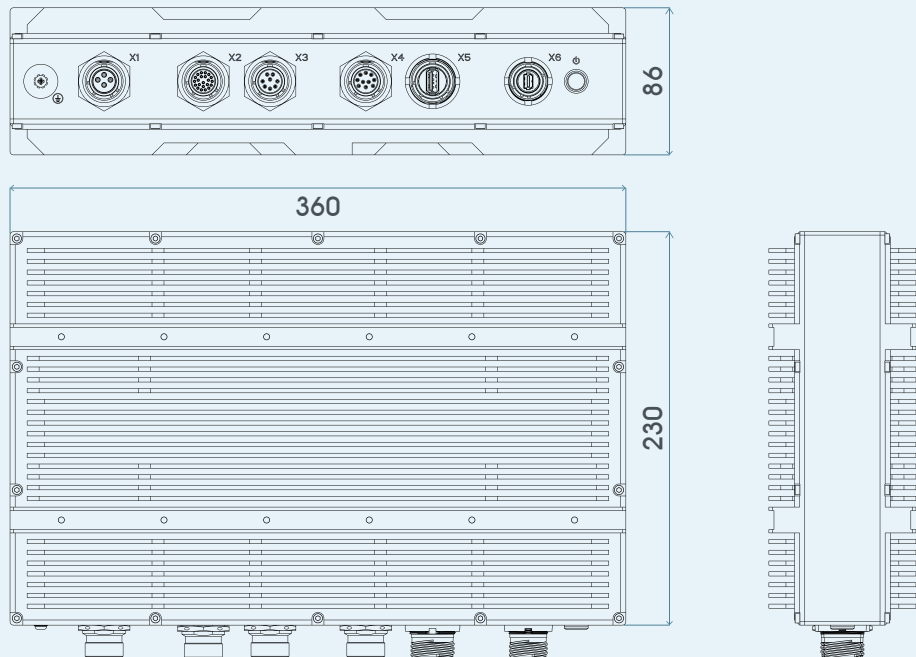
# DIAGRAM OF SR700

## ► Appearance



## ► Dimensions

SR700-X4D



# SYSTEM SPECIFICATIONS FOR THOR200 SERIES



Model	THOR200-RH-i7A20	THOR200-DL	THOR200-U8-D
Architecture	COMe T6	COMe T7	SBC
Cooling	Conduction Cooling	Conduction Cooling	Conduction Cooling
CPU	i7-13800HRE	Xeon D-1732TE	Xeon D-2733NT
GPU	MXM A2000	MXM A2000	N/A
RAM	Up to 64GB	Up to 64GB	Up to 256GB
Connector	D38999	D38999	D38999
Storage	1 x 2.5" SATA	2 x 2.5" SATA	8 x U.2 NVMe
3G-SDI	4 Channel	Options	N/A
CMOS	Options	Options	Options
Power	18V~36V DC-IN	18V~36V DC-IN	18V~36V DC-IN
Graphic Output	VGA	VGA	VGA
Dimensions	220 x 350 x 88 mm	220 x 350 x 88 mm	220 x 400 x 111 mm
MIL-STD-461	Compliance	Compliance	Compliance
MIL-STD-810	Compliance	Compliance	Compliance



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