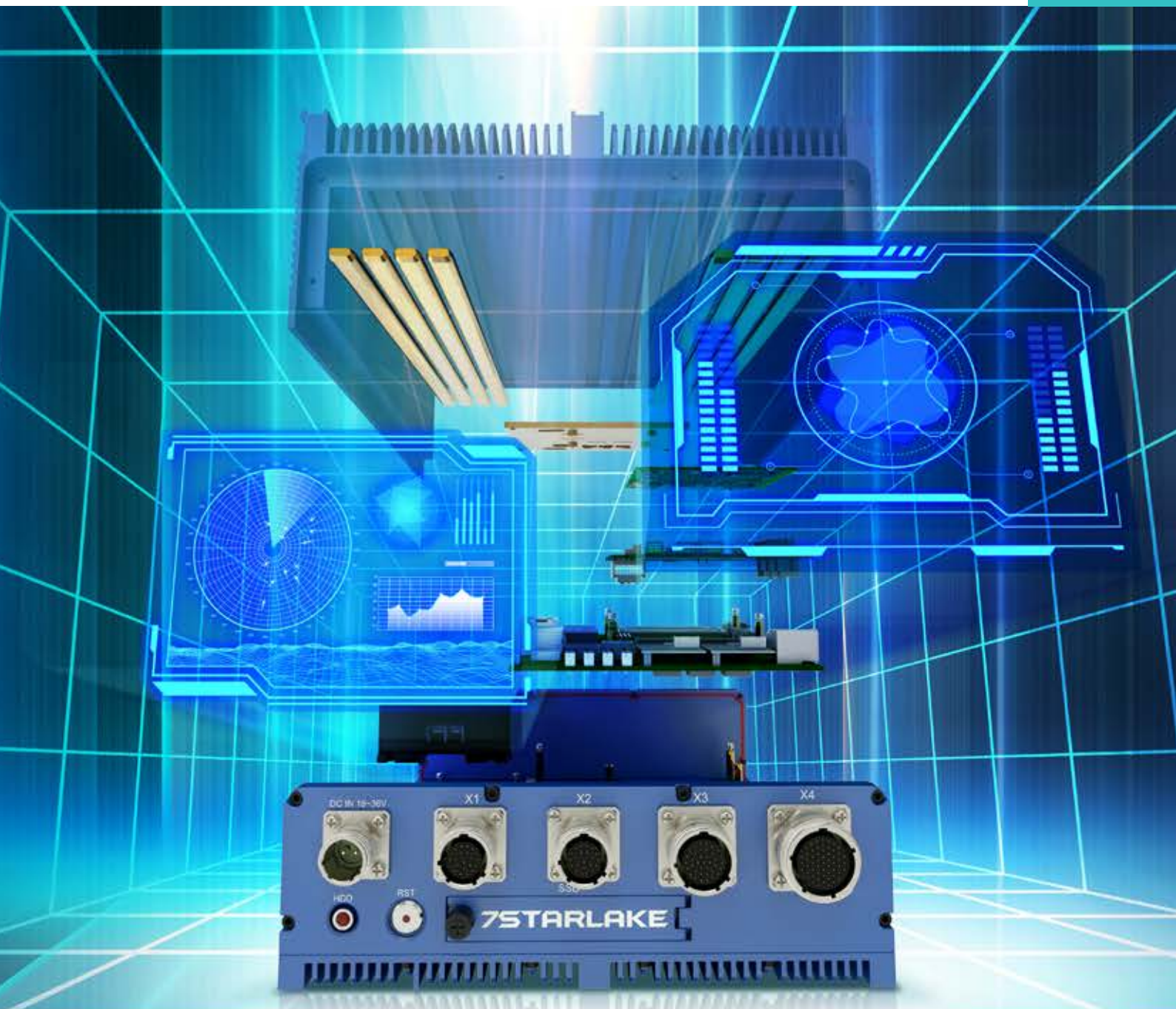
SFF GPU Computer
AV600/SR700 Series
Solution Guide



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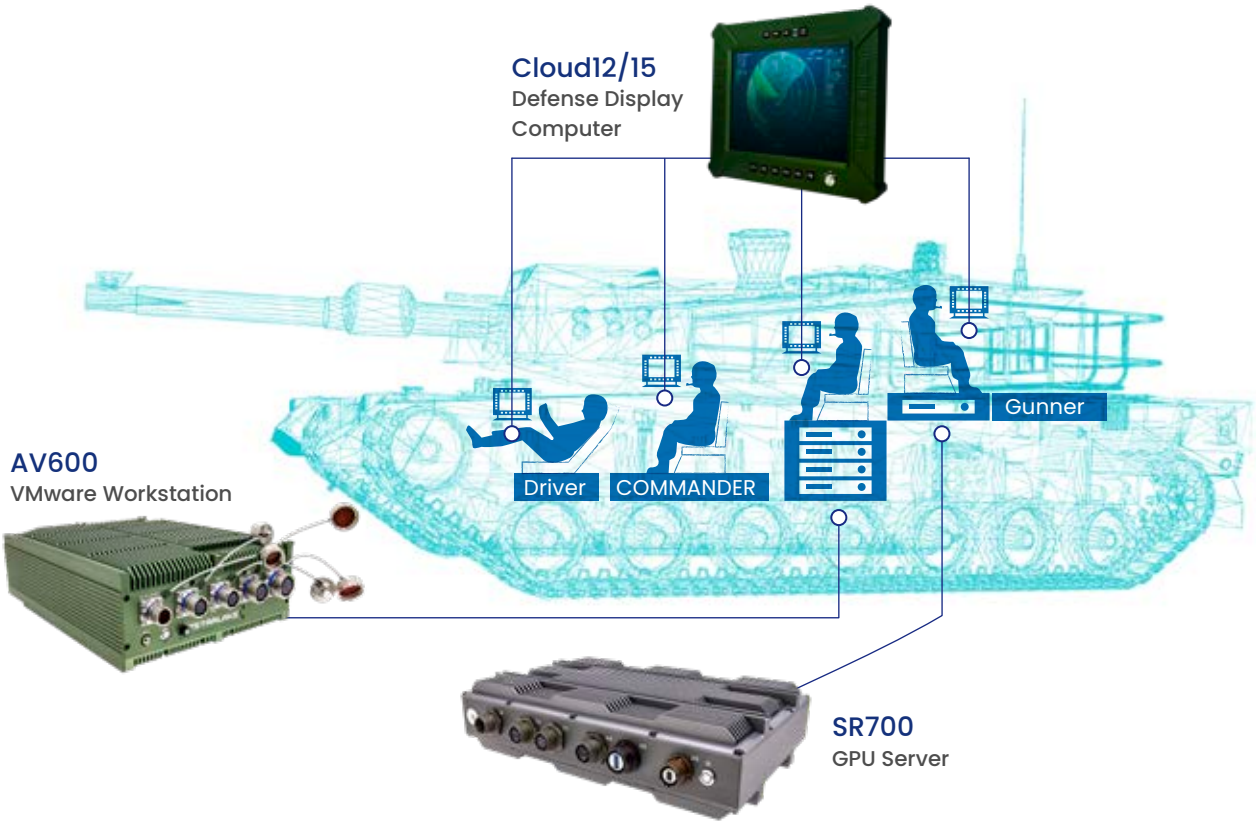
HIGHLIGHTS

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

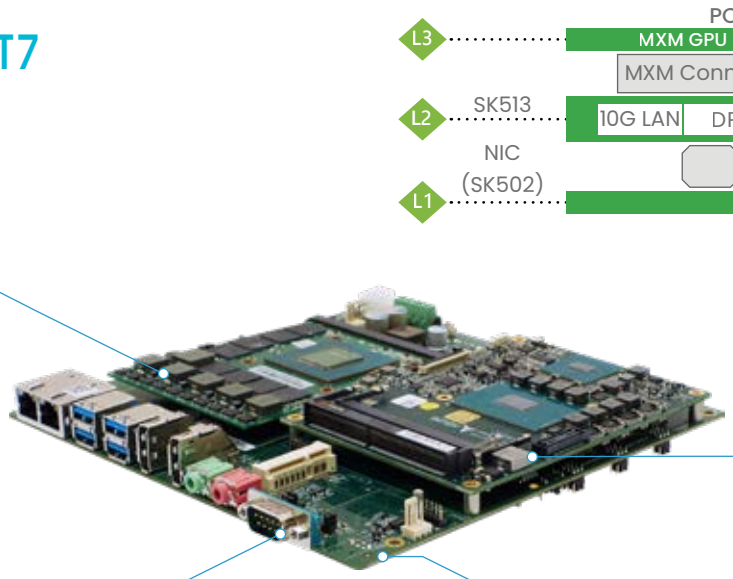
Small Form Factor (SFF)

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

Geforce	Quadro
• RTX2060S	• A1000
• RTX3070	• A2000
• RTX3080	• A4500
• RTX3090	• A5000

SK513、SK515、SK517

MXM Support

COM Express®

- PCIe signal by COMe Type6 connector
- MXM Carrier support

NIC

4x1 GbE | 4x10 GbE | 2x25 GbE

- PCIe signal by PCIe/104 & FPE

CPU

intel. CORE i7

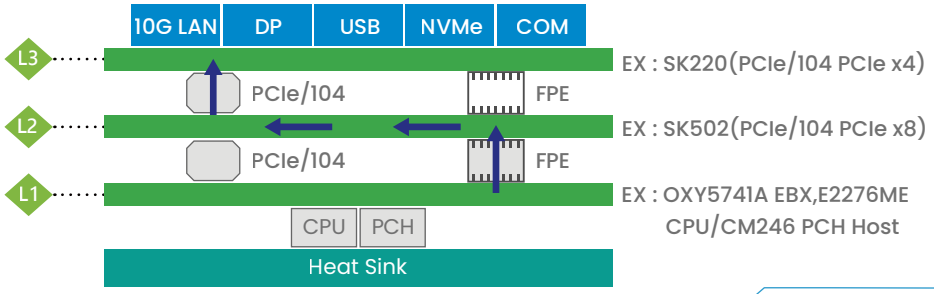
9th Coffee Lake Refresh	11th Tiger Lake	13th Raptor lake
E-2276ME	i7-11850HE	i7-13800HE
E-2276ML	W-11865MRE	i5-13600HE
i7-9850HE	W-11865MLE	i3-13300HE

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.

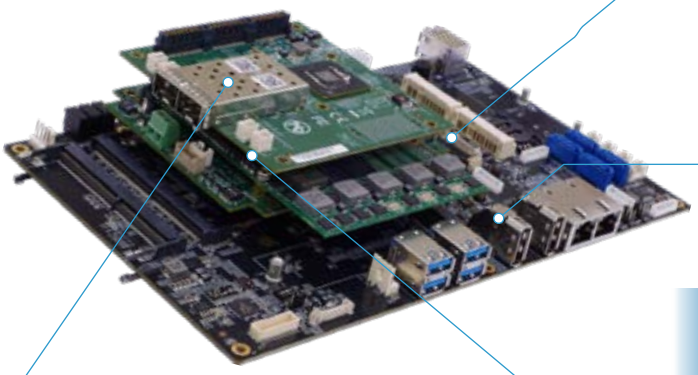
Integrating the PCI Express bus within the industry proven PC/104 architecture brings many advantages for embedded applications including fast data transfer, low cost due to PCIe/104's unique self-stacking bus, high reliability due to PCIe/104's inherent ruggedness, and long term sustainability.

SFF PCI/e 104



GPU

Geforce	Quadro
• RTX2060S	• A1000
• RTX3070	• A2000
• RTX3080	• A4500
• RTX3090	• A5000



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MXM

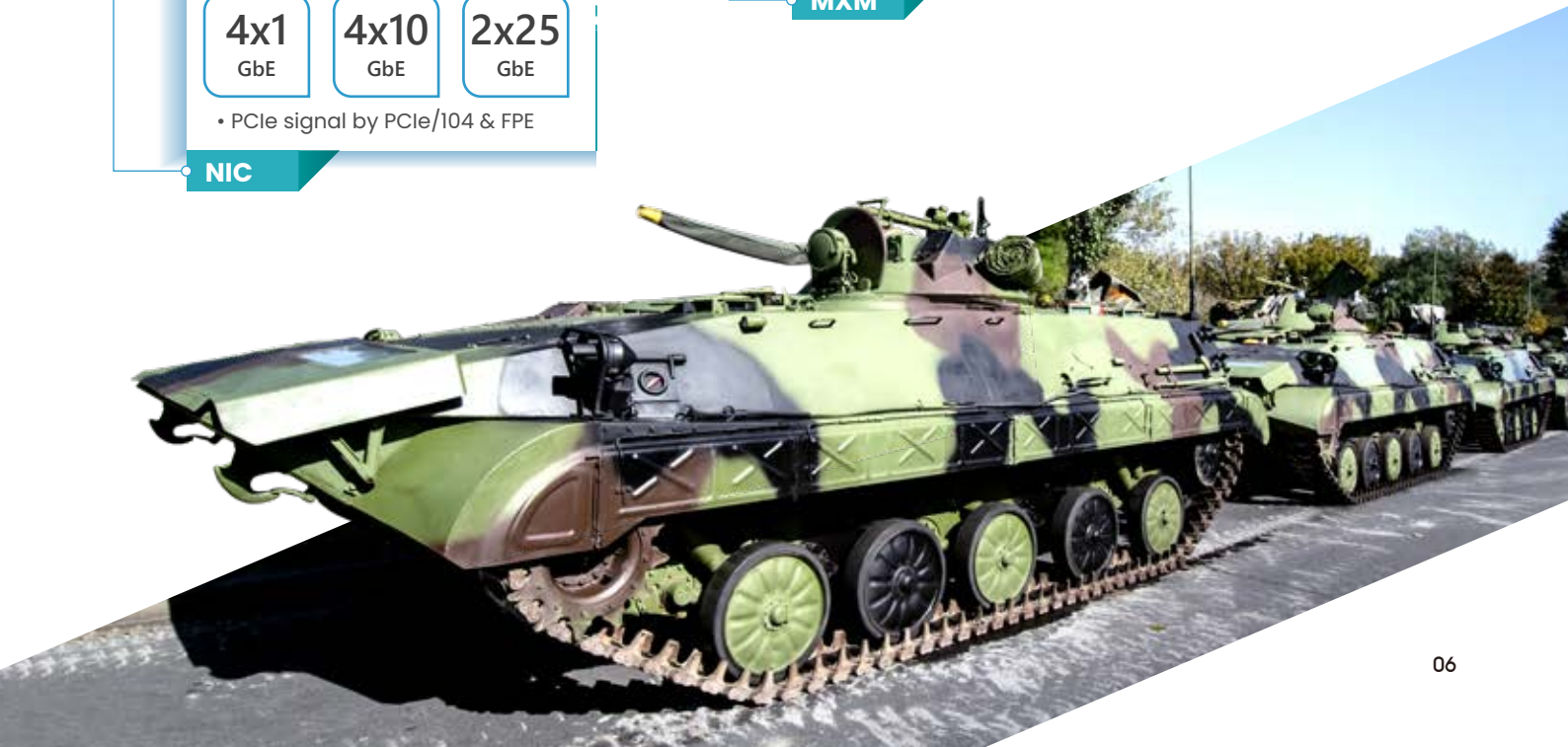
MXM Support

- PCIe signal By PCIe/104 & FPE
- MXM Carrier support

NIC

4x1 GbE	4x10 GbE	2x25 GbE

- PCIe signal by PCIe/104 & FPE



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

ELECTROMAGENETIC
MIL-STD-461

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

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

MIL-STD-1275

VEHICLE
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	Surge Low	Steady State
100V / 500ms	18V / 500ms	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, stabile 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 minus/ 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)

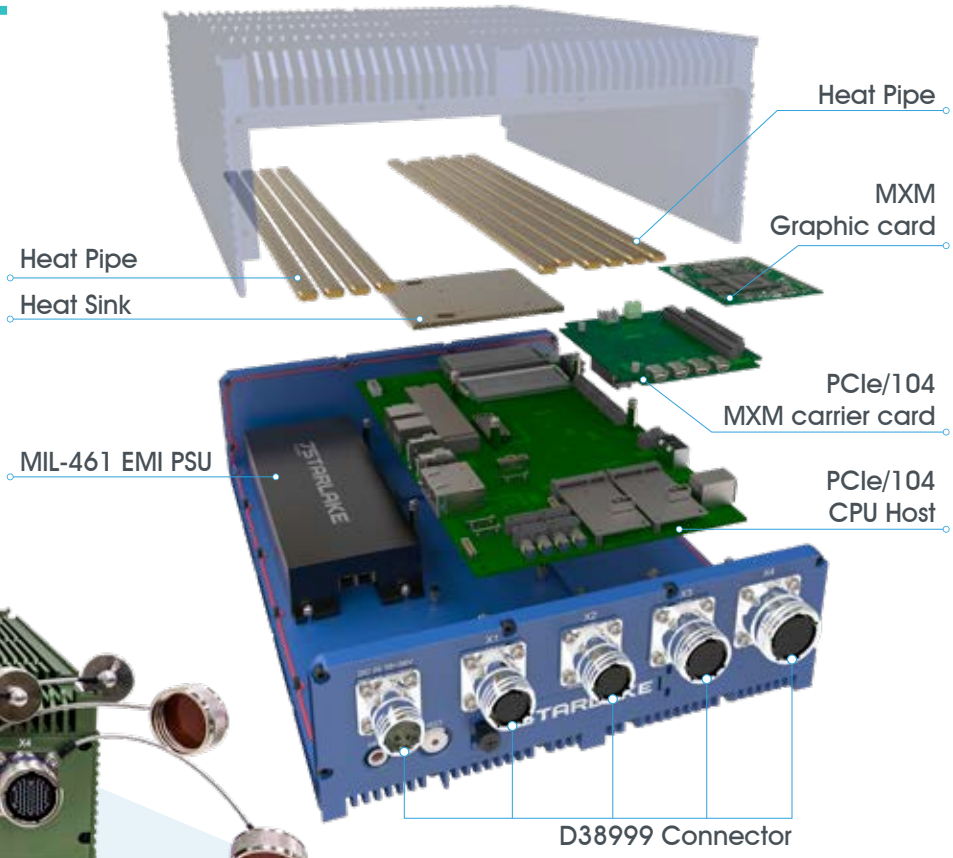
Wave Form : Sawtooth wave
Acceleration : 75g
Duration Time : 6 mS
No. of Shock : 3 times (Each axis)
Shock Direction : ±X, ±Y, ±Z akis

SYSTEM SPECIFICATIONS FOR AV600 SERIES

Model	AV600X-CH	AV600TH	AV600-THT
Architecture	PCIe/104	COM Express	COM Express
Cooling	Conduction Cooling	Conduction Cooling	Conduction Cooling With External Turbo Fan
CPU	E-2276ML	W-11865MLE	W-11865MRE
GPU	MXM A2000	MXM A2000	MXM A4500
RAM	Up to 128GB	Up to 96GB	Up to 96GB
Capture Card	Options	Options	Options
Storage(Internal)	1x M.2 NVMe	1x NVMe U.2	1x M.2 SATA
AES (H/W) Key	Optional	Optional	Optional
Swappable CMOS	Optional	Optional	Optional
POWER	18V-36V DC-IN	18V-36V DC-IN	18V-36V DC-IN
Graphic Output	DVI	DVI	DVI
Dimension	250 x 325 x 100mm	250 x 325 x 100mm	250 x 325 x 100mm
MIL-STD-461	Compliance	Compliance	Compliance
MIL-STD-810	Compliance	Compliance	Compliance
CE	Certified	Certified	Certified

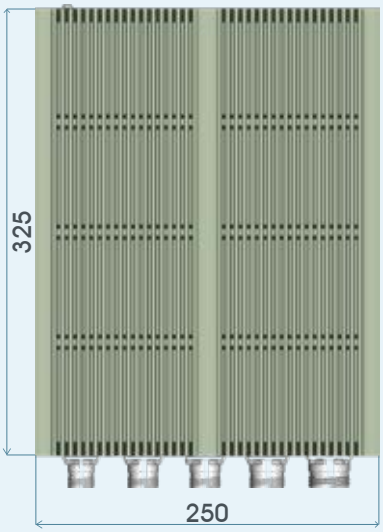
DIAGRAM OF AV600

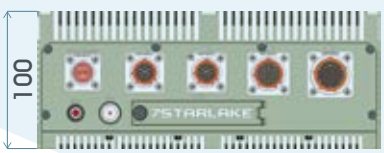
Appearance



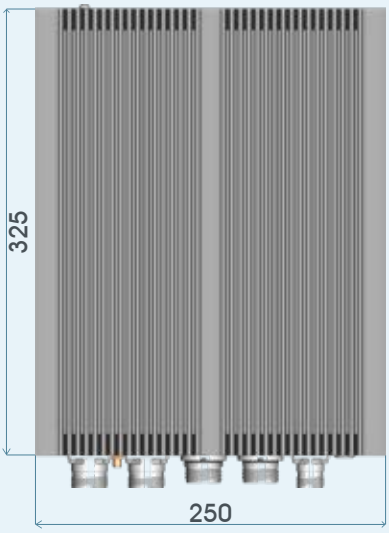
Dimensions

AV600X-CH

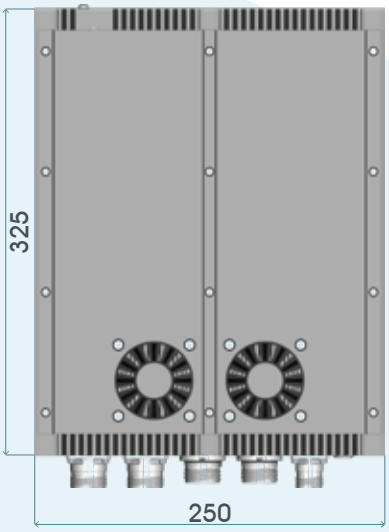




AV600TH



AV600-THT

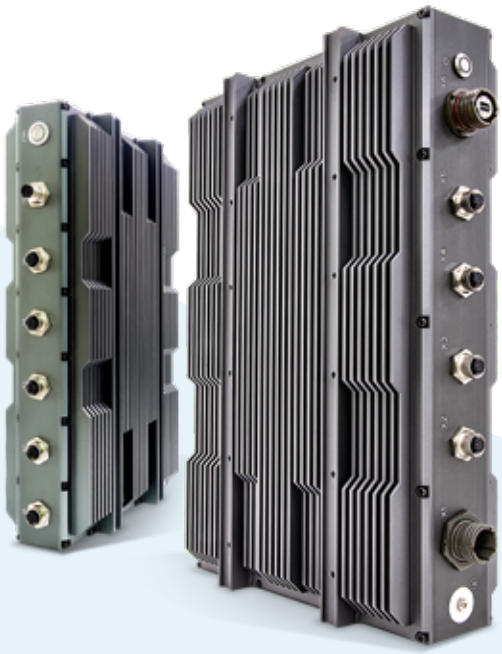


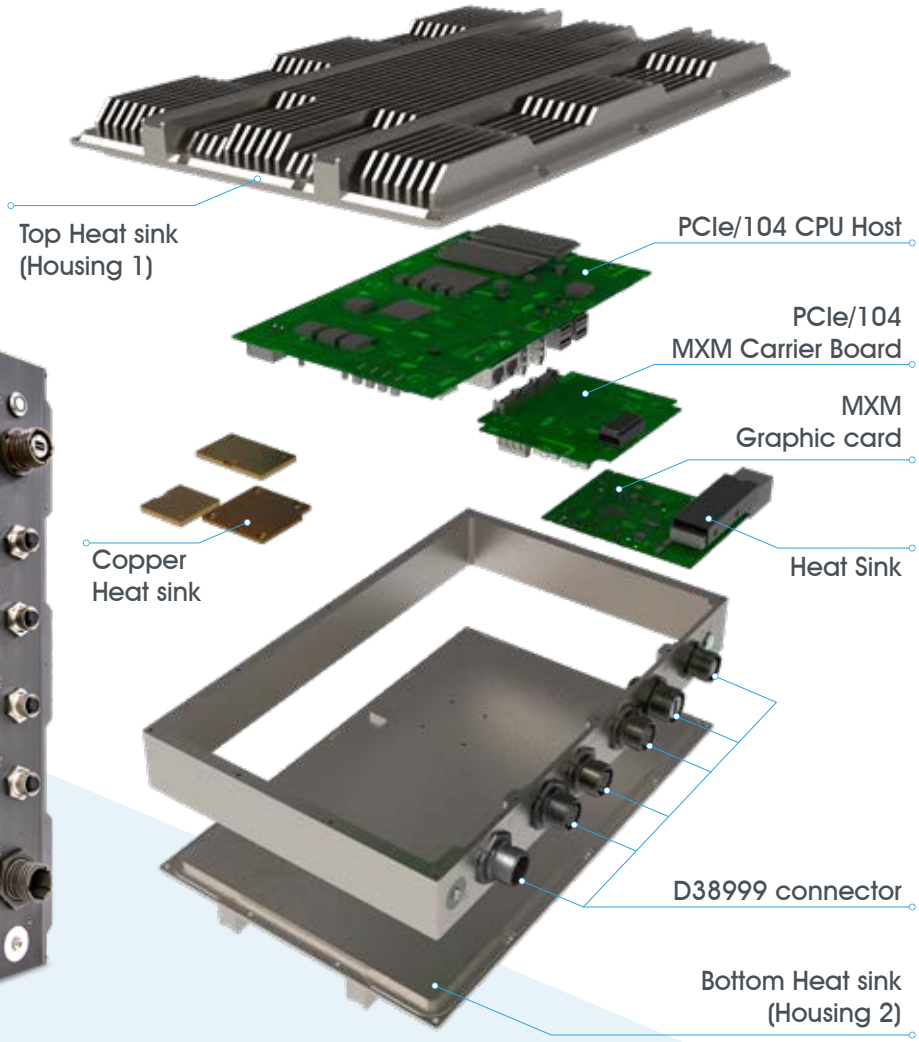
SYSTEM SPECIFICATIONS FOR SR700 SERIES

Model	SR700-X4M	SR700-X4	SR700-X4D
Architecture	PCIe/104	PCIe/104	PCIe/104
Cooling	Conduction Cooling	Conduction Cooling	Conduction Cooling
CPU	E-2276ME	E-2276ME	E-2276ME
GPU	MXM A2000	MXM A2000	MXM A2000
RAM	Up to 128GB	Up to 128GB	Up to 128GB
Connector	M12	M12+D38999	D38999
Storage(Internal)	1x M.2 NVMe	1x M.2 NVMe	1x M.2 NVMe
AES (H/W) Key	Optinal	Optinal	Optinal
Swappable CMOS	Optinal	Optinal	Optinal
POWER	9V~36V DC-IN	9V~36V DC-IN	9V~36V DC-IN
Graphic Output	VGA (M12)	mDP	mDP
Dimension	360 x 230 x 86mm	360 x 230 x 86mm	360 x 230 x 86mm
MIL-STD-461	Compliance	Compliance	Compliance
MIL-STD-810	Compliance	Compliance	Compliance

DIAGRAM OF SR700

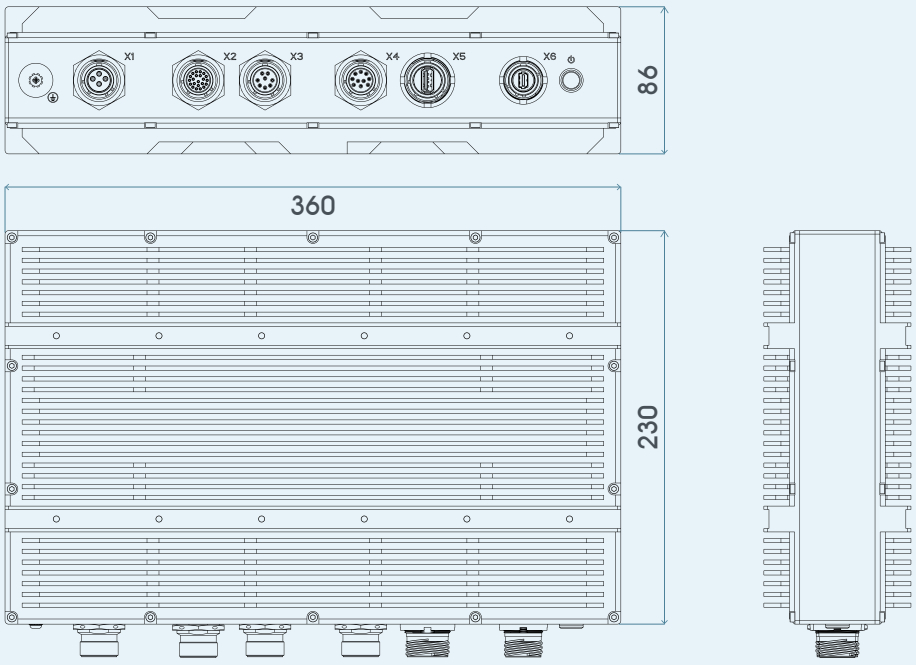
Appearance





Dimensions

SR700-X4D



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