



7SL-3500

5 Slot 3U VPX Conduction Cooled ATR

VPX VITA 48 – Rugged Thermal Solution

- ▶ 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 forced air sets with aggregate power demands over 300W, assisted by liquid up to 600W.
- ▶ Custom and standard 5 to 6 slot backplanes with VPX and SOSA aligned slot profiles in combinations supporting high speed signal processing applications.
- ▶ Scalable to multi CPU-GPU-FPGA requirements
- ▶ Designed expressly for Gen 4.0 ultra-high wattage military systems

Features

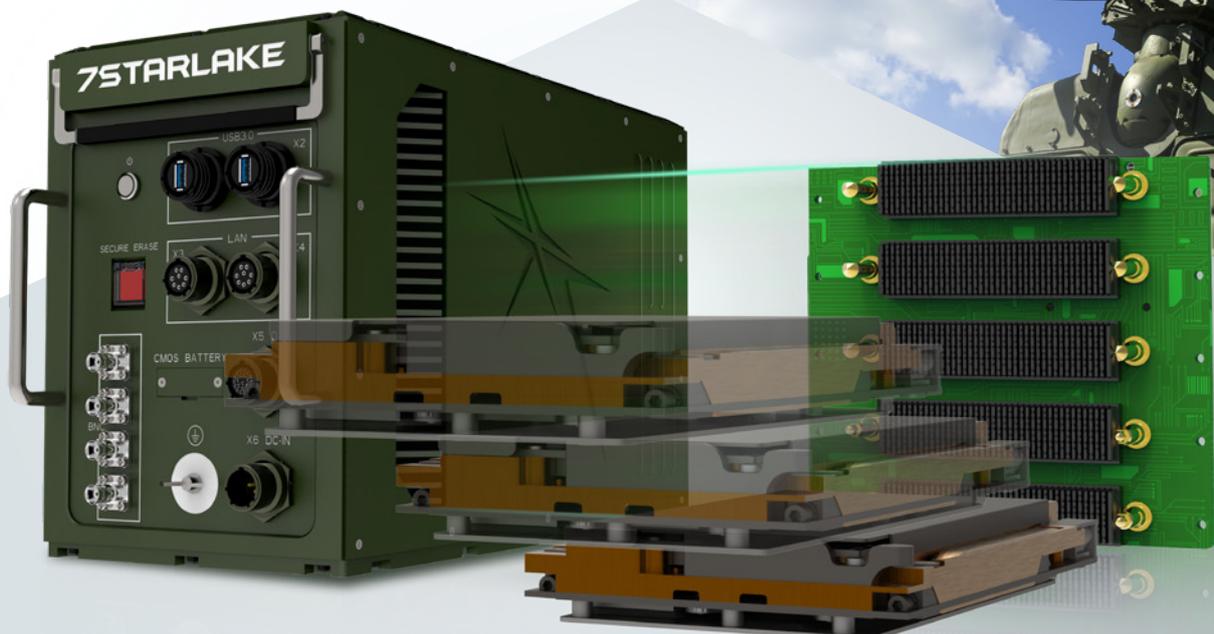
- ▶ 5 Slot –3 Payload plus 2 Peripheral
- ▶ Intel 11th Tiger Lake W-11865MRE
- ▶ NVIDIA MXM RTX A4500(5888 CUDA)
- ▶ 28V DC Input MIL-461/1275/704
- ▶ 300W Payload By Forced-Air Cooled
- ▶ 600W Payload By Liquid Cooled
- ▶ Design to Meet MIL-STD 810, MIL-461/1275/704, MIL-S-901D
- ▶ Custom backplanes with VPX and SOSA aligned slot profiles
- ▶ Custom I/O options including MIL-STD Wiring & Connectors
- ▶ Hybrid Conduction Cooled Heat Exchanger Sidewalls
- ▶ Extreme Temperature -40°C to 60°C

7SL-3500-CC	2 Payload (1-Xeon, 1-GPU)	150W Conduction Cooled
7SL-3500-FA	2 Payload (1-Xeon, 1-GPU)	300W Forced-Air Cooled
7SL-3500-LC	3 Payload (1-Xeon, 2-GPU)	600W Liquid Cooled



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7SL-3500



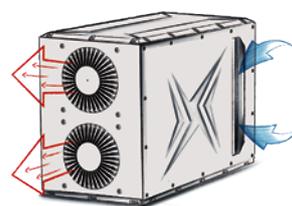
7SL-3500 3U-VPX Introduction

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

7SL-3500-CC	2 Payload (1-Xeon, 1-GPU)	150W Conduction Cooled
7SL-3500-FA	2 Payload (1-Xeon, 1-GPU)	300W Forced-Air Cooled
7SL-3500-LC	3 Payload (1-Xeon, 2-GPU)	600W Liquid Cooled



SLOTS	7SL-3500-CC	7SL-3500-FA	7SL-3500-LC
WIDTH	192.9mm	192.9mm	192.9mm
HEIGHT	269mm	269mm	269mm
DEPTH	389.5mm	389.5mm	410mm
WEIGHT	7.5kg	8.5kg	9kg
PAYLOAD THERMAL TYPE	Conduction Cooled	Force-Air Cooled	Liquid Cooled
MAX. PSU POWER	150W	300W	600W
PSU V-INPUT	28 VDC (10V~40V) MIL-461/1275/704		
STD BACKPLANE	VPX 3U 1" pitch backplanes		
SLOT/BOARD FORMAT	Conduction-cooled slots only for conduction-cooled ANSI-VITA 48.2 wedge-lock boards		



Conduction Cooled 7SL-3500-CC

7SL-3500 3U-VPX Introduction

7SL-3500-CC

2 Payload (1-Xeon, 1-GPU)

150W Conduction Cooled



150W Payload by
Conduction Cooled

Thermal	Passive	Conduction Cooled
Compute Node	2	1 x CPU 1 x GPU
NIC	2	2 x 10G
Backplane	5	2- Payload 3-Peripherals
Max PSU	150W	28VDC MIL-461/1275/704
Operation Temp.	-40°C to 60°C	



7Starlake Advanced Thermal Solutions

From ships at sea to high-altitude Drone, 7Starlake ATS solutions enable electronics survivability in the harshest environments. As an ever-increasing number of data acquisition methods are utilized in military and aerospace, the need to convert that rising data tide into precise, real-time action only escalates.

Applications like object targeting, ground vehicles tracking, thermal image monitoring, and multiple simultaneous sensors feeds. When a wealth of such sources need aggregation and immediate analysis, potentially with graphical visualization output to any number of displays, VPX-based systems can ensure proven solutions

Specification

Physical Dimensions: 10.6" (H), 7.6 (W) x 15.3" (D) incl. handles and connectors 269mm x 193mm x 390mm including connectors and mounting plate Machined aluminum alloy 6061-T6, bolt together construction Weight: Approximately 38lbs, no payload boards	Backplane VPX aligned slot profiles 10GBase KR4 capable VITA 48.2
I/O Capabilities Custom I/O panel supporting high speed connectivity High density MIL-STD 38999 circular connectors Rugged SMA connectors for RF and optical I/O	Thermal Operating: -40°C to 60°C Conduction Cooled by sink
Payload Compatibility 3U VPX multi-core single board computers, high speed GPGPU modules, video processing and Ethernet switching	Power Supply Input voltage: 18 to 36 VDC Output: up to 150W total
	Environmental Designed to meet MIL-STD-810, MIL-STD-461



Conduction Cooled

Conduction cooled SBC have traditionally been deployed in applications where heat evacuation with an airflow is impractical.

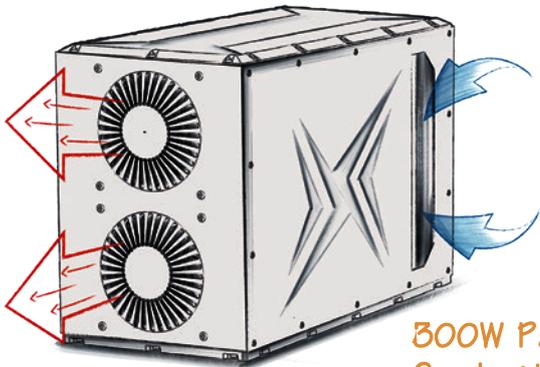
- ▶ As the most common heat-transfer device available, heat pipes can manage the transfer of heat between two solid interfaces effectively. Combining the advantages of thermal-conductivity and phase transition, heat pipes are extremely light-weight compared with traditional cooling methods.,
- ▶ For the highest thermal dissipation and thermal density, heat pipes can be very effective in conduction cooled environments.
- ▶ The heat pipes are embedded in a symmetrical topology from the sidewall, allowing the assembly to be less sensible to gravity or acceleration
- ▶ This technique, not only improves thermal performance, but also helps to sustain a high level of shock and vibration by providing a rigid frame to attach the board at multiple points.

7SL-3500 3U-VPX Introduction

7SL-3500-FA

2 Payload (1-Xeon, 1-GPU)

300W Forced-Air Cooled



300W Payload by
Conduction Cooled

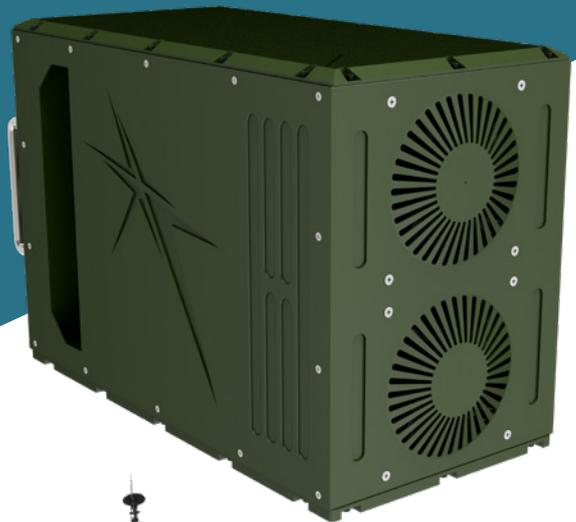
Specification

Physical	
Dimensions: 10.6" (H), 7.6 (W) x 18.5" (D) incl. handles and connectors 269mm x 193mm x 470mm including connectors and mounting plate Machined aluminum alloy 6061-T6, bolt together construction Weight: Approximately 38lbs, no payload boards	
I/O Capabilities	
Custom I/O panel supporting high speed connectivity High density MIL-STD 38999 circular connectors 100GBase KR4 capable Rugged SMA connectors for RF and optical I/O	
Payload Compatibility	
3U VPX multi-core single board computers, high speed GPGPU modules, video processing and Ethernet switching	
Backplane	Environmental
VPX aligned slot profiles VITA 48.8	Designed to meet MIL-STD-810, MIL-STD-461
Thermal	Power Supply
Operating: -40°C to 60°C 2 x high cfm fans	Input voltage: 18 to 36 VDC Output: up to 300W total

Thermal	Passive	Forced-Air Cooled
Compute Node	2	1 x CPU 1 x GPU
NIC	2	2 x 100G
Backplane	5	2- Payload 3-Peripherals
Max PSU	300W	28VDC MIL-461/1275/704
Operation Temp.	-40°C to 60°C	

Force Air Conduction Cooled

- ▶ 7SL-3500 Hybrid conduction cold plate assisted by forced air sets with aggregate power demands over 300W
- ▶ Internal recirculation fans ensure dry air is forced across conduction or air-cooled payload modules, minimizing hot-spots and dissipating heat homogeneously



Liquid Cooled 7SL-3500-LC



7SL-3500 3U-VPX Introduction

7SL-3500-LC

3 Payload (1-Xeon, 2-GPU)

600W Liquid Cooled

Advanced conduction liquid cooling systems that enables higher powered, compact electronics in ruggedized military, aerospace applications.

*600W Payload
by Liquid Cooled*

CLCP includes multi-channel cold liquid inlet/outlet owning high flexibility in adjusting numbers of inlet/outlet by request. When coolant flows through top sink, liquid can absorb the heat and take it away from the heat sources quickly to the heat exchanger. Leveraging both liquid-cooling and air-cooling's strong points; these features accomplish higher rack density and efficiency, comprehensive reduction in power use, and increase of overclocking potential.



Thermal	Passive	Liquid Cooled
Compute Node	3	1 x CPU 2 x GPU
NIC	2	2 x 100G
Backplane	5	3-Payload 2-Peripherals
Max PSU	600W	28VDC MIL-461/1275/704
Operation Temp.		-40°C to 60°C



Specification

Physical

Dimensions: 10.6" (H), 7.6 (W) x 15.3" (D) incl. handles and connectors 269mm x 193mm x 390mm including connectors and mounting plate Machined aluminum alloy 6061-T6, bolt together construction Weight: Approximately 38lbs, no payload boards

I/O Capabilities

Custom I/O panel supporting high speed connectivity
High density MIL-STD 38999 circular connectors
100GBase KR4 capable
Rugged SMA connectors for RF and optical I/O

Environmental

Designed to meet MIL-STD-810, MIL-STD-461

Backplane

VPX aligned slot profiles
VITA 48.4

Thermal

Operating: -40°C to 60°C
Liquid Cooled by sink

Power Supply

Input voltage: 18 to 36 VDC
Output: up to 600W total

Payload Compatibility

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

VPX-REDI Liquid Cooled

7SL-3500-LC is a VPX-REDI Liquid-cooled enclosure utilizing side-wall cooling within the enhanced wedge-lock guide rails (increased 50% contact area) cooling of standard conduction Liquid Cooling Hardware Implementations. In order to effectively reduce overall temperature and prevent the leakage of the liquid, 7Starlake innovated a unique heat exchanger which integrating Conduction Liquid Cold Plate (C.L.C.P.) building in most advanced " Gun Drilled ", which with 4 pipes (each pipe 10mm x 10mm x 400mm) to dissipate max 1KW heat on the 3/4 ATR system

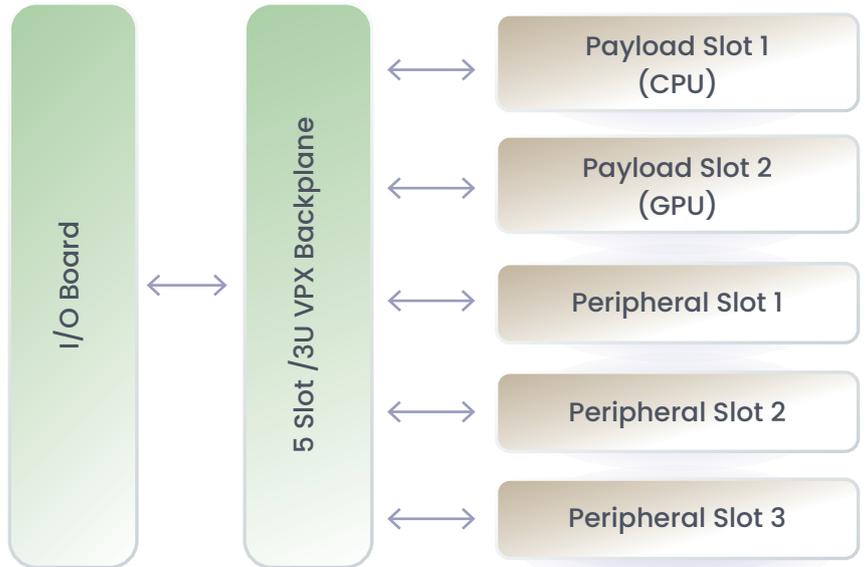
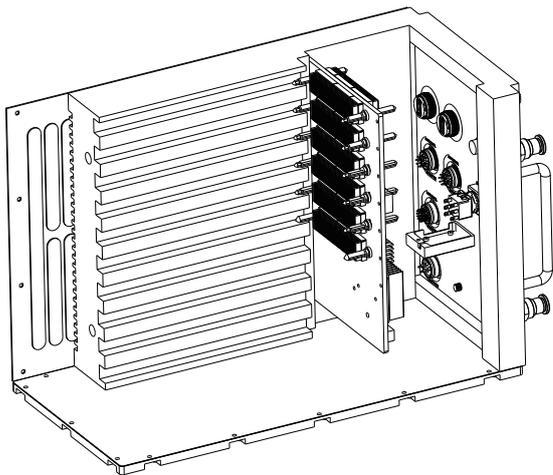


Backplane Diagram

2-1

5 Slot

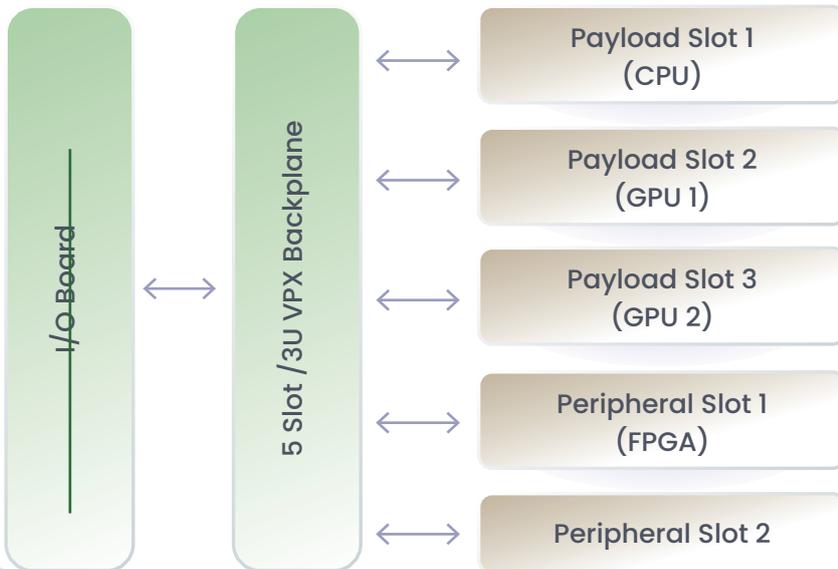
2 Payload plus 3 Peripheral Slots(150W_300W)



2-2

5 Slot

3 Payload plus 2 Peripheral Slots(600W)



3U VPX Blade List

CPU Blade 1 ▶ 11th Intel® Xeon®W-11865MRE

Key Feature :

- ▶ Intel® Xeon® W-11865MRE processor (formerly Tiger Lake-H) up to 8 cores with 45 watt TDP
- ▶ DDR4-2666 soldered ECC SDRAM up to 16GB
- ▶ SOSA-aligned and VITA 46/47/48/65 compliant for quick deployment
- ▶ Up to 1TB M.2 SSD optional
- ▶ One XMC expansion slot with PCIe x8 Gen3
- ▶ Ethernet connectivity: 1x 2.5GBASE-T to P2; 2x 10GBASE-KR to P1 options 2x 1GBASE-KX
- ▶ 1x DisplayPort, supports DP++ with resolution up to 8K/60Hz



CPU Blade 2 (Options) ▶ 9th Intel® Xeon®E-2254ML

Key Feature :

- ▶ Intel® Xeon® E-2254ML processor (formerly Coffee Lake-H) up to 4 cores with 25 watt TDP
- ▶ DDR4-2666 soldered ECC SDRAM up to 16GB
- ▶ Up to 64GB SATA SLC SSD option
- ▶ Up to PCIe x16 Gen3 interface supporting non-transparent bridge
- ▶ Up to 1TB M.2 SSD optional
- ▶ One XMC expansion slot with PCIe x8 Gen3



GPU Blade 1 ▶ NVIDIA RTX A4500

Key Feature :

- ▶ NVIDIA RTX™ GA104 GPU with 17.66 TFLOPS FP32 peak performance
- ▶ PCIe Gen 4 up to x16 interface
- ▶ Up to 5888 CUDA® cores, 46 RT Cores, and 184 Tensor Cores
- ▶ Up to 17.66 TFLOPS peak FP32 performance
- ▶ Up to 16GB GDDR6 memory, 256-bit
- ▶ Up to 512GB/s maximal memory bandwidth
- ▶ Support up to 4 DP 1.4a displays, 115W TGP



GPU Blade 2 ▶ NVIDIA RTX 5000

Key Feature :

- ▶ NVIDIA Quadro Turing TU104 GPU, 9.5 TFLOPS peak performance
- ▶ PCIe Gen 3 up to x16 interface
- ▶ Up to 3072 CUDA cores
- ▶ Up to 9.4 TFLOPS peak FP32 performance
- ▶ Up to 16GB GDDR6 memory, 256-bit
- ▶ Up to 448GB/s maximal memory bandwidth
- ▶ Support up to 4 DP 1.4a displays, 110W TGP



System SPEC

System

CPU	Intel® Xeon® W-11865MRE processor (formerly Tiger Lake-H) Up to 8 cores (TDP 45W)
Memory type	Up to 64 GB DDR4-2666 soldered with ECC
GPU	▶ NVIDIA RTX A4500, 16GB GDDR6, 5,888 CUDA ▶ NVIDIA RTX 5000, 16GB GDDR6, 3,072 CUDA
BIOS	Dual 256Mbit SPI flash

Security

TPM	Discrete TPM 2.0 chip
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Storage

SATA	1x SATA 6Gb/s
M.2	1x M.2 2242 on top side (M-key)

Side I/O (D38999)

X1/X2	2 x USB3.0
X3/X4	2 x LAN
X5	1 x DVI
X6	1 x DC-IN
BNC	4
Secure Erase	1x AES KEY
CMOS Battery	1
GND	1
Power Button	1

OS support list

OS	Windows 10, Linux (kernel 5.4 and higher)
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Application

Application	▶ Military Platforms Requiring Compliance MIL-STD-810G ▶ Embedded Computing and applications subject to Harsh Temperature, Shock, Vibration, Attitude, Dust and EMI Conditions.
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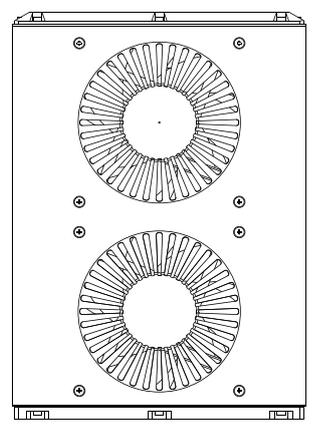
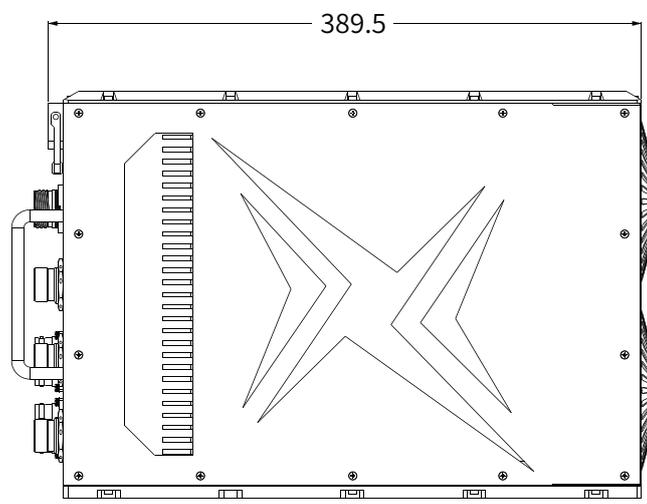
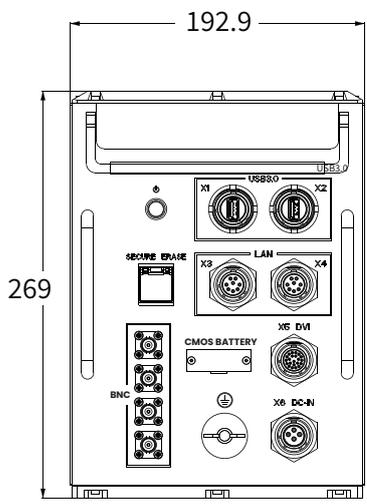
Environment

Power Requirement	18V~36V DC-IN	Operating Temp.	7SL3500-CC : -40°C to 60°C
Dimension	192.9x389.5x269mm		7SL3500-FA : -40°C to 60°C
Weight	13 KG		7SL3500-LC : -40°C to 60°C
Storage Temp.	-40°C to 85°C	Relative Humidity	5% to 95%, non-condensing
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 ▶ 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) ▶ Method 514.6, Vibration Category 24/Non-Operating (Category 20 & 24,Vibration) ▶ Method 514.6, Vibration Category 20/Operating (Category 20 & 24,Vibration) ▶ Method 516.6, Shock-Procedure V Non-Operating (Mechanical Shock) ▶ Method 516.6, Shock-Procedure I Operating (Mechanical Shock) 		

Safety & EMC

EMC	<ul style="list-style-type: none"> ▶ EN 61000-4-2: Air discharge: 8 kV, Contact discharge: 6kV ▶ EN 61000-4-3: 10V/m ▶ EN 61000-4-4: Signal and DC-Net: 1 kV ▶ EN 61000-4-5: Leads vs. ground potential 1kV, Signal und DC-Net: 0.5 kV 		
MIL-STD-461	<ul style="list-style-type: none"> ▶ CE102 basic curve, 10kHz - 30 MHz ▶ RS103, 200 MHz - 3.2 GHz, 50 V/m equal for all frequencies 	<ul style="list-style-type: none"> ▶ RE102-4, (1.5 MHz) -30 MHz - 5 GHz 	
MIL-STD-1275	<ul style="list-style-type: none"> ▶ Steady State – 20V~33V, ▶ Surge Low – 18V/500ms, ▶ Surge High – 100V/500ms 	<ul style="list-style-type: none"> ▶ Emitted spikes ▶ Injected Voltage surges ▶ Emitted voltage surges 	<ul style="list-style-type: none"> ▶ Voltage ripple (2V) ▶ Voltage spikes ▶ Starting Operation

Appearance/Dimension/ Drawing Diagram





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