

## Block Diagram

## Product Picture

### **X9 VENOM XEON® D DUAL SLOT 3UVPX-NAS (P/N: VPX3IL-DS-NAS)**

*3U VITA 65 OpenVPX/SOSA-aligned single-board computer with Intel® Xeon® D CPU, six M.2 storage sites, two Thunderbolt™ ports each with 100 W power, four 100 GbE ports, PCIe and 100G to backplane, and card face I/O to chassis front panel.*

- X9 OpenVPX single-board computer (SBC) composed of upgradeable engine module, carrier module to backplane, and I/O module for network-attached storage (NAS)
- Intel® Xeon® D (Ice Lake) CPU up to 20 cores and 64GB DDR4 ECC DRAM
- Massive bandwidth via inter-chassis and front panel connectivity with Thunderbolt 4, PCIe Gen 4, USB, and 100 GbE
- Two Thunderbolt™ 4 ports, each with 100 W power. Two additional ports optional on I/O module.
- Six M.2 2280 RAID-capable sites for storage (NVMe SSDs)
- Direct-to-drive and software RAID for NVME drives
- 100 GbE with support for Remote Direct Memory Access (RDMA) over converged Ethernet (RoCE): two fiber ports route to chassis front panel, two 100GBASE-KR ports to backplane
- PCIe Gen 4 (x8 and x1) interconnect fabric to VPX backplane
- Additional I/O options including full size NVIDIA® RTX5000 MXM GPGPU, custom FPGA, dual Thunderbolt 4 ports, or quad CoaXPress® / Camera Link™
- Dual SAM I/O™ sites for MIL-1553, ARINC-429, NTDS, GPS, or legacy I/O
- TPM 2.0 for root of trust, Secure Boot on Windows® 10/11
- DisplayPort / DVI to VPX backplane
- Operates on single 12 VDC supply from VPX backplane

### SPECIFICATIONS

- Backplane: 2 slots at 1.0-in pitch
- Weight: 0.75 lbs
- MIL-STD: MIL-STD-810G, MIL-STD-461F, MIL-S-901D
- Temperature: -40° C to +85° C, conduction- or air-cooled
- Ruggedness Available up to GMS ruggedization level R5



## SYSTEM OVERVIEW

The X9 VENOM DUAL SLOT 3UVPX-NAS (P/N: VPX3IL-DS-NAS) starts with an upgradeable GMS processor “engine” module connected to the VPX carrier board. This single slot conduction-cooled SBC merges the industry’s very latest commercial technology into an exceptionally high-performance module with a massive amount of super-speed I/O. The two-slot X9 VENOM 3UVPX-NAS adds a high-speed I/O board to the stack, bringing four additional M.2 storage sites, additional I/O options including GPGPU, quad CoaXPress® / Camera Link™ ports, or custom FPGA, and an unheard of 455 Gbps of total I/O bandwidth.

The modules are designed for extended temperature, long life, conduction- or optional convection-cooling, and operate from a single 12 VDC supply.

To realize this incredible slot density, GMS took a feature-rich server-sized monolithic motherboard and “folded” it into stackable 3U-sized modules — a technique GMS has pioneered, patented, and refined through over 40 years of small form factor (SFF) system leadership. The three-board X9 VENOM PCBs are interconnected via ultra-high-speed board-to-board connectors that route signals such as PCIe Gen 4 between, and through, the modules with no speed degradation. The CPU “engine” module connects to the VPX “carrier” module, which then connects with the “HS” I/O NAS module. Each module is carefully groomed for timing, signal integrity, EMI mitigation, and maximum performance. GMS-unique technology allows 34 lanes of PCIe to be routed effectively between all three boards.

## MOSA APPLICATIONS

X9 VENOM is designed to provide the ultimate open-standard 3U OpenVPX SBC for MOSA (modular open standard approach) and was developed in alignment with the SOSA™ Technical Standard. Using Intel’s latest Xeon® D CPU, the X9 VENOM family represents the state of the art in SBCs. As a Slot 1 controller, the SBC is loaded with I/O that can replace multiple I/O cards in an OpenVPX backplane.

In-chassis inter- and intra-board front panel connectivity via 100G Ethernet or USB 3.1 provides massive bandwidth and eliminates bus contention or the need for switch boards.

The X9 VENOM 3UVPX-NAS is ideal for defense applications that are both processing and I/O intensive with the need for additional add-in functions. VENOM modules fit best where investments have been made on an OpenVPX platform, where more bandwidth is required than is available on the OpenVPX backplane by itself, or when additional high-speed I/O is required between systems that are not closely coupled on the local chassis backplane.

X9 VENOM modules can also be used without the OpenVPX backplane; consult GMS for details. VENOM modules may be ordered from the factory with operating systems such as Windows® or Linux® pre-installed. Other common or real-time operating systems such as VxWorks® are available.

## I/O AND EXPANSION OPTIONS

- Two Thunderbolt™ 4 ports standard, each with 100 W power delivery
- Two DisplayPort video 3840 x 2160 UHD via Thunderbolt 4 ports
- Dual 100 GbE fiber ports for routing to chassis front panel
- Dual 100GBASE-KR to VPX backplane
- Ten M.2 sites for SSD storage or I/O
- Dual SAM I/O™ sites for MIL-1553, ARINC-429, NTDS, GPS, or legacy I/O
- Three USB 3.1 ports, one USB 2.0 port
- Two COM serial ports (RS-232/422/485)
- Eight GPIO ports
- Trusted Platform Module (TPM) 2.0 for secure boot operation
- Anti-tamper plus temperature and shock sensor(s)
- Optional I/O supports NVIDIA RTX5000 GPGPU, two additional Thunderbolt 4 ports, quad CoaXPress / Camera Link, or a single custom FPGA site

## STANDARD AND OPTIONAL FEATURES

	X9 VENOM HOST (Engine + Carrier)	NAS (HS I/O)
Processor	Intel® Xeon® D (Ice Lake)	-
Model #	2796TE	-
Cores	20	-
Threads	40	-
Speed (Turbo Boost)	3.1 GHz	-
Cache	30 MB Smart Cache	-
TDP (Down/Up)	65 W / 125 W	-
Memory	16/32/64 GB DDR4 ECC	-
Storage (M.2 2280)	2x, up to 8 TB	4x, up to 16 TB
Thunderbolt™ 4 Ports	2x	2x Optional*
100 GbE	2x (fiber) 2x (backplane)	-
Input Power	+12 VDC	+12 VDC
NVIDIA® RTX5000 GPGPU	-	1x Optional*
CoaXPress®	-	4x Optional*
Camera Link™	-	4x Optional*
Custom FPGA	-	1x Optional*
Dual Redundant 1553	-	Optional
Wi-Fi™ / Bluetooth™	-	Optional
GPS	-	Optional
Cellular	-	Optional

\* Can only accommodate one option