

Product Description

TuffServ Rackmount Solutions (TRS) bring Ampex's unrivaled experience with rugged, conduction-cooled airborne systems to the rack-mount system arena! TRS addresses three key issues encountered when attempting to take products designed for data center use into aerospace environments: cooling, removable storage and the management of internal cables in high-vibration environments.



The processor subsystem is based on standard, commercial motherboards

The latest X11-class motherboards support enormously powerful CPUs, including configurations with dual 28 core Xeon Platinum processors each designed for a power rating of over 200W, and the adoption of graphics processing units for computational tasks can easily double that power dissipation.

To accommodate both the high power processors and the large (Extended ATX, 12" x 13") motherboards that support them, the TRS dispenses with the legacy approach of having the storage devices (disks, SSDs, etc) in front of the motherboard, relocating them to an attached "second enclosure" located underneath the motherboard.

In addition to improving the airflow across the motherboard, the second enclosure houses 12 storage devices (disks or SSDs) on a removable tray, which allows the complete set of devices to be removed and replaced as a single module. The tray, roughly 12" square by 1" thick, encapsulates the storage devices with Heat Dissipation Covers -- integrated heat sinks -- that allow for efficient cooling of the storage in the airflow. Tray options exist for 6Gbps SATA, 12Gbps SAS and NVMe, with standard drive "heights" of 7mm, 12.5mm and 15mm supported. The NVMe variant employs a PCI Express "Gen3" x16 host adapter (backward compatible with x8) and the necessary PCI Express switches to provide an aggregate data rate of 16,000Mbytes/sec between the set of

SSDs and the host. Using the currently available devices, total storage capacities in excess of 120TB per tray is attainable.

To further improve the TRS resilience to vibration and obstructed airflow, a specially designed Power / Signal Distribution Plane is provided, located beneath the conventional motherboard. This eliminates the need for lengthy power cables running around the motherboard, by providing power close to where it's required; a rugged printed circuit board carries the voltages from the power supply to connectors adjacent to the motherboard's and GPU's power sockets, and short service loops connect the two. By minimizing the length of the cable, better anchorage against vibration is provided as well as reduced interference with airflow.



Storage Tray Layout
(Heat Dissipation Covers removed)

Airflow is provided by a front-mounted bank of oversized fans, located behind a removable and washable filter. A baffle in front of the card cage deflects air down and across the storage devices.

The 3U variant supports all half-height PCI Express cards, while the 4U supports both half-height and full-height.

Features

- Supports latest X11 Motherboards with Intel® Xeon® Scalable Processors
- Full Size Motherboard Support (E-ATX)
- Innovative "Dual Layer" Enclosure System
- Removable Storage Tray
 - (Variants for SATA, SAS and NVMe)
- Optimized Clean Air Flow, Power / Signal Distribution Plane
- Available in 3U and 4U Heights, Standard 19", Short Depth Profile

Sample Applications

- High Capacity Storage Server
- Database Server
- "Big Data" Analysis
- Data Processing/Reduction
- "Artificial Intelligence" Processing

AMPEX TuffServ® Rackmount Solutions

Specifications¹

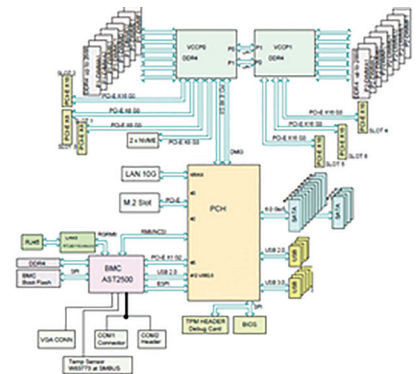
CPU Subsystem	Dual Intel Xeon Scalable Processor 81xx/61xx/51xx/41xx/31xx CPUs, with 4 to 28 cores each, clocked from 2.0 to 3.5Ghz (3.0 to 4.2GHz boost), between 8MB and 38MB cache. SSE4.2, AVX, AVX2, AVX-512 and TSX-NI instructions. Up to 205W per CPU.
Chipset	Intel C622 PCH
Memory Subsystem	Up to 2TB 3DS-LRDIMM, RDIMM, NVDMM, 2400MHz DDR4 with ECC. Up to 256GB per module.
Trusted Platform Module	TPM 1.2 or 2.0
Network Interface	Two 10 Gigabit 10GBase-T plus one 1000Base-T IPMI Ethernet
Expansion Slots	Four PCI Express Gen3 x16 Two PCI Express Gen3 x8
Embedded Graphics	VGA via AST 2500 BaseBoard Management Controller
Storage Interfaces (Embedded)	Fourteen SATA-3 ports Supports RAID 0, 1, 5 and 10
On Board Storage	M.2 Slot (NVME 3.0/x4), 2260, 2280 and 22110 module profiles
Storage Interface (Additional)	Ampex NVMe Controller (Requires PCI x16 slot)
Storage Tray	Up to twelve "2.5 inch" devices (100mm x 60mm), up to 15mm thick
USB Interfaces	Two USB 3.0 (back panel) Two USB 2.0 (back panel) USB 3.0 and USB 2.0 headers (internal)
Serial Ports	Two, one each back panel and internal
Power Supply	Redundant (optional), 700W (3U model), 1000W (4U)
Voltage	120/240V 50/60 Hz AC. Contact Ampex for MIL-STD-704 options.

Mechanical

Dimensions – 3U Variant	Standard 19 inch rackmount Chassis, 17 inches deep; 5.25" (133mm) H x 17.1" (434mm) W x 17" (431mm) D
Weight – 3U	25lbs (11.4Kg) (TBR)
Dimensions – 4U Variant	Standard 19 inch rackmount Chassis, 17 inches deep; 7" (177mm) H x 17.1" (434mm) W x 17" (431mm) D
Weight – 4U	30lbs (13.6Kg) (TBR)
Mounting	Mounting ears, optional chassis slides or tray

Environmental

Temperature	Operating 0° C to +45° C Non-operating -10° C to +60° C
Humidity	25% to 75% RH
Vibration	0.25 grms (active 5 - 350Hz)
Shock	20g (half sine, 2ms, calculated)



¹Specifications subject to change without notice.

Ampex Data Systems Corporation, A Delta Information Systems company

26460 Corporate Ave., Hayward, CA 94545, USA

Tokyo Office

www.ampex.com

1-650-367-2011

sales@ampex.com

+81-3-6433-9081 info@ampex.co.jp

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