

WARP Mechanics® WDS-7224 SAS-3 JBOF 12Gbps All-Flash Storage Enclosure

Features & Benefits

- 24 integrated 2.5" SSD modules
- Fully compliant with SAS 3.0 for up to 12Gbps
- 2x mini-SAS x4 ports plus 1x expansion port per SAS IO Module
- Daisy-chain up to 10 enclosures for more scalability
- Hot-swap power & cooling, drive, and IO modules
- SCSI Enclosure Services (SES-3) compliant
- RS-232, LAN, and front control panel mgmt. interfaces

WARP Mechanics is known for its high-capacity storage solutions, but not every situation calls for the most density. Sometimes light and fast are the order of the day, especially when it comes to all-flash SSD systems. Enter the WDS-7224 JBOF.

A "just a bunch of flash" subsystem, the WDS-7224 is a 19-inch 2U rackmount JBOD unit optimized for external and shared SSD storage. It features the latest SAS 3.0 12Gb/s interface and is designed to fit in environments which need highly reliable and scalable growth but in a footprint better suited to SSD devices. The WDS-7224 incorporates the latest enhancements fully compatible with the 12Gb/s SAS T10 specification including LSI DataBolt™ bandwidth optimizer technology (EDFB, End Device Frame Buffering). Using



DataBolt, it's possible to deliver 12Gb/s aggregate bandwidth from 6Gb/s SATA SSD drives by intelligently buffering data, resulting in over 50% increase.

Even though it has a small profile, the WDS-7224 doesn't skimp on features. A versatile SAS3/SATA3 disk expansion system, the WDS-7224 is ideal for the high capacity and scalability storage that IT demands. The platform supports redundant 12Gbps SAS IO modules, allowing HA connections from hosts. It may connect to customer-provided servers via HD mini-SAS cables, or act as an expansion enclosure for other WARP Mechanics products to support *WARPr*aid, *WARP*nas, and *WARP*hpc services such as the WARP 30000/40000 series of high performance storage appliances.

System status information is provided by the front panel LEDs, including SSD modules, power supplies, and cooling fan status. In addition, it offers GUI and terminal management to monitor the enclosure environmental conditions over Ethernet or RS-232 interfaces. With a total of four x4 12Gbps High Density SAS ports, each JBOD can deliver up to 192 Gb/s (24GB/s) in read/write performance per shelf. A built-in SAS expansion port enables the system to connect up to 240 drives daisy-chained to one host. That's 960TB of raw storage using today's high-capacity flash devices.

The WDS-7224 Storage Enclosure is a high-capacity, scalable, and cost-effective design. Wherever you and your company need to go, the WARP Mechanics portfolio can get you there, faster and more cost-efficiently than any other products in their class.



WARP Mechanics® WDS-7224 SAS-3 JBOD

Technical Specifications



Ordering Part Number and Product Name

WDS-7224-D2J • WDS-7224 All-Flash JBOD

Scalability/Capacity

Up to 24 SSD modules – 96TB if using 4TB modules. Daisy chaining of enclosures for additional capacity will usually be limited by the SAS HBA or SAS RAID HBA used. Practical configurations of ~960TB on a single host are possible with some WARP servers. Selected WARP Mechanics system-level configurations have no known upper limit. (Zettabyte range.)

Throughput Performance

Theoretically, one chassis with two I/O modules supports 2x 2x 4x12Gb, or 192Gb/sec. half-duplex. (Full-duplex theoretical limit is higher.) *Practically*, bandwidth tends to be limited by the characteristics of the installed SSD modules at a lower level.

Latency Performance

The SAS expanders in the I/O modules exhibit orders of magnitude lower latency than fast SSD modules, and a second order derivative in respect to IOPS.

Dual I/O Controllers

Redundant active/active JBOD I/O modules. Auto-negotiate data path speeds; in-band management; two 4x12Gb SAS 3.0 ports (SFF-8644) per controller.

Redundant Hot-Swap Components

- Two SAS-3 JBOD I/O controller modules
- Two advanced power supply fan modules (PSFM)
- Two independent AC power inlets
- Up to 24 2.5" flash drive modules

Rackmount Enclosure

Height 88 mm (3.46 in.) – 2 Rack Units
Width 483 mm (19.0 in.)
Depth 559 mm (22.0 in.)
Weight 18.8 kg (41.46 lbs.) – fully configured with 24 high-cap SSDs
Weight without SSDs: 15.0 kg (33.06 lbs.)

Firmware/Software

WARP Mechanics controller firmware supports SCSI Enclosure Services (SES) 3.0 for in-band management. WARPware hosts include tools for managing firmware and advanced features.

Disk Drive Modules

24 independent 1.5GB/s (12Gb) point-to-point connections to each 2.5" SAS or SATA drive module with dual-port access and failover by each I/O controller to each drive. SATA drive modules require active MUX for redundant I/O.

Active Failure Notifications

In-band via SES-3, audible alarms, LEDs, and front panel display

Maximum External Cable Length

Up to 10m. Within selected WARP end-to-end systems, longer distances are supported via SAS switches, or by using WARPware storage clustering heads.

Host/Expansion Interfaces

Two SAS-3 I/O controller modules per chassis, each with two 4x12Gbps SAS-3 connections (48Gb per interface.)

HD Mini-SAS (SFF-8644) cables can be used for host connections or for daisy-chaining up to ten enclosures on a single path.

Monitoring and Reporting

Monitoring for temperature, advanced power and cooling modules including blower speed control, disk drives and I/O module(s). In-band reporting of serial number, part number and revisions of each FRU and chassis via SES or RS-232.

Warranty Information

Standard one year; up to three via normal renewable support; extended to five years in special circumstances for large installations. Contact WARP Mechanics sales to discuss special requirements.

AC Power

Two 400W PSFMs, hot-swap and redundant
AC 90V ~ 264V Full Range, 8A ~ 4A, 47Hz ~ 63Hz
Compliant with 80 Plus efficiency Gold level
N+1 redundant fans (fans integrated in PSFM)

Operating Environment

Temperature 10°C ~ 40°C (50°F ~ 104°F)
Humidity 10% ~ 85% Non-condensing

Standards Compliance

This product has been tested and evaluated as Information Technology Equipment (ITE) at accredited third-party laboratories for all safety, emissions and immunity testing required for the countries and regions where the product is marketed and sold. The product has been verified as compliant with the latest applicable standards, regulations and directives for those regions/countries. The suitability of this product for other product categories other than ITE, may require further evaluation.

Copyright © 2016 WARP Mechanics Ltd. All Rights Reserved

WARP Mechanics, WARPware, the WARP Mechanics logo, the WARP Mechanics icon, and SmartStorage System are trademarks of WARP Mechanics Ltd. in the United States and other countries. Other brand, product, or service names may be trademarks or service marks of, and are used to identify, products or services of their respective owners. This document is supplied "AS IS" for information only, without warranty of any kind, expressed or implied. WARP Mechanics reserves the right to change this document at any time, without notice.