

## WARP Mechanics® WDS-2490 SAS JBOD Hyper Scale Storage Enclosure

### Features & Benefits

- Extreme High Density and Capacity Dual-path Storage Enclosure
- 90 x 3.5/2.5" SAS3 12Gb/s Hot-swap HDDs
- Dual hot-swap IO Modules w/ four mini SAS HD ports per module
- Redundant BMC for remote monitoring
- High Performance up to 20+ GB/s transfer rate
- SES 3.0 compliant
- HDD Zoning and individual HDD power cycling

IT architects require much larger building blocks to meet modern data growth rates. To access such giant data sets, storage must also be faster in terms of IOPS and throughput. The WARP Mechanics WDS-2490 fills these needs in an efficient, cost-effective package for hyper-scale capacity in a high-density footprint.



Optimized for the absolute highest capacity storage applications, the WDS-2490 supports 90x 3.5" SAS3/SATA3 hard drives in hot-swappable top-loading drive bays. The top-loading design optimizes HDD signal trace routing, and an improved HDD carrier to dampen vibrations and maximize performance.

The WDS-2490 features dual hot-swappable expander modules with four mini SAS HD ports per module. It may connect to customer-provided servers via SAS cables, or act as a disk shelf for WARP Mechanics appliances to support *WARPrmaid*, *WARPnas*, and *WARPhpc* services such as the WARP 30000 and 40000 series appliances.

With 8x x4 12Gbps High Density SAS ports, each JBOD can deliver up to 384 Gbps: that's 48 Gigabytes per second of throughput per chassis. With advanced 10TB drive modules, the WDS-2490 can scale up to 9PB per datacenter rack.

Equipped with 4x 1000W (N+1) redundant high-efficiency power supplies and five high-speed, low-vibration, hot-swappable cooling fans, the WDS-2490 is a reliable and hassle-free storage system. There are several LEDs in the enclosure to keep you informed of the status of the system overall, as well as the activity and health of components. In addition, the redundant BMC provides remote power control and system monitoring via IPMI.

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.





### Ordering Part Number and Product Name

JPS-024290 • WDS-2490 Hyper-scale JBOD

### Scalability/Capacity

Up to 90 drive modules – 720 TB if using 8TB modules. Daisy chaining of enclosures for additional capacity will usually be limited by the SAS HBA or SAS RAID HBA used. Practical configurations of ~5PB 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 4x 2x 4x12Gb, or 384Gb/sec. half-duplex. (Full-duplex theoretical limit is higher.) *Practically*, bandwidth tends to be limited by the characteristics of the installed drive modules at a lower level.

### Latency Performance

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

### Dual I/O Controllers

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

### Redundant Hot-Swap Components

- Two SAS-3 JBOD I/O controller modules
- Four advanced power supply modules (PSU)
- Five x 80mm heavy duty fans with PWM fan speed control
- Up to 90 3.5" drive modules adaptable to 2.5" carriers

### Rackmount Enclosure

Height 7" (178mm) – 4U high  
 Width 17.6" (447mm)  
 Depth 35.66" (906mm)  
 Packaging 31.49" (W) x 30.12"(H) 45.28" (L)  
 Gross Weight 225 lb (102.06 kg)

### 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

90 independent 1.2 GB/s (12Gb) point-to-point connections to each SAS drive module with dual-port access and failover by each I/O controller to each drive. SATA drives are non-redundant I/O and only supported in a single IOM system. Form factor: 3.5" HDDs; 2.5" supported for SSDs via adapter.

### Active Failure Notifications

In-band via SES-3, audible alarms for serious errors, and via LEDs, and IPMI sensor reports

### 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 four 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 four 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 all serial number, part number and revisions of each FRU and chassis via SES/IPMI.

### 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

Four 1000W PSUs, hot-swap and N+1 redundant  
 100-240VAC auto-ranging, 47Hz-63Hz input (high line power only)  
 Compliant with 80 Plus efficiency Titanium level

AC Input: 100-127 V, 50-60 Hz  
 200-240 V, 50-60 Hz

+12V Max: 66.7A (100Vac-127Vac)  
 Max: 83A (200Vac-240Vac)

12V SB Max: 2.1A

### Operating Environment

Temperature 5°C ~ 35°C (41°F ~ 95°F)  
 Humidity 8% ~ 90% (non-condensing)

### Non-Operating Environment

Temperature -40°C ~ 60°C (-40°F ~ 140°F)  
 Humidity 5% - 95% (non-condensing)

### Standards Compliance

Regulatory (Power Supply) Safety / EMC  
 USA - UL listed, FCC  
 Canada - CUL listed  
 Germany - TUV Certified  
 Europe/CE Mark  
 EN 60950/IEC 60950-Compliant