

Ultra-Density **4U 48bay** SAS/SATA JBOD

AIC's 48bay SAS/SATA JBOD is now available for customer sampling starting July. This 4U JBOD is in a new class of disk arrays known as high capacity systems. High Capacity systems are more complicated than traditional systems but offer the end user many benefits.

Cost

A major cost benefit to the user is its high density of 12x hard disks per 1U space, this is more than twice the density of a typical 3U 16bay enclosure. In a full 42U rack ten of these 4U JBODs can be installed for a total of 960TB of raw storage space, versus 448TB of space from fourteen 3U 16bay JBODs. For a typical storage farm this could mean a saving of hundreds of racks, not to mention the amount of maintenance cost savings due to less equipment to maintain. The overall savings on Total Cost of Ownership makes this 4U a huge value proposition for storage solution providers.



Short Depth

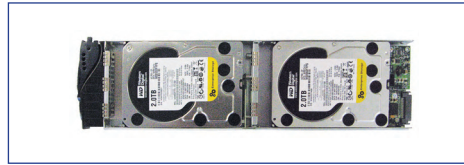
Compared to other high density enclosures in a 4U format the AIC Xstore XJ-SA24-448R-B JBOD is the shortest at only 24 inches. This makes the AIC 4U48 ideal in applications where sub 30-inch deep cabinets and four-post racks are used, such as broadcasting, digital media streaming, and telecommunications. The AIC 4U48 beats the 30 inches depth limitation with 6 inches to spare. Without the AIC 4U48 24" chassis these applications are forced to use less-dense storage enclosures which may be shorter but end with higher costs as they have more units to manage, more potential failures and more rack real estate consumed. The AIC 24" design also means better cooling, which can result in better mean time before failure (MTBF) for the hard disk drives in the enclosure.

Front-loading Drive Bays

XJ-SA24-448R-B comes with 24 dual-drive sleds that are all front-loading as opposed to the top-loading design from other high-density storage products in the market. Front loading is a major end user benefit as a high density enclosure fully loaded with 48 hard disk drives can weight as much as 120 to 150 lbs. To access a failed HDD in a top-loading system, one would have to slide out this 150-lb box with 48x spinning spindles to access the HDD. In contrast to top loading systems to access a failed HDD in the AIC 4U48 front-loading system is as easy as just pulling out single HDD tray. In a front loading system the stability of all the other HDD spindles is not compromised as only the failed drive is moved. The front-loading drive bay design not only saves space it also makes maintenance simple.



One drawback of the dual sled system is that two hard drives are removed at the same time. However, below are illustrations showing how losing two drives at a time can be managed by the host controller to address this concern.

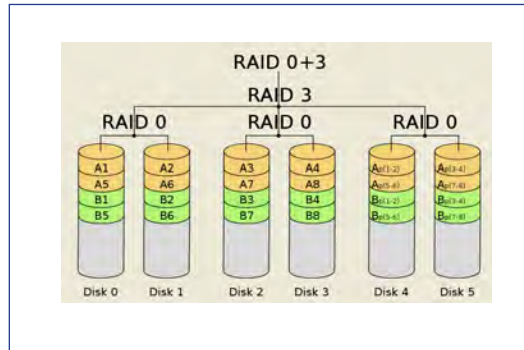


Solution 1 – Create RAID 6 Arrays

RAID 6 allows the concurrent failures of two disks from the same array, so multiple RAID 6 arrays can be created among the 48x disks in each JBOD to minimize risks. This is the simplest to implement to support dual-HDD sled design if controller supports RAID 6.

Solution 2 – Stripe the two disks in each sled

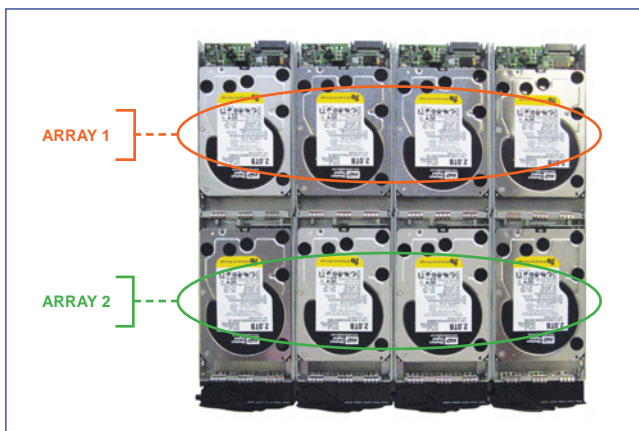
By running a RAID 0 on the two disks in each sled and then run a RAID array across the sleds instead of individual drives is called a Nested RAID or Hybrid RAID. Lost of two drives from each RAID 0 is considered by the RAID 5 on top as a single failure from this array, so it's tolerable.



Example of a RAID 0+3 Nested RAID

Solution 3 – Run RAID arrays across only the front or rear row of drives

By not running the two disks from each sled in the same RAID array, pulling each dual-HDD sled out would only introduce one failure per each RAID array each disk resides in. This is less complicated since it does not involve Nested RAID.



Cool by Design

Due to the front-loading drive bay design airflow between the drive sleds is optimally arranged, so with the four powerful Power + Fan modules airflow is never compromised. There is absolutely no re-circulation of exhausted heat of any sort within the enclosure so even 48x 15,000RPM SAS hard disk drives can work correctly under 35C ambient. The shorter depth also plays an important role for the excellent cooling since airflow does not have to travel more than 24 inches to the exhaust point.



No single point of Failure

All elements of the AIC 4U48 have redundant systems. With a 3+1 power system a single PSU failure is not a problem. Each PSU module has a dual power feed, an AC feed for the PSU and a system back-plane feed for the Fan, temperature, and Management functions. A PSU without an AC feed still functions as a cooling element can be fully managed.



Energy Efficiency

The four 500W single output Power Supplies provides a superb 85%+ efficiency. For a system this size this could mean close to 300W of savings coming from power supply efficiency versus a 70% efficient power solution, which in turn translates into over \$1000 per year of operating cost savings. This high efficiency PSU is possible due to AIC's power management system. All PSU's are high efficiency single 12V rail PSU with a novel point of load conversion. Each drive sled has in turn a high efficiency point of load converter to power to the disk drives. Point of load conversion and Power management firmware allows on-off control of each drive allowing programmable power-saving schemes to reduce system power wastage. In large configurations such as large datacenters the total power savings can really make the difference.

Compatibility

Unlike some JBODs on the market today, this intelligent SAS/SATA expansion storage enclosure is under continuous validation efforts to ensure compatibility with various RAID Controllers, Host Bus Adapters, and SAS/SATA hard drives. A compatibility matrix can be obtained from AIC before selecting controllers and hard drives for integration.

Management

The AIC 4U48 JBOD can be managed using a standard SES Interface. In addition to the standard SES commands AIC provides a comprehensive set of vendor specific commands for fine grain control of the enclosure. These commands allow the user to control Disk Zoning, On-Off control of enclosure, Disk Phy statistics, and many low level functions. These vendor commands are provided through a serial port or through SES Page-4 vendor specific commands.

Storage Management Software

The AIC 4U48 is a stand alone product, however it is also fully integrated with AIC's storage stack XSM – Xtreme Storage Manager. The AIC 4U48 JBOD when used with XSM provides a full RAID storage system offering RAID, Volume virtualization, iSCSI, Fiber Channel, and SAS Host interfaces with add-on modules for SnapShot and Replication.



Summary

This XJ-SA24-448R-B SAS/SATA JBOD from AIC represents the best value on the market today for anyone looking for high-density secondary storage solutions. The technology and cost savings offered by this JBOD again demonstrate the unmatched engineering capability and innovative minds of AIC. XJ-SA24-448R-B JBOD can be ordered with SAS Interposer and SATA AAMUX interposer.