



# Xserve RAID



This high-performance storage system delivers data protection and enormous capacity—up to 2.5TB—at a groundbreaking price.

## Key Features

**Massive storage capacity.** Fourteen drive bays hold up to 2.5TB of storage.<sup>1</sup> Independent ATA drive channels eliminate interdrive dependencies to maximize bandwidth and availability.

**High-speed throughput.** The dual independent 2Gb Fibre Channel host interface transfers terabytes of data at up to 400MB/s—fast enough for demanding HD video editing applications.<sup>2</sup>

**Superior data protection.** A high-availability architecture and dual independent RAID controllers support RAID levels 0, 1, 3, 5, and 0+1. In addition, Xserve RAID supports hybrid RAID levels 10, 30, and 50 when used in conjunction with host-based software RAID.

**Maximum uptime.** Xserve RAID keeps running with redundant load-sharing power supplies and cooling modules. These field-replaceable modules enable service without tools or downtime.

**Remote management and monitoring.** The included RAID Admin application makes it easy to set up, manage, and monitor Xserve RAID systems from virtually anywhere on the Internet.

**Server-class support products.** Problem resolution is fast with the AppleCare Premium Service and Support Plan and AppleCare Service Parts Kits.

Xserve RAID combines leading-edge storage technologies for superior capacity and data protection in a 3U rack-optimized enclosure. Fast throughput and flexible configuration options make Xserve RAID ideal for businesses and institutions that demand high-availability, high-performance storage. With up to 2.5TB of capacity<sup>1</sup> and innovative tools for remote management, this breakthrough RAID solution is easy to configure, easy to maintain, and powerful enough to meet your organization's growing storage requirements.

The innovative Apple-designed Xserve RAID architecture combines affordable, high-capacity ATA drive technology with a dual independent 2Gb Fibre Channel host interface for fast, reliable data access. Each 180GB Apple Drive Module uses a dedicated drive channel, maximizing the 400MB/s Fibre Channel host connection.<sup>2</sup> This also means that as you add drives, Xserve RAID scales in both capacity and performance. And by adding more systems, you'll have virtually limitless expansion.<sup>3</sup>

When it comes to managing and protecting your digital assets, failure is not an option. That's why Xserve RAID provides fast access to storage without compromising data integrity. A high-availability architecture with dual independent RAID controllers delivers protected storage with unprecedented performance. In fact, Xserve RAID boasts a throughput at RAID level 5 that's fast enough to support real-time HD 1080i video editing. In the event of a drive failure, access to your data remains unaffected while Xserve RAID automatically rebuilds the contents of the failed drive on a spare drive.<sup>4</sup>

To maximize availability of your critical data, Xserve RAID is designed for nonstop operation. Redundant hot-swap power and cooling modules allow the system to keep your data online and accessible even if one module fails. All the active components are modular, making it easy to replace them in seconds—usually without any interruption of service.

Each Xserve RAID controller features an environment management coprocessor that controls RAID setup and monitoring of disk arrays and enclosure conditions. The Java-based RAID Admin application works with the coprocessors to build RAID sets on the fly, allowing administrators to bring protected storage online quickly and easily. Newly created RAID sets are available immediately, while Xserve RAID initializes them in the background. RAID Admin also provides integrated monitoring of all Xserve RAID systems across your organization, with instant event notifications via email or pager.

With Xserve RAID, Apple delivers a high-performance, high-availability storage system that is both affordable and easy to use. Designed for businesses, schools, and digital content creators, it's the ideal solution for managing and protecting your digital assets.

## Specification Sheet

Xserve RAID

### RAID levels

RAID technology can be applied in different configurations, or RAID levels—each offering a unique balance of I/O performance, data protection, and storage efficiency. Xserve RAID supports the most popular RAID levels, so you can select the best configuration for your application and your budget.

**RAID 0: Striping.** Lays down data in stripes across an array of drives for exceptional I/O performance, but with no data protection.

**RAID 1: Mirroring.** Writes identical copies of data on a pair of disks for total redundancy, but with limited performance and inefficient use of drives.

**RAID 3: Striping with parity.** Stripes data across two or more drives and stores parity data on a dedicated drive, providing data redundancy and performance that's faster than that of a single drive.

**RAID 5: Striping with distributed parity.** Distributes data and parity information across an array for high throughput, good redundancy, and efficient use of drives.

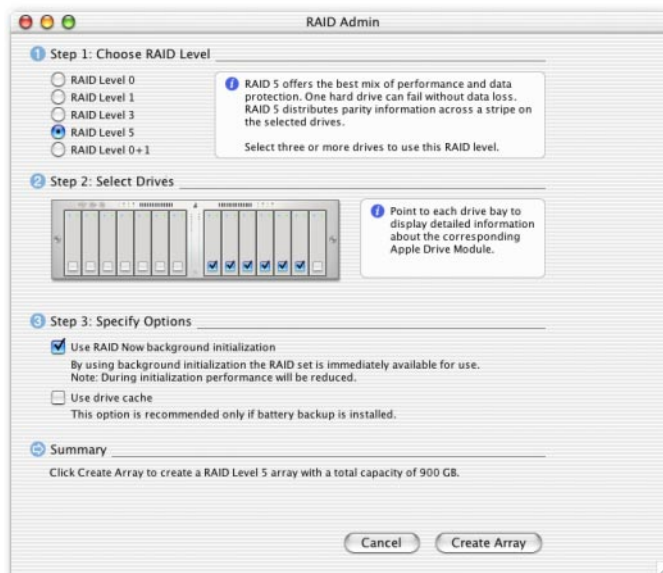
**RAID 0+1: Striping over mirroring.** Stripes data across pairs of mirrored drives for a mix of performance and redundancy.

**RAID 10, 30, and 50: Striping over RAID 1, 3, and 5.** Uses hardware RAID to create two or more sets in RAID level 1, 3, or 5, and software RAID to stripe across the sets. This creates a single data volume with the best balance of performance and data protection.

### Intuitive tools for creating RAID arrays

Xserve RAID includes RAID Admin, a revolutionary Java-based application for setting up and managing multiple Xserve RAID systems. RAID Admin works over TCP/IP, so you can configure and monitor protected storage from virtually any computer on the Internet. In addition, it uses robust password authentication to protect your storage systems from unauthorized access.

RAID Admin provides an intuitive interface for creating RAID sets on the fly—perfect for RAID novices and experienced administrators alike. Choose a RAID level and you get information about the benefits and limitations of that level. Next, click the drives you want to assign to the RAID set. RAID Admin even gives you information about each of the drives in your Xserve RAID system, so there's no guesswork. Any remaining drives are automatically assigned as global hot spares for each controller. When you're ready, choose background initialization to make the newly created RAID set available immediately.

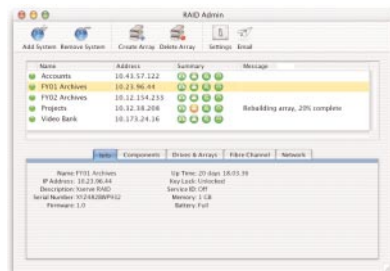


RAID Admin lets you create disk arrays in three easy steps.

### Visual feedback and remote monitoring

Xserve RAID is designed to provide continual visual feedback for local monitoring. The front panel has indicator lights and LEDs that display health and status at a glance for all system components. In the event of a component failure, the alarm system is triggered and system identifier buttons on the front and back panels light up—making it easy to locate a particular Xserve RAID in a rack with multiple devices.

At the same time, the RAID Admin application provides real-time remote monitoring of all Xserve RAID systems on the network. Next to each system name, icons display in green, yellow, or red to indicate the health of each subsystem, while the tabs below provide detailed information about operating conditions and performance. If operating conditions for any subsystem exceed predefined thresholds, RAID Admin sends email notifications to the administrator for fast problem resolution without downtime or data loss. Also included in RAID Admin are advanced Fibre Channel networking features such as LUN masking, which enables you to make storage volumes accessible to specific host systems while masking them from others on the Fibre Channel network.



RAID Admin software displays summary health and status information for multiple Xserve RAID systems. Using Apple's Rendezvous technology, it automatically discovers Xserve RAID systems on your network and can add them to the display.

## Configurations

Order number	M8668LL/A	M8669LL/A	M8670LL/A
Total available storage <sup>1</sup> —RAID 0	720GB	1.26TB	2.52TB
Usable storage <sup>1</sup> —RAID 1	360GB	540GB	1.08TB
Usable storage <sup>1</sup> —RAID 3 and 5	540GB	1.08TB	2.16TB
ATA/100 Apple Drive Modules (7200 rpm)	Four 180GB drives	Seven 180GB drives	Fourteen 180GB drives
On-drive cache	8MB per drive	8MB per drive	8MB per drive
Expansion	Fourteen drive bays with independent 100MB/s ATA channels for up to 2.5TB of storage		
Service and support	90 days of free telephone support and one-year limited warranty; optional extended service and support products		
Also included	Mounting screws with M5, M6, and 10/32-inch threads; caged nuts; two agency-approved 12-foot power cables		

## Specifications

RAID controllers and cache memory	<ul style="list-style-type: none"> <li>Dual independent controllers, each with environment management coprocessor for out-of-band remote management and monitoring</li> <li>128MB of cache per controller (256MB total); support for up to 512MB per controller (1GB total)</li> <li>Cache Backup Battery Modules (sold separately) for over 72 hours of memory protection</li> </ul>
RAID operation	<ul style="list-style-type: none"> <li>Support for RAID levels 0, 1, 3, 5, 0+1, 10, 30, 50 (10, 30, and 50 require host-based software RAID)</li> <li>Support for multiple RAID sets, multiple hosts, and LUN masking</li> <li>Background RAID set creation; automatic variable background rebuilding; global drive hot sparing (per RAID controller)</li> </ul>
Fibre Channel storage-to-host connection	<ul style="list-style-type: none"> <li>Dual 2Gb Fibre Channel ports (HSSDC2), 200MB/s throughput per channel with guaranteed bandwidth (400MB/s full duplex)<sup>2</sup></li> <li>Host connectivity using 2Gb Apple Fibre Channel PCI Card (sold separately) or compatible third-party PCI card</li> <li>Support for point-to-point, loop, and fabric (switched) topologies</li> <li>Dual 10/100BASE-T Ethernet for remote management</li> </ul>
Apple Fibre Channel PCI Card (sold separately)	<ul style="list-style-type: none"> <li>64-bit, 66MHz card with dual SFP 2Gb Fibre Channel ports; compatible with 32-bit, 66MHz slots</li> <li>Two 2.9-meter Fibre Channel copper cables (SFP transceiver to HSSDC2); compatible with SFP fiber-optic cables and transceivers</li> </ul>
Cooling	<ul style="list-style-type: none"> <li>Redundant hot-swap cooling modules with self-regulating speeds and front-to-back cooling</li> <li>Environmental monitoring system for automatically maintaining optimal ambient temperature</li> </ul>
Electrical requirements	<ul style="list-style-type: none"> <li>Redundant load-sharing hot-swap power supplies (450W); universal input (90V to 264V AC), power factor corrected</li> <li>Maximum input current: 7.1A (90V to 132V) or 3.5A (180V to 264V)</li> <li>Power usage: 300W typical continuous power, 400W maximum continuous power</li> <li>Dual DB-9 serial ports for UPS systems</li> <li>Frequency: 47Hz to 63Hz, single phase</li> </ul>
Environmental requirements	<ul style="list-style-type: none"> <li>Operating temperature: 50° to 95° F (10° to 35° C)</li> <li>Storage temperature: -40° to 116° F (-40° to 47° C)</li> <li>Relative humidity: 5% to 95% noncondensing</li> <li>Maximum thermal output: 1365 BTUs per hour</li> <li>Maximum altitude: 10,000 feet</li> <li>FCC Class A approved</li> </ul>
Size and weight	<ul style="list-style-type: none"> <li>5.25 inches (13.3 cm) high by 17 inches (43.2 cm) wide by 18.4 inches (46.7 cm) deep</li> <li>Fits EIA-310-D-compliant, industry-standard 19-inch-wide four-post racks from 24 to 36 inches deep; deeper racks require third-party extender</li> <li>60 to 110 pounds (27 to 45 kg), depending on configuration</li> </ul>



### Xserve

Xserve RAID works seamlessly with Xserve, Apple's highly acclaimed server solution. Equipped with single or dual 1.33GHz PowerPC G4 processors, Xserve packs phenomenal computational power and a rich feature set into an affordable 1U rack-optimized system. Two full-length 64-bit, 66MHz PCI slots provide up to 533MB/s throughput to take advantage of the advanced Xserve RAID architecture and 2Gb Fibre Channel interface. Dual independent Gigabit Ethernet ports ensure rapid delivery of data over today's high-speed networks. Xserve includes Mac OS X Server Unlimited-Client Edition, Apple's UNIX-based server operating system with comprehensive file sharing and Internet services for Mac, Windows, and UNIX clients.

### Apple Fibre Channel PCI Card

Xserve RAID connects to a host Xserve or Power Mac G4 system using the dual-port 2Gb Apple Fibre Channel PCI Card (sold separately). This high-speed storage interface offers dedicated bandwidth with throughput of up to 400MB/s. The Fibre Channel interconnect technology supports multiple application environments, using point-to-point, loop, and fabric topologies. The PCI card comes with two 2.9-meter copper cables. For connecting over longer distances—up to 500 meters—Apple's card accepts SFP (Small Formfactor Pluggable) optical transceivers for use with fiber-optic cables.

## For More Information

For more information about this product or to purchase Apple products, visit the Apple Store online ([www.apple.com](http://www.apple.com) or 800-MY-APPLE), an Apple Store near you, or an authorized Apple reseller.

For more information about specific Xserve technologies, including Xserve, Xserve RAID, and Mac OS X Server, visit [www.apple.com/xserve](http://www.apple.com/xserve).

## Ordering Information

The following standard Xserve RAID configurations are available. You can also order custom-configured Xserve RAID systems with additional Apple Drive Modules and more cache memory.

### 720GB Xserve RAID

Order number M8668LL/A

### 1.26TB Xserve RAID

Order number M8669LL/A

### 2.52TB Xserve RAID

Order number M8670LL/A

**System requirements:** Xserve or Power Mac G4 (800MHz or faster) with Mac OS X v10.2.4 or Mac OS X Server v10.2.4 (or later) and compatible Fibre Channel PCI card.

## Other Products

These products are available to enhance your Xserve RAID system.

### Apple Fibre Channel PCI Card

Order number M8940G/A

### Xserve (single-processor server)

Order number M8888LL/A

### Xserve (dual processor server)

Order number M8889LL/A

### 180GB Apple Drive Module

Order number M8939G/A

### Cache Backup Battery Modules (2)

Order number M8941G/A

### AppleCare Premium Service and Support Plan

Order number M8927LL/A

### AppleCare Service Parts Kit

Order number M8929G/A

## Service and Support Products

Extend your one-year limited warranty with these world-class support options. See [www.apple.com/support/products](http://www.apple.com/support/products) or call 800-275-2273 in the United States or Canada.

### AppleCare Premium Service and Support Plan.

Covers hardware repairs with four-hour onsite response during business hours and next-day onsite response after business hours (terms apply). Up-and-running support and basic troubleshooting are also available by phone or email 24 hours a day.<sup>5</sup>

**AppleCare Service Parts Kit.** Provides crucial Xserve RAID parts—a RAID controller, power supply, cooling module, and 180GB Apple Drive Module—for rapid onsite replacement and resolution of the most common hardware failures.

**Mac OS X Server Software Support.** Provides consultative phone and email support for advanced Mac OS X Server integration and migration issues.

**Apple Professional Services.** Offers comprehensive consulting for enterprise-oriented deployments. Services include installation and integration, planning and migration, application development, and project consulting. See [www.apple.com/services](http://www.apple.com/services) or call 800-848-6398.

<sup>1</sup>For hard drive capacity measurements, 1GB = 1 billion bytes and 1TB = 1 trillion bytes; actual formatted capacity less. Usable capacity depends on drive configuration and RAID level. <sup>2</sup>Actual rates will vary depending on configuration and RAID level. <sup>3</sup>Host operating system limitations apply. <sup>4</sup>Automatic rebuild requires a designated hot spare; not available for RAID level 0. <sup>5</sup>A separate AppleCare Premium Service and Support Plan must be purchased for each Xserve RAID system to be covered. To qualify, your Xserve RAID system must be within its one-year hardware warranty. Coverage ends three years after date of Xserve RAID purchase. Actual onsite response time and availability of onsite service depend on location; see [www.apple.com/support/products/premium](http://www.apple.com/support/products/premium) for details. Local telephone fees may apply; telephone numbers may vary and are subject to change.