

# SAS 3224

## PCIe® to 24-port, 12 Gb/s SAS/SATA IOC



### Applications

- Direct Attached SAS/SATA controller solutions for high-connectivity applications
- External storage controllers requiring high connectivity SAS/SATA interface for the host or drive side connect

### Key Features

- High Performance IOP
  - PowerPC 476 @ 1.2 GHz
  - 32 KB L1 I/D caches
  - 512 KB L2 caches
  - 6 MB Internal RAM
- PCI Express 3.0 Host Interface
  - Supports x8, x4, x2, x1 PCIe lanes at a transfer rate up to 8.0 GT/s per lane, full duplex
  - Lane and polarity reversal
  - Supports End-to-End CRC (ECRC) and Advanced Error Reporting (AER)
  - PCI Express hot plug support
  - Variable PCIe bandwidth negotiation

### Extending RAID and SAS Technology Leadership, Broadcom Introduces 24-port 12 Gb/s SAS/SATA IO Controller (IOC)

Broadcom products serve four primary target markets: wireless communications, wired infrastructure, enterprise storage, and industrial. Broadcom offers the industry's broadest portfolio of storage solutions, backed by decades of experience and trusted by the world's leading server and storage suppliers. Broadcom provides the building blocks for storage solutions that help customers understand, prioritize, store and protect critical data.

The Broadcom 12 Gb/s SAS portfolio includes MegaRAID® controller cards, host bus adapters (HBAs), advanced software options, Syncro® shared DAS solutions and SAS storage ICs, including RAID-on-Chip (ROCs), I/O controllers and expanders.

### Overview

The SAS 3224 is a fourth generation Serial Attached SCSI (SAS) IO Controller (IOC) device based on the leading Fusion-MPT™ (Message Passing Technology) architecture. The SAS 3224 integrates the latest enhancements in SAS and PCI Express technology.

The SAS 3224 supports 8 PCIe® lanes and complies with the PCI Express (PCIe) 3.0 specification that extends the PCIe data rates up to 8.0 GT/s per lane, and is backwards compatible to the 5.0/2.5 GT/s data rate supported by PCIe 2.x., 1.x. It also incorporates enhancements such as End-to-End CRC (ECRC) with Advanced Error Reporting (AER) and the latest advancements in lane and polarity reversal, power management, hot plug support, and MSI/MSI-X and legacy interrupt generation.

The 24-port IO controller device provides SAS data transfer rates of 12, 6, and 3 Gb/s per lane and SATA data transfer rates of 6 and 3 Gb/s per lane. The device automatically negotiates between the speeds. Enhanced features are supported such as T-10 EEDP for early detection of and recovery from data corruption and Spread Spectrum-Clocking (SSC) for EMI reduction. Additional features include DataBolt Technology, allowing users to take advantage of 12 Gb/s speeds while utilizing existing 6 Gb/s drives and backplanes, and SATA FIS-based switching that provides improved performance with SATA drives.

The SAS 3224 is ideal for the host or drive side connect for external storage controllers requiring a SAS/SATA interface. The SAS 3224 can support up to 2,000 devices and 8,000 outstanding IOs without external RAM and can achieve up to 1 million plus IOs per second.

## Key Features (con't)

- 12 Gb/s SAS Interface
  - 24 port SAS+SATA controller
  - Supports 12, 6, and 3 Gb/s SAS and 6, 3 Gb/s SATA data transfer rates
  - Spread spectrum clocking
  - Supports SSP, SMP, STP and SATA protocols
  - SAS/SATA device support
  - Supports narrow and wide ports
  - T-10 End to End Data Protection (EEDP)
  - T-10 Optical Support
  - Supports DataBolt bandwidth aggregation technology
- External memory interface support
  - 8-and 16-bit Flash/NVSRAM
- Communication interfaces
  - I<sup>2</sup>C interfaces for enclosure management services
  - UART and Ethernet interfaces
  - SFF-8485 compliant, SGPIO
  - JTAG support
- Package 27 mm

Broadcom provides a complete suite of industry standard operating system drivers. Broadcom also supports Virtual Operating Systems with device emulation and para-virtualization.

## Fusion-MPT Architecture Overview

Fusion-MPT architecture marks the next generation of I/O architecture designed to deliver the highest performance available today while reducing time to market, integration, and certification time. Fusion-MPT devices are high performance, cost-effective protocol controllers that represent the newest system-level integration technology in intelligent I/O processors from Broadcom.

Figure 1: SAS 3224 Block Diagram

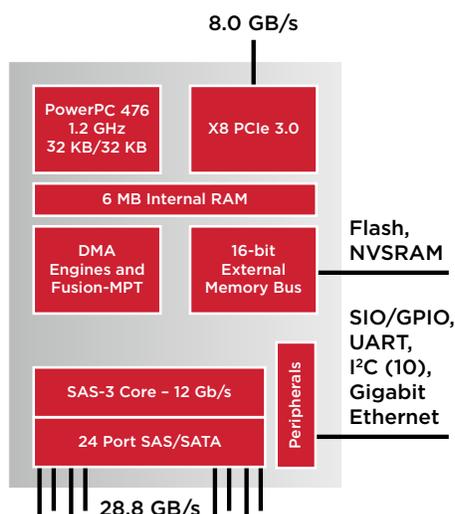


Figure 2: SAS 3224 Direct Attach

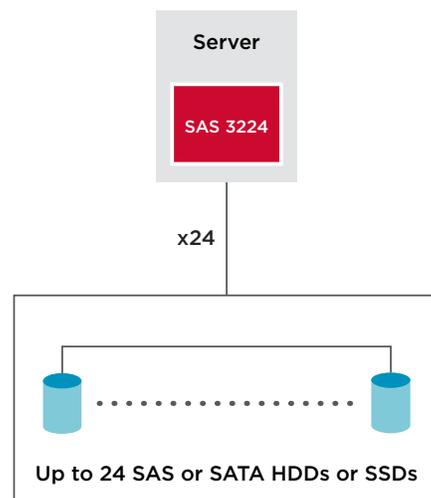


Figure 3: SAS 3224 Topology Diagram

