

# SAS 3324

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



### Applications

- Direct Attached SAS/SATA controller solutions for entry to mid-range servers
- SAS RAID host bus adapter
- Cost effective, single chip solution for entry-level RAID storage systems supporting up to 24 direct-attach drives
- Storage Processor for external storage applications (SAS 3324SP)

### Key Features

- High Performance IOP
  - (2) PowerPC 476 @ 1.2GHz
  - (2) 32KB L1 I/D caches
  - (2) 512KB L2 caches
  - 2MB shared L3 cache
- Exclusive-OR hardware engine for RAID 5
- RAID 6 hardware acceleration
- RAID Features
  - MegaRAID® support with activation key (RAID levels 0, 1, 5, 6, 10, 50 and 60)
- DRAM back-up at power fail using ONFI (Open NAND Flash Interface)
  - Supports bad block management
  - Also supports offload to SDRAM (requires battery backup or Supercap)

### Extending RAID and SAS Technology Leadership, Broadcom Introduces 24-port 12Gb/s SAS/SATA RAID-On-Chip (ROC)

Broadcom storage 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 12Gb/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 3324 is a fourth generation Serial Attached SCSI (SAS) RAID-On-Chip (ROC) device based on ROC technology and the leading Fusion-MPT (Message Passing Technology) architecture. The SAS 3324 integrates the latest enhancements in SAS and PCI Express technology.

The SAS 3324 supports 8 PCIe® lanes and complies with the PCI Express 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 Single Root I/O Virtualization (SR-IOV) with 16 virtual functions, 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 ROC device provides SAS data transfer rates of 12, 6, and 3Gb/s per lane and SATA data transfer rates of 6 and 3Gb/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, Spread Spectrum-Clocking (SSC) for EMI reduction, and data encryption for the protection of confidential data. Additional features include DataBolt Technology allowing users to take advantage of 12Gb/s speeds while utilizing existing 6Gb/s drives and backplanes, and SATA FIS-based switching that provides improved performance with SATA drives. The SAS 3324 is available with encryption and without encryption.

The SAS 3324 ROC integrates a 72-bit, DDR3-1866 interface and supports hardware acceleration engines for RAID 5 and RAID 6 parity calculations and high performance dual core PowerPC 476 RISC processor that achieves 2400 Dhrystone MIPS (DMIPS) resulting in a cost-effective ROC ideal for entry and mid-range servers.

## Key Features (cont.)

- 12Gb/s SAS Interface
  - 24 port SAS+SATA controller
  - Supports 12, 6, and 3Gb/s SAS and 6, 3Gb/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
- 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, duplex
  - Lane and polarity reversal
  - SR-IOV (16 virtual functions)
  - Supports End-to-End CRC (ECRC) and Advanced Error Reporting (AER)
  - PCI Express hot plug support (SAS 3324SP)
  - Variable PCIe bandwidth negotiation
- External memory interface support
  - 72-bit, DDR3 interface running up to 1866MHz
  - 8- and 16-bit Flash/SRAM/NVSRAM
- Communication Interfaces
  - I<sup>2</sup>C interfaces for enclosure management services
  - UART and Ethernet interfaces
  - SFF-8485 Compliant, SGPIO
  - JTAG support
- Package (estimated) 27mm

Broadcom offers a full featured RAID implementation, MegaRAID<sup>®</sup> hardware RAID (0, 1, 5, 6, 10, 50, 60) is ideal for high performance and high availability applications.

For ease of use, the RAID products are managed under a common management utility, MegaRAID Storage Manager (MSM). Broadcom provides a broad suite of industry standard operating system drivers.

## 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.

