

# Marvell® 88RC9548/88RC9580

6Gb/s SAS/SATA RAID-on-Chip Processor

## Overview

Marvell® offers new RAID chip solutions for data centers that must deliver the storage and performance needed for High Performance Computing (HPC), Cloud, web/file/email services, security/surveillance, video-on-demand and other data-intensive applications. The Marvell 88RC9548 and 88RC9580 are a four-port and an eight-port 6Gb/s SAS/SATA RAID-on-Chip (ROC) respectively that provide an PCI Express 2.0 host interface and incorporates an ARM-based processor, RAID 5/6 and CRC32 engines and internal SRAM and DDR3 memory interfaces optimized for advanced RAID topologies. Both the 88RC9548 and the 88RC9580 support Serial Attached SCSI 2.0 (SAS 2.0) and the SATA protocol defined in the Serial ATA, Revision 3.0 specification. Leveraging the high-performance SAS/SATA PHYs and a self-configuring PCI Express core, each of the PHYs is

capable of 1.5, 3 and 6Gb/s SAS and SATA link rates and PCI Express running backward compatibility to PCIe 1.1.

The Marvell RAID-on-Chip solutions bring a high-performance, cost-effective 6Gb/s per port combined SAS and SATA solution to Host Bus Adapter (HBA) and server designs utilizing a one-, four- or eight-lane PCI Express 2.0 interface, delivering up to 4GB/s bandwidth to the host system for performance-hungry applications. The family of devices includes an embedded ARM® CPU running at 900MHz for full RAID offload without occupying system CPU utilization, thereby increasing overall system performance. Figure 1 illustrates the block diagram of the 88RC9580. The following table summarizes the feature of the Marvell RAID-on-Chip devices.

## Block Diagram

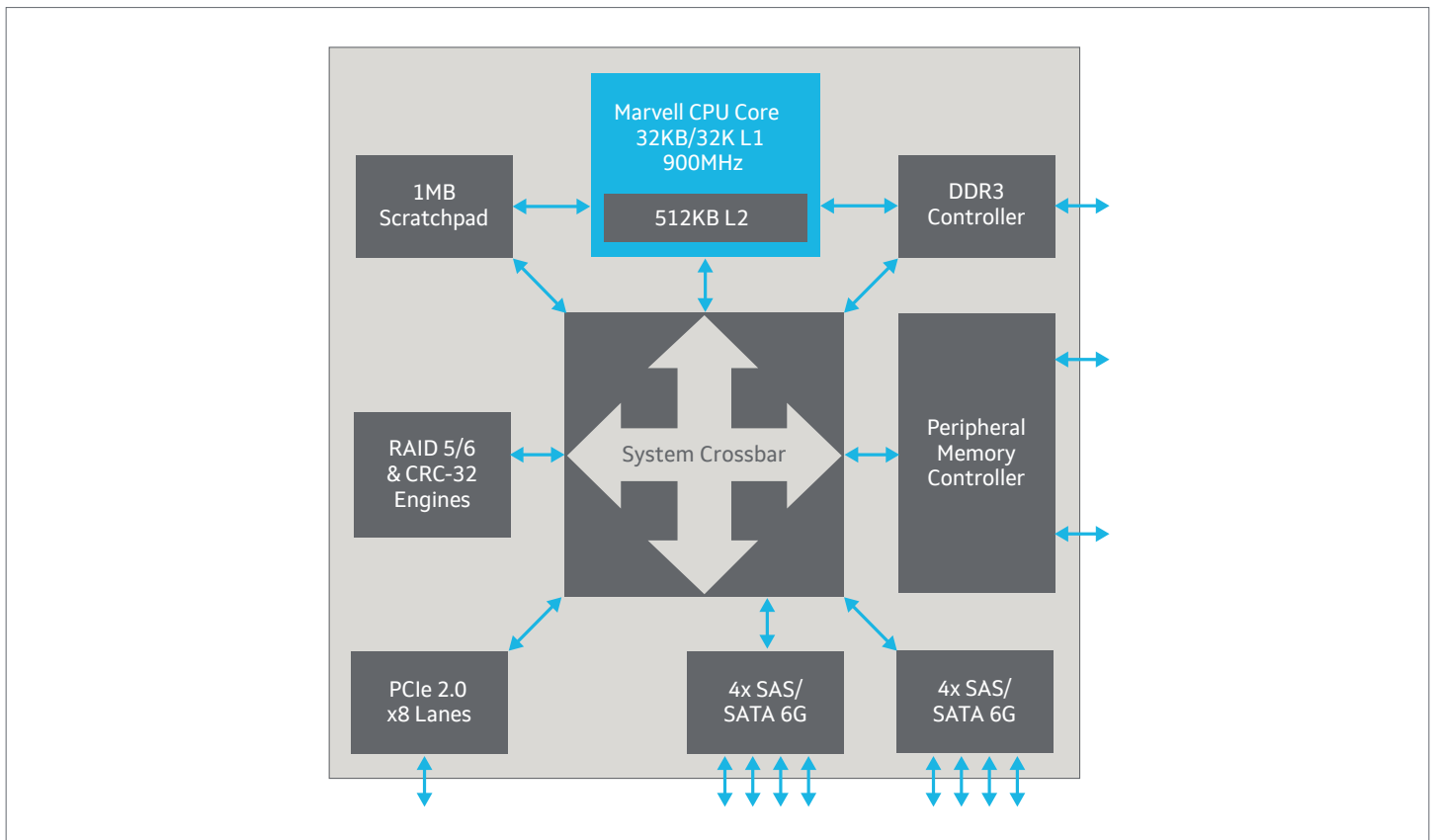


Figure 1. Block Diagram

## Key Features

MODEL	88RC9548	88RC9580
• PCIe 2.0 Compliant (5 GT/s)	X1, X4, or X8	X1, X4, or X8
• 6Gb/s SAS/SATA Ports	4	8
• SAS 2.0 Compliant	Support SSP, SMP, STP and wide port	Support SSP, SMP, STP and wide port
• SATA 6Gb/s Compliant	6Gb/s SATA PHY with speed negotiation to backward support 1.5Gb/s and 3Gb/s	6Gb/s SATA PHY with speed negotiation to backward support 1.5Gb/s and 3Gb/s
• Programmable Signaling Levels	Gen1x, Gen2i, Gen2x and Gen 3i	Gen1x, Gen2i, Gen2x and Gen 3i
• Concurrent I/Os per Chip	4096	4096
• Native Command Queuing	Supports up to 128 simultaneous SATA devices with 32 concurrent I/Os per device	Supports up to 128 simultaneous SATA devices with 32 concurrent I/Os per device
• FIS-based Switching	Better performance with simultaneous connection	Better performance with simultaneous connection
• Embedded CPU	900MHz ARM CPU for full RAID offload	900MHz ARM CPU for full RAID offload
• DDR Memory Interface	Supports both DDR2 and DDR3 memory of up to 8GB	Supports both DDR2 and DDR3 memory of up to 8GB
• NVSRAM Interface	Supports up to 4MB of external NVSRAM memory (x8 / x16)	Supports up to 4MB of external NVSRAM memory (x8 / x16)
• SPI Flash Interface	External Flash containing configuration data and/or boot code	External Flash containing configuration data and/or boot code
• T10 End-to-End Data Protection	Complete data path protection between host and drives	Complete data path protection between host and drives
• Enclosure Management	SGPIO and SES-2 over I2C support	SGPIO and SES-2 over I2C support
• Two-Wire Serial Interface (TWSI)	Interface for external EEPROM containing configuration information	6Gb/s SATA PHY with speed negotiation to backward support 1.5Gb/s and 3Gb/s
• GPIO Support	Up to 42 GPIO pins	Up to 42 GPIO pins
• Power Consumption	~8W	~9W
• Package Size & Type	27mm × 27mm 676-Ball FCBGA	27mm × 27mm 676-Ball FCBGA

## Target Applications

The Marvell RAID-on-Chip solutions are high performing, reliable and scalable SAS RAID solutions for demanding dataintensive applications such as high-performance computing, web/file/email servers, Thunderbolt RAID array, video/ audio editing, security/surveillance, video-on-demand and medical imaging. Also, the 88RC9548 and 88RC9580

have embedded ARM CPU and XOR engines supporting advanced RAID features such as Dual XOR RAID 6, P+ Q + Copy, or Q + Q + Q RAID 6, and are ideal for mid-range to high-end servers and high quality data storage systems capable of running hardware RAID 0/1/10/5/6/50/60. RAID stacks is available from Marvell as an option.

## Target Market

- RAID HBA
- Storage Server/Cloud Storage
- PCIe SSD Applications

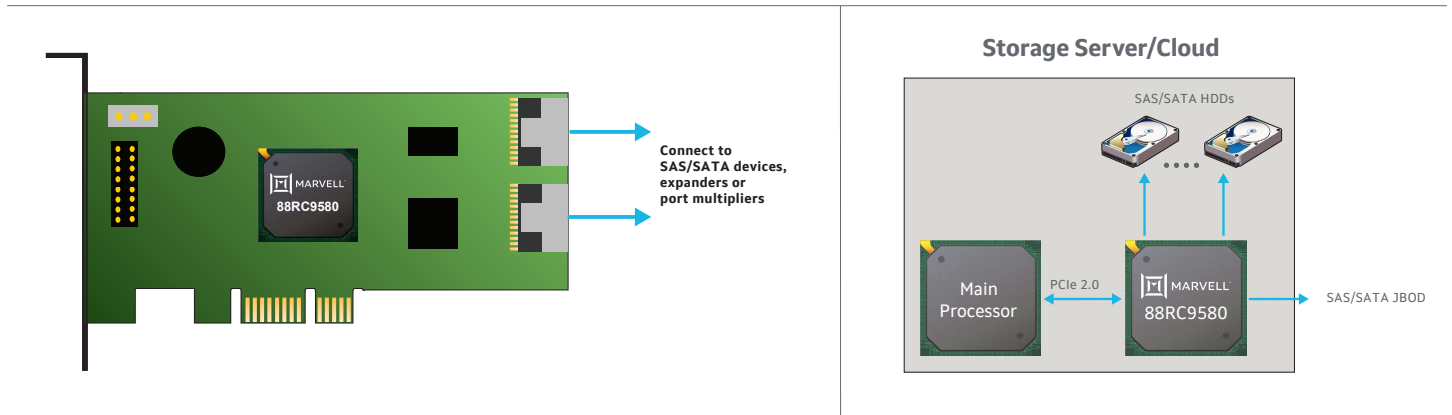


Figure 2. RAID HBA (Host Bus Adapter)

Figure 3. Storage Server/Cloud Storage Applications

The device is available with a complete software development kit that includes programming register specification, non-RAID firmware reference code and Linux open source driver. The chip and developer kit provide customers the flexibility to develop their own firmware, RAID stack, drivers and management software to meet various market requirements.



To deliver the data infrastructure technology that connects the world, we're building solutions on the most powerful foundation: our partnerships with our customers. Trusted by the world's leading technology companies for 25 years, we move, store, process and secure the world's data with semiconductor solutions designed for our customers' current needs and future ambitions. Through a process of deep collaboration and transparency, we're ultimately changing the way tomorrow's enterprise, cloud, automotive, and carrier architectures transform—for the better.

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