Marvell® 88SS1321 SSD Controller

PCIe Gen 4x4, 4-Channel High-Performance SSD Controller with NVMe 1.3c Interface

Overview

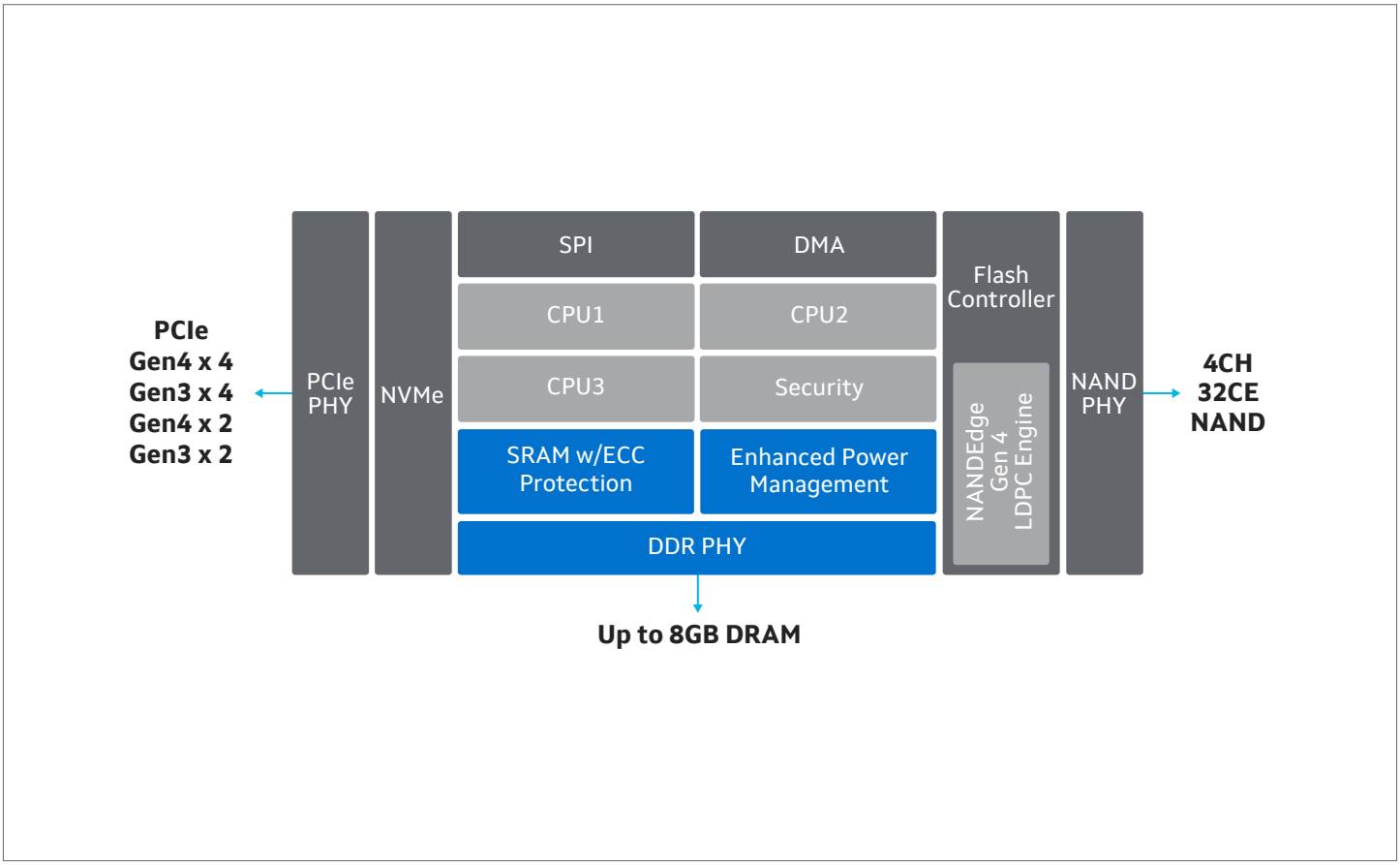
The Marvell® 88SS1321 enables high performance and high capacity SSDs for use in small form factor applications; for example, cloud data center compute server storage, enterprise boot drives, PC client storage and gaming storage as well as emerging industrial and edge device applications.

Leveraging a tri-core Arm® Cortex® R5 architecture that supports both DRAM and DRAMless operations, the product is ideally suited for m.2 2242, 2280 SSDs in single & double-sided and m.2230 in double-sided form factor. The Marvell 88SS1321 controller supports PCIe Gen 4 and four ONFI and TOGGLE NAND channels operating at up to 1200MT/s that enable high capacity, high throughput and low latency storage over a wide range of use cases. The common hardware and firmware controller architecture in 12nm process technology provides the best-in-class electrical and thermal characteristics and ultra-low power consumption.

The 88SS1321 leverages the 4th generation of the Marvell NANDEdge™ LDPC engine for extracting the highest level of error correction capability and low-latency read retries and endurance to support next generation TLC and QLC memories.

The SSD controller also supports TCG standards including an AES engine and OTP storage for secure drive configuration.

Block Diagram



Key Features

Features	Benefits
Processor	• Tri-Cortex R5 CPUs
Interface	• PCIe Gen 4x4; Gen 4x2; Gen 3x4 and Gen 3x2 • 6G SATA
DDR Controller	• Upto 8GB DDR4, LPDDR3, LPDDR4(x) • 32-bit data bus width • 2 chip enable pins
Flash Controller	• 4 Channels @ 1200MT/s • Up to 32 CEs (4CH x 8 CE/Channel) • Compatible with ONFI 2.2/2.3/3.0/4.0/4.1, JEDEC mode and Toggle 1.0/2.0/3.0/4.0 • Hardware RAID • 4th generation of Marvell NANDEdge™ LDPC engine
NVMe	• NVMe Standard Revision 1.3c compliance • Supports Host Memory Buffer (HMB) Option
Data Protection & Security	• End-to-end data protection • OTP support for secure drive configuration • AES encryption hardware
Temperature Support	• 0C to 70C (C-temp) • -40C to 85C (I-temp) • On-Die Temperature Sensor
Performance	• 128KB Sequential Read up to 3.9 GB/s • 128KB Sequential Write up to 3.3 GB/s • 4K Random Read up to 690K IOPS • 4K Random Write up to 500K IOPS
Deep Sleep Idle Power	• PS4 (L.1.2): ~1mW
Package	• 12mm x 13.5mm (356 ball) FC-TFBGA package

Target Applications

- PC Client
- Gaming
- Industrial
- Data Center
- Enterprise Boot-Drive High-performance SSDs

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Marvell first revolutionized the digital storage industry by moving information at speeds never thought possible. Today, that same breakthrough innovation remains at the heart of the company's storage, networking and connectivity solutions. With leading intellectual property and deep system-level knowledge, Marvell semiconductor solutions continue to transform the enterprise, cloud, automotive, industrial, and consumer markets. For more information, visit www.marvell.com.

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