Marvell® 88SE9220/9230/9235

PCIe to SATA 6Gb/s Controllers

Overview

Marvell, a market leader of PCIe to SATA embedded controller devices, has added the Marvell® 88SE9220 and Marvell 88SE9230 host controllers as cost-effective solutions for connecting Serial ATA (SATA) peripherals. The Marvell 88SE9220 and 88SE9230 connect SATA III devices to a PCI Express (PCIe) 2.0 host, delivering up to 1 Gigabyteper-second (GB/s) bandwidth. Each host controller supports two or four 6 gigabit-per-second (Gb/s) SATA peripheral interface ports and a two-lane 5.0 Gb/s PCIe host interface. In addition, it features hardware RAID running with an enhanced ARM-based processor to offload the host CPU; Marvell proprietary Marvell HyperDuo technology for automated solid-state drive (SSD)/ hard disk drive(HDD) tiering; on-the-fly AES 128/256-bit encryption for connected SATA SSD/HDD devices; and AHCI interface for in-box driver support. A complete suite of RAID 0/1/10 and HyperDuo software is provided, including the OS device driver, BIOS/Firmware and management utility. The Marvell 88ES9220 and 88SE9230 host controllers allow for a small footprint, highly integrated SATA III design that will enable highperforming yet cost-effective HDD, SSD and other peripheral designs.

Block Diagram

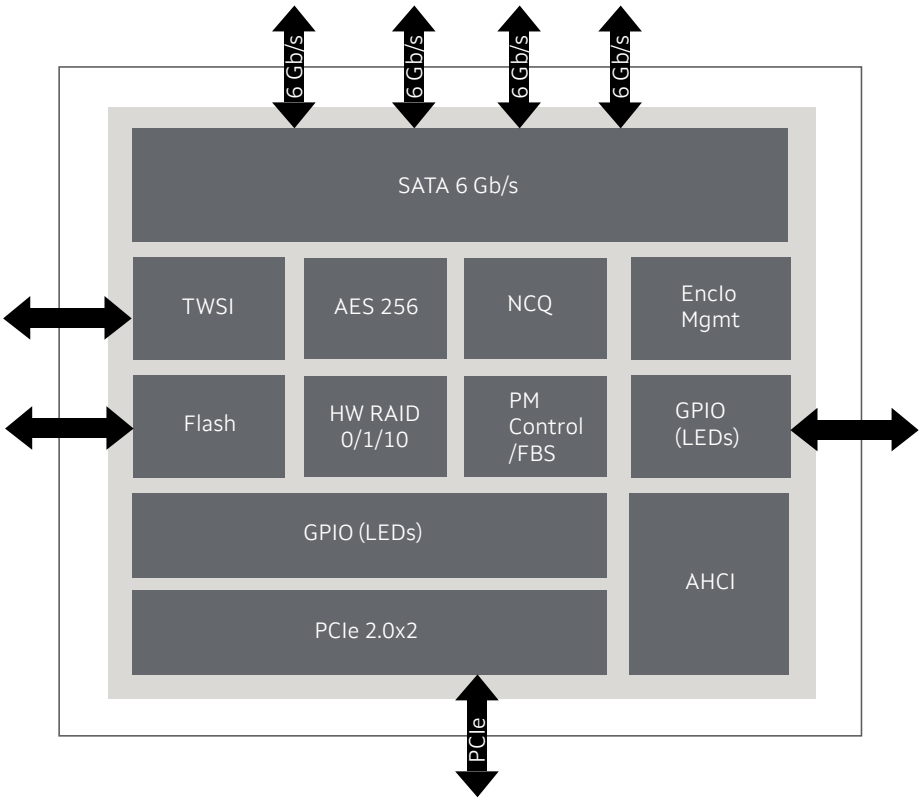

Fig 1. Block Diagram for Marvell 88SE9230

Key Features

Features	88SE9220	88SE9230	88SE9235
Marvell RAID Software	Yes	Yes	No
Marvell HyperDuo	Yes	Yes	No
6 Gb/s SATA Ports	2	4	4
SATA 3.0 Compliant	6 Gb/s SATA PHY with speed negotiation to backward support 3 Gb/s and 1.5 Gb/s		
PCIe 2.0 Compliant	Support 1x or 2x PCI Express 2.0 interface (5.0 Gb/s)		
Native Command Queuing	32 outstanding commands per port for high performance		
eSATA Support	Flexible SATA ports support internal or external (up to 5m) SATA links		
Hardware RAID	Yes, RAID 0/1	Yes , RAID 0/1/10	No
AES Encryption	Yes, 128/256-bit AES	Yes, 128/256-bit AES	No
AHCI Inbox Driver Support	Yes	Yes	Yes
Enclosure Management	I2C support		
Two-Wire Serial Interface (TWSI)	Interface for external EEPROM containing configuration information		
GPIO Support	LEDs status monitoring		
SPI Flash Interface	External flash containing configuration data and/or boot code		
Port Multiplier Support	Yes	Yes	Yes
FIS-Based Switching	Better performance with simultaneous commands		
On-Chip Oscillator	Low-cost crystal support		
Power	1W	1W	1W
Package Size/ Type	7mmx7mm / 56-pin QFN	9mmx9mm / 76-pin QFN	9mmx9mm / 76-pin QFN

Target Applications

The Marvell 88SE9220 and 88SE9230 SATA host controllers are ideal solutions for RAID on motherboard (ROMB) and cost-effective host bus adapters (HBAs). It allows PCIe-based host systems to control up to four SATA 6Gb/s HDDs or SSDs. An embedded ARM-based CPU makes this product a pure hardware RAID controller and enables in-box driver support without additional driver installation. The included Marvell Storage Utility (MSU) provides a user-friendly interface to end users, while the Marvell RAID driver allows the drives to be used with a SATA port multiplier for increased system performance and capacity.

The Marvell HyperDuo offers a breakthrough embedded technology for new generation 6Gb/s SATA Controllers, enabled on the Marvell 88SE9230 and 88SE9220. Based on years of research and patent-pending software and hardware, HyperDuo enables 80 percent of the performance of an SSD at less than half the cost. Configured with one hard drive and multiple SSDs, HyperDuo uses intelligent algorithms to automatically migrate hot data to the SSD while enabling all data to be safely stored on a larger capacity SATA HDD for higher input/output operations per second (IOPS), throughput and capacity.

The Marvell 88SE9235 can be used for embedded platform applications such as home NAS/media servers, DVR/NVRand set-top boxes, or by HBA vendors to develop their own RAID software or in-box OS drivers.

Fully programmable on-chip transceivers support SATA, eSATA, and xSATA at 6 Gb/s and are backward compatibleto 1.5 Gb/s and 3 Gb/s. Built-in support for SATA Port Multipliers with FIS-based switching ensures maximum performance. The small footprint of the device, and the few required external components, take up minimal board space, easing system design and reducing cost. Embedded enclosure management via I2C protocol, further reduces system cost.

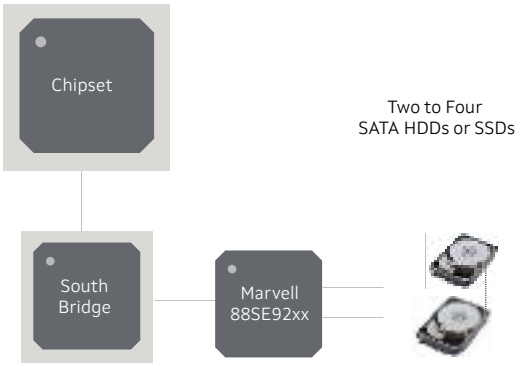

Fig 2. RAID-On-Motherboard Application

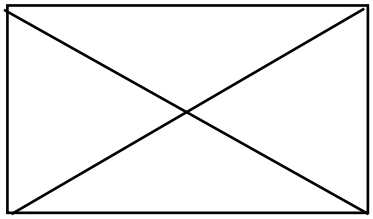

Fig 3. SATA RAID HBA Application