# Marvell 88SM9715/9705/9602

## 6Gb/s SATA Port Multipliers

## PRODUCT OVERVIEW

The Marvell®, the market leader for SATA controller devices, has added the 88SM97xx series of the industry's first 6Gb/s SATA port multipliers. Leveraging Marvell's industry-leading SATA PHY technology, the 88SM97xx series brings customers excellent SATA device compatibility, signal integrity and best-in-class cost/performance for SATA storage enclosures used in set-top box, NAS, DVR and public cloud computing JBOD solutions.

The 88SM97xx line supports one SATA 6Gb/s host port and up to five SATA 6Gb/s device ports with backward compatibility to 3Gb/s and 1.5Gb/s. Advanced features include support for PHY test mode and SATA BIST over host and device links, programmable amplitude and pre-emphasis settings to support various backplane and cabling environments, spread spectrum clocking (SSC) transmission, FIS-based switching for performance enhancement and asynchronous notification. In addition, the 88SM9715 incorporates enclosure management features where temperature sensor, PWM, tachometer and voltage rail monitoring are built in, eliminating the need for extra enclosure management chips, thus reducing the overall BOM cost for customers.

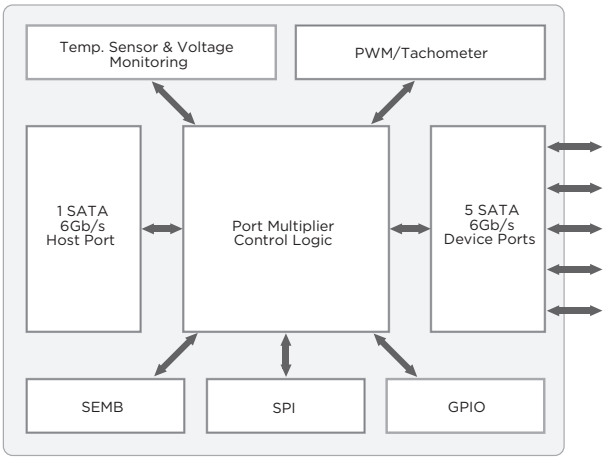


Fig 1. Block Diagram for 88SM9715

| MODEL | 88SM9715 | 88SM9705 | 88SM9602 |
|---|---|---|---|
| • 6 Gb/s SATA Host Port | 1 | 1 | 1 |
| • 6 Gb/s SATA Device Ports | 5 | 5 | 2 |
| • SATA 3.0 Compliant | 6 Gb/s SATA PHY with speed negotiation to backward support 3 Gb/s and 1.5 Gb/s | | |
| • Native Command Queuing | 32 outstanding commands per port for high performance | | |
| • FIS-based Switching | Better performance with simultaneous commands | | |
| • eSATA Support | Flexible SATA ports support internal or external SATA links | | |
| • Hot Plug Support | Yes | Yes | Yes |
| • Enclosure Management | Embedded temperature sensor, PWM, tachometer and SEMB | SEMB | N/A |
| • GPIO Support | For DIP switches, LEDs and buzzer settings | | |
| • SPI Flash Interface | External Flash containing configuration data | | |
| • Programmable Settings | Programmable amplitude and pre-emphasis settings to support various backplane and cabling environments | | |
| • Industrial Temp Support | Yes | | |
| • Power Consumption | < 0.9W | < 0.9W | < 0.6W |
| • Package Size/Type | 10mmx10mm / 84-pin QFN | 10mmx10mm / 84-pin QFN | 6mmx6mm / 48-pin QFN |

## TARGET MARKETS AND APPLICATIONS

The Marvell 88SM97xx series is an ideal solution for public cloud storage customers that demand massive low-cost SATA JBOD storage capacity and 6Gb/s sequential throughput performance. When multiple 88SM97xx chips are aggregated behind the Marvell 88SE9485 SAS/SATA 6Gbps IO controller (see Figure 2), this solution can enable capacity scaling up to 40 SATA disk drives (160TB storage capacity using 4TB SATA HDDs). Compared to traditional high-end 6Gb/s or 12Gb/s SAS expanders, the Marvell 88SM97xx port multiplier solution provides significant cost savings without sacrificing sequential I/O performance.

For cost-sensitive applications like DVR/NVR video surveillance (see Figure 3), the 88SM97xx series is a perfect fit. Fast-growing adoptions of high-definition (HD) IP cameras are significantly increasing the demand for higher storage capacity, which requires higher drive count SATA HDD enclosures. The 88SM97xx can directly connect with SATA ports from the CPU/chipset of DVR/NVR systems to dramatically expand the port count for connectivity to many SATA HDDs. Marvell also offers fully tested combinations of Marvell SATA 6Gb/s IO controllers + port multipliers, such as the 88SE9170/88SE9235/9215 + 88SM97xx, enabling flexible JBOD configurations. Other popular application usage models for the 88SM97xx include SMB/enterprise NAS/DAS and home cloud set-top boxes and NAS.

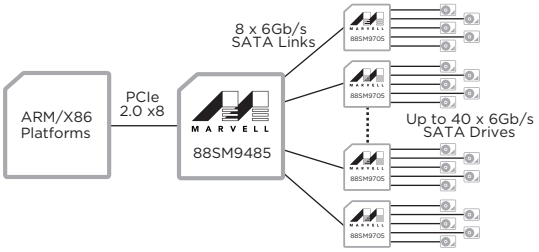


Fig 2. Cloud Storage Application

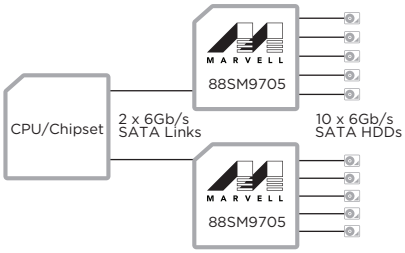


Fig 3. DVR/NVR Application

Figures 4 and 5 show the sequential read and write performance respectively with different configurations. These demonstrate the capability of running over 500 MB/s throughputs with one 88SM97xx. When scaling with eight 88SM9715 chips, the throughput can reach over 3GB/s that can meet performance requirements for most SATA storage applications.

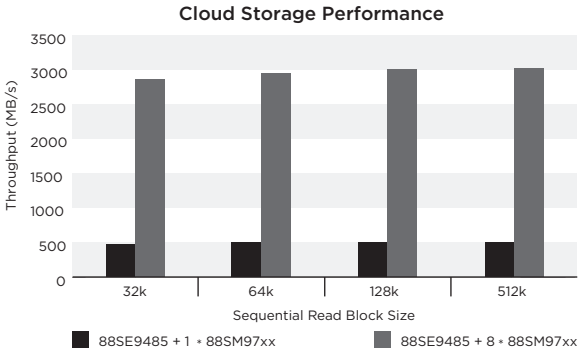


Fig 4. Sequential Read Performance

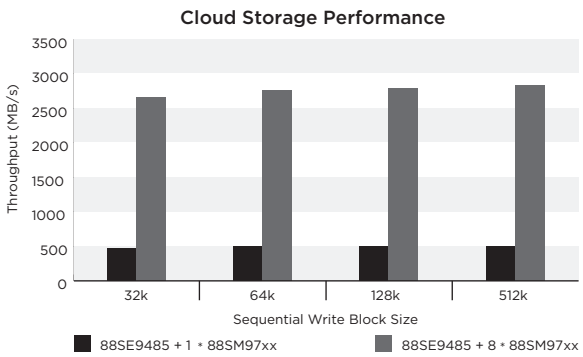


Fig 5. Sequential Read Performance

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