MARVELL

**Product Brief**

# Marvell® 88SF9210/9110/9118

6Gb/s SAS to SATA Bridge Chips

## Overview

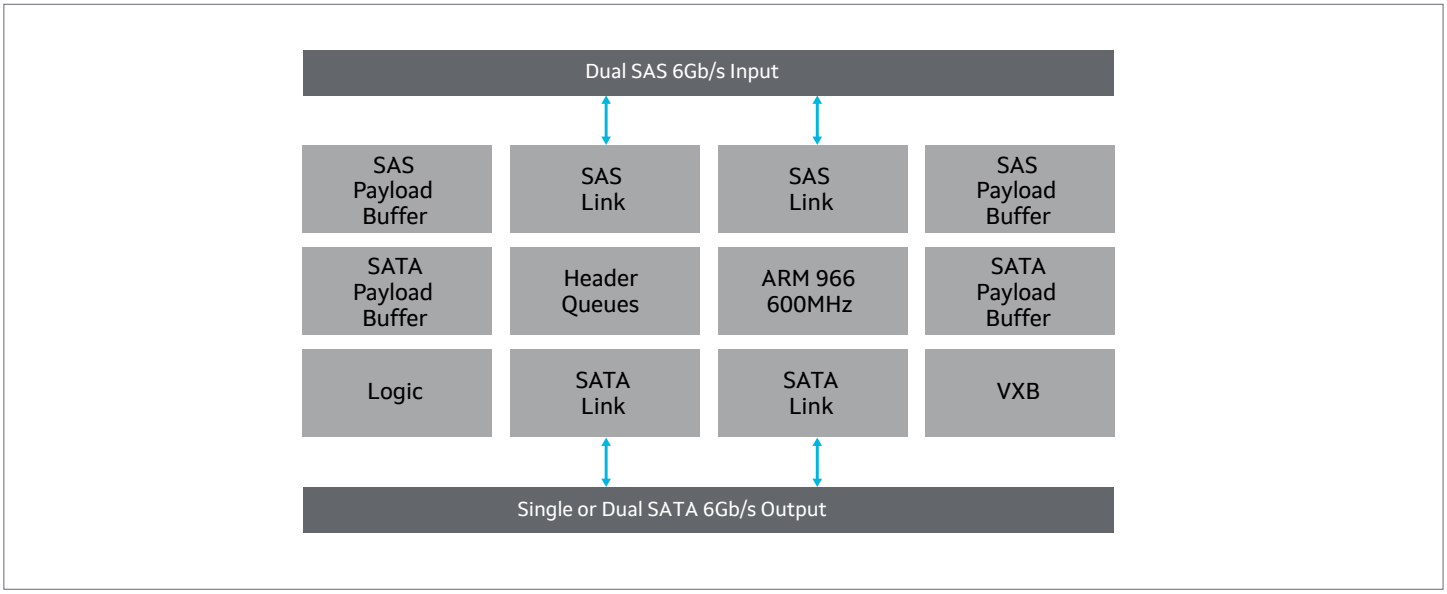
The Marvell® 88SF9210/9110/9118 are 6Gb/s SAS-to-SATA bridge chips, enabling cost-effective, high-capacity SATA drives to be used in high availability (HA) enterprise storage systems. This product series contains two integrated SAS target ports, and one or two integrated SATA host ports. The bridge chips allow standard single port SATA HDDs or SSDs to function as dual-ported SAS SSP target devices.

The bridge chips incorporate an ARM-based processor running at 600MHz to service all protocol translation, perform internal error handling and service all SCSI commands that do not have corresponding functions in the SATA protocol, such as Mode Select and Mode Sense. The internal processor terminates SAS SSP protocol in SAS target mode and ensures the link between expander and bridge is managed efficiently, resulting in maximum overall system performance. In addition, it provides elimination of STP protocol especially in configurations where SAS expanders are used, and provides the ability to preserve HW configurations information (e.g. Mode Select) across Resets and power loss.

The bridge chips support concurrent active-active full duplex commands and data transfers, and up to 128 concurrent I/O operations from up to 32 SAS initiators. The single or dual SATA interfaces provide full ANSI compliant SATA host functionality (SATA 1.0a, SATA 2.6 and SATA 3.0 specifications) on the SATA ports. Internal sector size translation is provided since native SATA devices do not support non-512-byte sector sizes. This allows SAS initiators to configure the device for sector sizes of 512, 520, 524 or 528 bytes. All sector size translation and mapping is performed by the internal processor and is transparent to the SATA device.

The other advantages include the support for XDREAD, XDWRITE and XPWRITE commands, as well as the Write/Verify command. This product series provides full support for the T10 Protection Information Model. Protection information fields, also known as DIF fields, can be verified, inserted or deleted from the data stream by the bridge chips, transparent to the SATA device.

### Block Diagram



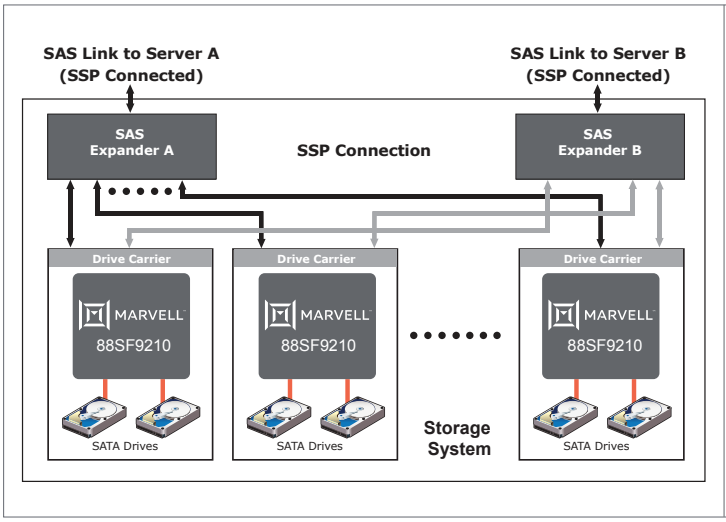



Figure 2. 88SF9210 in Enterprise Storage System

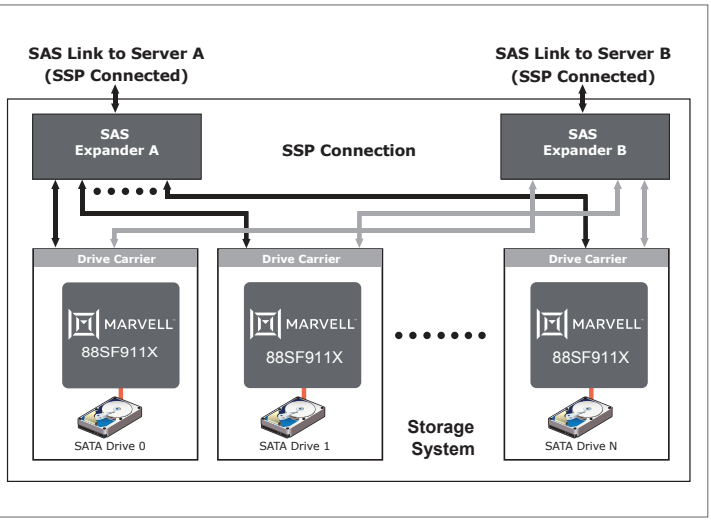



Figure 3. 88SF9110/9118 in Enterprise Storage System

## Key Features

| Model | 88SF9210 | 88SF9110 | 88SF9118 |
|---|---|---|---|
| 6Gb/s SAS Target Port | · 2 | · 2 | · 2 |
| 6Gb/s SATA Host Port | · 2 | · 1 | · 1 |
| SAS 2.0 Compliant | · Support SSP and SAT-2 specification | | |
| SATA 3.0 Compliant | · 6 Gb/s SATA PHY with speed negotiation to backward support 3 and 1.5 Gb/s | | |
| Concurrent IOs per Chip | · 128 | | |
| Multiple SAS Initiators | · Up to 32 SAS initiators | | |
| Native Command Queuing | · 32 outstanding commands per SATA host port for high performance | | |
| Sector Size Translation | · Translate non-512 byte sector size | | |
| T10 Protection Information Model | · Protection information fields can be verified, inserted, or deleted from the data stream | | |
| Diagnostic Capabilities | · Including Send Diagnostic, Mode Select, Mode Sense | | |
| Error Handling | · Well-defined Link layer and Transport layer error handling | | |
| Online FW Upgrade | · Upgradable via Marvell GUI-based FW utility | | |
| SPI Flash Interface | · External flash containing configuration data and firmware code | | |
| Power Consumption* | · 1.35W | · 1.10W | · 1.25W |
| Package Size/Type | · 10 x 10mm / 84-pin QFN | · 10 x 10mm / 84-pin QFN | · 8 x 11mm / 117-ball TFBGA |

*Measured at room temperature

## Target Applications

The Marvell 6Gb/s SAS-to-SATA bridge chips are flexible and powerful solutions, enabling economical and high capacity SATA drives to be used in enterprise storage systems that demand full duplex active-active operation and redundant (high availability) connectivity.

The 88SF9210 is a single-chip solution ideal for high-density storage systems, allowing two SATA HDDs/SSDs to be installed in the same drive carrier. This allows the SAS host connection to maintain full redundancy while presenting both connected SATA drives as LUNs. Being able to use a single bridge for two drives additionally results in less board space, reduction in power and higher performance. The two SATA host ports support makes it the best choice for low-cost nearline/archival storage (Tier-2/3) applications.

The 88SF9110 is targeted for dongle board design in a drive carrier with installation of a single 3.5-inch HDD or SSD, while the 88SF9118 is targeted for installation with 2.5-inch HDD or SSD.

This product series is available with a complete development kit, including reference schematic/BOM list/Gerber file and Firmware user manual.

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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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