12 Gbps SmartIOC 2100 SAS IO Controllers

PM8222, PM8225, PM8238, PM8239, PM8242 and PM8243

Summary

Microchip SmartIOC 2100 SAS I/O Controller products provide reliable ultra-high performance HBA functionality with industry-leading low-power operation. These SmartIOCs provide unparalleled flexibility along with a broad range of standard features designed to meet the most demanding server storage applications.

These SmartIOC controllers offer optional entry-level hardware RAID 0/1/10/5 modes without any external DRAM. The 24- and 16-port devices also offer additional dedicated RAID-capable boot ports.

The controllers support Microchip Smart Storage Solution drivers for all major operating systems and a comprehensive set of management tools, including a GUI and CLI.

Features

HBA Features

- Persistent logging and binding
- Up to 1.6M IOPS performance for PM8242, PM8243, PM8238, PM8239 and up to 1.4M IOPS performance for PM8222, PM8225 (4K random reads)
- Up to 6.9 GB/s bandwidth
- Transport Layer Retry (TLR) support
- Multi-initiator (host)/clustering for SAS
- TRIM and UNMAP support for SSDs
- SAS dual path failover (RAID stack managed Active/Standby)
- Baseboard Management Controller (BMC) support with Management Component Transport Protocol (MCTP) over PCIe or I^2C
- 4K native sector support
- Hot plug drive support
- Adapter power management modes
- S.M.A.R.T. diagnostic access
- SMP commands using ARCONF
- Supports eight lanes of PCIe 3.0 to the host, each lane supporting PCIe Gen 3 rates up to 8.0 Gbps
- Enclosure Management: SES-2/3 SGPIO: SFF-8485 IBPI: SFF-8489 SGPIO as a virtual SES enclosure: SFF-8448

Entry-Level RAID Features

- Flexible configuration for RAID mode
- Dynamic sector repair
- Multiple LUN support
- Support for up to 238 raw devices
- Support for up to 32 target devices in RAID mode
- Supports up to eight SAS/SATA Logical/RAID volumes
- Split mirror and combine
- Copyback hot spare
- Displays raw devices on connector
- RAID build modes
- Quick initialization
  - Background initialization
  - Rapid parity initialization
  - Heal array and move array
- Bootable array support
- Erase drive
- Configurable stripe size
- Bad stripe marking
- Hot spare support (dedicated, global, or predictive)
- Persistent logging for RAID and HBA
- 4K native sector support in RAID

Microchip Storage Management Utilities

maxView™ provides both server-based and remote administration. This fully browser-based tool supports all standard browsers and is available through a USB boot image. maxView controller management components include:

- maxView GUI
- ARCCONF CLI
- Event Monitor (event logging and email alerts)
- VSphere plug-in
- OpenStack plug-in
- Smart Storage Administrator CLI

Highlights

- Industry-leading throughput
- Compatible with Microchip Smart Storage solution drivers for all major operating systems and their unified management utilities
- Two additional 6G SAS/SATA boot ports with RAID 1 support included in 24 and 16 port configurations
- RAID 0, 1, 10, 5 with hardware acceleration and no additional host software requirements
- No DDR memory required, regardless of mode
- The PM8243, PM8239, PM825 include support for maxCrypto™ controller-based encryption

Tools for Setup and Troubleshooting

Microchip provides a complete suite of design-in collateral to support embedded designs with this product including: reference designs, detailed hardware specifications and design-in guides.

- UEFI HII configuration tool
- CTRL-A Legacy BIOS configuration tool
- ChipLink diagnostic tools
  - Extensive debug, diagnostics, configuration and analysis tools with an intuitive GUI
  - Access to configuration data, management capabilities, and signal integrity analysis tools such as real-time eye capture
  - Connects to device over UART

Operating System Support

- Extensive operating system support includes major software releases for Windows®/Server, VMware ESXi, Red Hat Enterprise Linux®, SUSE Enterprise Linux, Ubuntu, CentOS, XenServer, Fedora, Debian, and Solaris
- Certification for Microsoft WHQL, VMware IOVP and VMware VSAN

High-Speed I/O

- x8 PCIe Gen 3 8 GT/s
  - PCIe link rates supported: 8 GT/s, 5 GT/s, 2.5 GT/s
  - PCIe-compliant link training and manual PHY configuration
- PM8243/PM8242: 24x SAS-3/SATA PHYs for high-speed targets
- PM8239/PM8238: 16x SAS-3/SATA PHYs for high-speed targets
- PM8222/PM8225: 8x SAS-3/SATA PHYs for high-speed targets
- SAS or SATA operation on a per-PHY basis
  - SAS link rates supported: 12 Gbps, 6 Gbps, 3 Gbps
  - SATA link rates supported: 6 Gbps, 3 Gbps, 1.5 Gbps
- PM8241/PM8242 and PM8239/PM8238: 2x SAS-2/SATA PHYs for boot devices
- Independent per-channel selectable high-speed outputs support multiple programmable levels of pre-emphasis and output swing
- Multiple programmable levels of receive equalization
- Integrated resistive termination
- Automatic negotiation of link speed
- Decision Feedback Equalizer provides robust recovery of 12 Gbps SAS signals over lossy channels

Peripheral I/O Interfaces

- PM8241/PM8240 and PM8237/PM8236: Eight multi-master and seven master-only Two-Wire Interfaces (TWIs)
- PM8205/PM8204: Seven multi-master and two master-only TWIs
  - TWIs support variable bit rates up to 400 Kbps
- Two industry-standard 16750 UARTs
- Seven SFF-8485-compliant Serial GPIO (SGPIO) ports
- Up to 30 GPIO ports depending on SGPIO port configuration
- Firmware API for peripheral control including features such as activity LED, UART configuration, zoning configuration, interprocessor communications and enclosure control

Note: Some peripheral I/O interface pins are multiplexed.

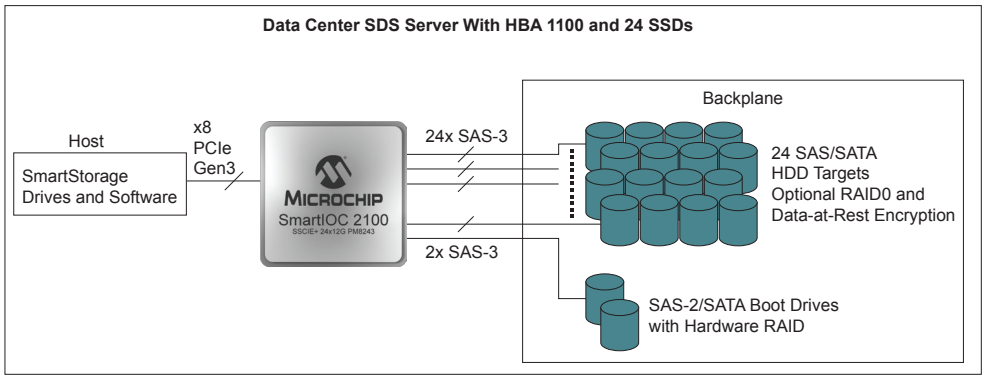
maxCrypto Encryption (PM8243, PM8239, PM825 Only)

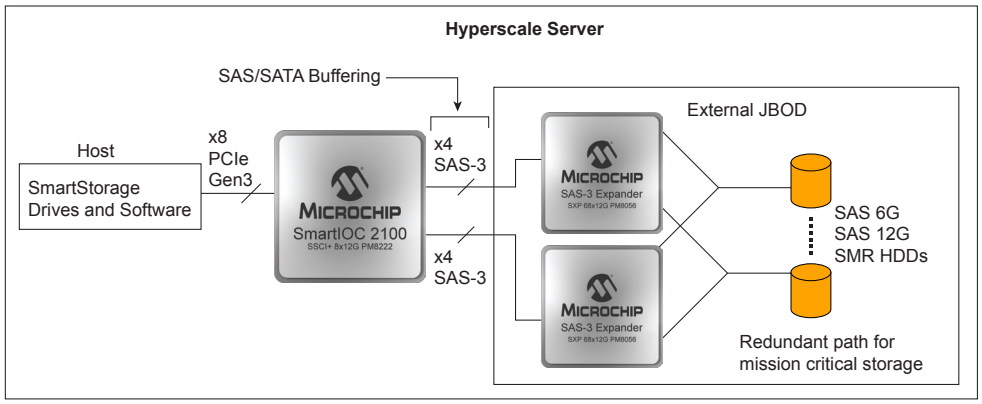
- AES data encryption and decryption with key sizes of 128/196/256

Example Application

Efficient SDS for Hyperscale Data Centers

- Support for high-density single-controller configurations
  - Up to 24 ports + 2 additional boot ports
- Hardware RAID 1 on boot devices
- Lower power and higher performance than multi-controller designs
- No external memory required
- Hardware-based value RAID 5 available
- Support for vSAN and Storage Spaces Direct





Order Number*	Storage Ports	Boot Ports	Package
PM8243A-F3EI (with encryption)	24	2	27 mm × 27 mm
PM8242A-F3EI	24	2	27 mm × 27 mm
PM8239A-F3EI (with encryption)	16	2	27 mm × 27 mm
PM8238A-F3EI	16	2	27 mm × 27 mm
PM8222B-F3EI	8	0	23 mm × 23 mm
PM8225B-F3EI (with encryption)	8	0	23 mm × 23 mm

*A: Revision; F3: Package Descriptor; E: ROHS 6-compliant; I: Industrial Temperature

For More Information

https://www.microsemi.com/product-directory/smart-storage-platform/4097-12g-smartioc-2100-controllers

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