

12 Gbps SmartROC 3100 RAID-on-Chip Storage Controllers

PM8204, PM8205, PM8236, PM8237, PM8240 and PM8241

Summary

The Microchip 12 Gbps SmartROC 3100 RAID-on-Chip storage controllers offer industry-leading performance and power savings with support for hardware RAID 0/1/10/5/50/6/60 and native HBA modes.

These fourth-generation SmartROC controller devices offer a comprehensive feature set for enterprise server data storage solutions and best-in-class performance. This highly integrated solution offers industry-leading low power and several BOM consolidation advantages over competing solutions, resulting in a reduced total cost of ownership.

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



Features

SmartRAID Solution

- Flexible configuration for RAID mode
- Displays raw devices on connector
- RAID Build modes
 - Quick initialization
 - Background initialization
 - Rapid parity initialization
- SAS dual path failover (RAID stack managed Active/Standby)
- SMP commands using ARCCONF
- Dynamic sector repair
- Split mirror and combine
- Copyback hot spare
- Heal array and move array
- Bootable array support
- Erase drive
- Configurable stripe size
- Bad stripe marking
- Hot spare support (dedicated, global or predictive)

Ultra-High Performance and Feature Rich

- Persistent logging for RAID and HBA
- 4K native support for RAID and HBA
- Adapter power management modes
- Multiple LUN support
- Support for up to 238 raw devices

- Support for up to 238 target devices in RAID mode
- Supports up to 64 SAS/SATA logical/RAID volumes
- Up to 1.6M IOPS performance for PM8240, PM8241, PM8237, PM8236 and up to 1.4M IOPS for PM 8204, PM8205 (4K random reads)
- Up to 145K IOPS RAID 5 performance for PM8240, PM8241, PM8237, PM8236 and up to 140K K IOPS RAID 5 performance for PM8204, PM8205 (4K random writes)
- SAS expander support
- Transport Layer Retry (TLR) support
- Baseboard Management Controller (BMC) support with management component
- Transport Protocol (MCTP) over PCIe or I²C
- Enclosure Management: SES-2/3 SGPIO: SFF-8485 IBPI: SFF-8489 SGPIO as a virtual SES enclosure: SFF-8448
- Up to 6.9 GB/s bandwidth
- Up to 3.8 GB/s RAID 5 throughput for PM8240, PM8241, PM 8237, PM8236 and up to 3.6 GB/s RAID 5 throughput for PM8204, PM8205
- Hot plug drive support
- S.M.A.R.T. diagnostic access
- Supports eight lanes of PCIe 3.0 to the host, each lane supporting PCIe Gen 3 rates up to 8.0 Gbps
- SATA Native Command Queuing (NCQ)

Highlights

- RAID 0, 1, 10, 5, 50, 6 and 60 with hardware acceleration
- Supports 1 GB, 2 GB or 4 GB DDR4 memory with speeds up to 2133 MT/s, providing access to volume DDR at top-line performance
- Compatible with Microchip Smart Storage solution drivers for all major operating systems and Microchip Smart Storage solution unified management utilities
- The PM8240, PM8241, PM8237 and PM8236 include two additional 6G SAS/SATA boot ports with RAID 1 support
- The PM8241, PM8237 and PM8205 include support for maxCrypto™ controller-based encryption

Microchip Storage Management Utilities

maxView™ provides both server-based and remote administration. This fully browser-based tool supports all standard browsers and also 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

Third-Generation Green Backup

- Integrated controller automatically backs up DDR cache to NAND Flash after a power failure
- ONFi 1.0, 2.x and 3.0

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
- PM8241/PM8240: 24x SAS-3/SATA PHYs for high-speed targets
- PM8237/PM8236: 16x SAS-3/SATA PHYs for high-speed targets
- PM8205/PM8204: 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/PM8240 and PM8237/PM8236: 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.

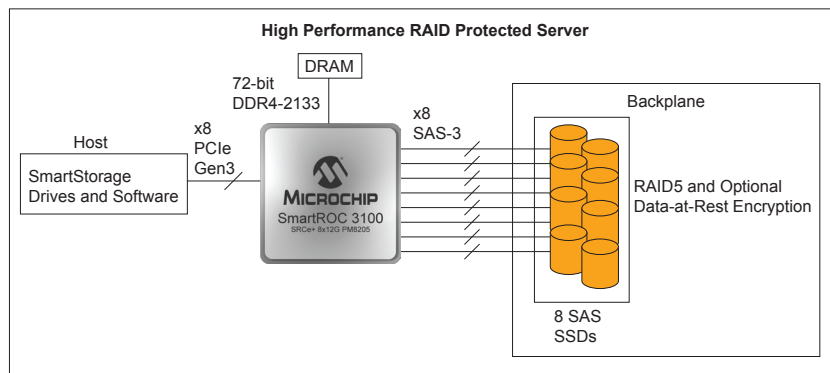
maxCrypto Encryption (PM8205, PM8237, PM841 Only)

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

Maximum RAID Performance With SSDs

Hardware-Accelerated RAID

- Lowest industry power
- Support for all popular server and workstation operating systems
- Advanced RAID features, including:
 - maxCache 4.0
 - RAID 1/10 advance data management
 - Heal array
 - Move array
 - Big block bypass
 - Mixed mode support



Order Number*	Storage Ports	Boot Ports	Package
PM8041A-F3EI (with encryption)	24	2	27 mm × 27 mm
PM8240A-F3EI	24	2	27 mm × 27 mm
PM8237A-F3EI (with encryption)	16	2	27 mm × 27 mm
PM8236A-F3EI	16	2	27 mm × 27 mm
PM8205B-F3EI (with encryption)	8	0	23 mm × 23 mm
PM8204B-F3EI	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/raid-controllers/4042-12g-smartroc-3100-controllers#use-cases>