

# 6 Gbps SAS/SATA Protocol Controller Family for Storage Systems

16/8-Port SPCve, 16/8-Port SPCv

## Summary

Microchip's SPCve and SPCv are a highly-integrated 6G SAS/SATA 1.5G/3G/6G Protocol Controller family optimized for fabric-attached RAID storage system applications and native SAS/SATA HBA applications. SPCve features StorClad™ encryption technology, which provides a high-performance, manageable and scalable controller-based encryption solution.



The 6 Gbps Protocol Controller family provides an efficient and scalable architecture that eliminates the system performance limitations of competing SAS controller devices. It provides application programming environments that are compatible with other members of the Tachyon SAS/SATA controller family and Tachyon Fibre Channel controllers, and it can easily be ported to address specific customer environments.

These controllers provide you with end-to-end diagnostics and error handling mechanisms to increase system performance, availability and most importantly, manageability. Unique end-to-end features and algorithms can be achieved from host to hard disk drive by using the SPCv 6G or SPCve 6G in combination with Microchip's market-leading SAS/SATA expanders, multiplexers and enclosure management solutions.

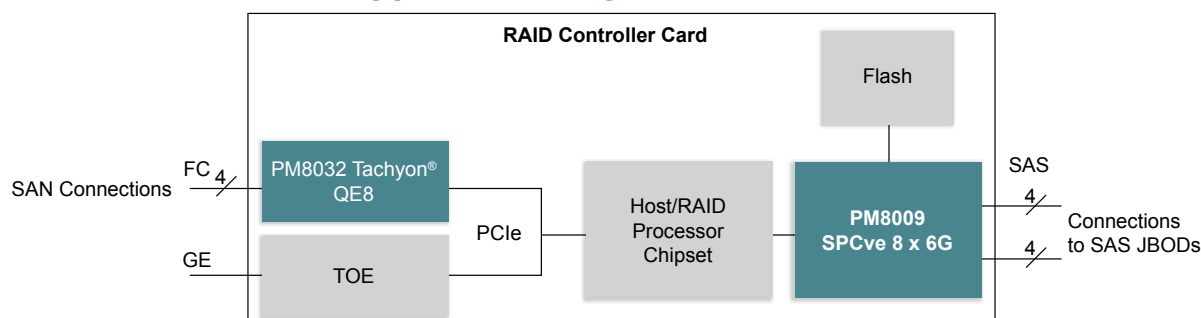
## Features

- Support for up to 4K SAS addresses for high-density applications
- Minimal host CPU dependency boosts overall system performance
- Support for up to 4K outstanding I/Os
- Wide target support enables high-performance and front-end SAS applications, or can be used for host-to-host failover coordination
- Support for wide-port initiator and wide-port target modes
- Hardware assist support for error recovery
- Verification, insertion, and replacement of T10 integrity fields
- Data Integrity Fields (DIF) as defined by SBC-2

## Highlights

- Highest density, lowest power per port SAS controller solution available
- Enterprise-class system performance, availability and manageability
- End-to-end system diagnostics and error handling mechanisms from host to hard disk drive
- Enables cost-effective secure data SAS/SATA encryption solution across both HDD and SSD devices
- FIPS 140-2 Level 3-certifiable solution meets the most stringent data security requirements

## RAID Controller Card Application Diagram



### Encryption

- IEEE 1619-compliant line rate AES-XTS for data-at-rest encryption
- 256-bit key size supported
- FIPS 140-2, Levels 1–3 certifiable
- Secure Key Encryption Key (KEK) management
- Support for 4M Data Encryption Keys (DEKs) and 8 KEKs
- KMIP-compliant key blob support

### SAS/SATA Ports

- SAS initiator, SAS target or SATA HBA operation on a per-PHY basis
- SSP, SMP, STP and direct-attached SATA protocol support
- Each PHY supports up to 600 MB/s of bandwidth
- Hot-plug and SATA NCQ support
- SAS 2.1 optical support

### PCI Express (PCIe)

- Eight-lane native PCIe-compliant 2.5 Gbps (PCIe 1.1), 5 Gbps (PCIe 2.0), and 8 Gbps PHYs (PCIe 3.0)

### Statistics and Performance

#### Monitoring Support

- Enhanced SAS error monitoring and fault isolation
- SAS topology monitoring and fault determination

### High-Speed I/O

- Independent per-channel selectable high-speed outputs support multiple programmable levels of pre-emphasis and output swing
- Independent per-channel selectable high-speed inputs support multiple programmable levels of receive equalization
- Integrated resistive termination
- Automatic negotiation of link speed

### More Information

<https://www.microsemi.com/product-directory/sas-sata-i-o-controllers/4046-6g-sas-sata-i-o-controllers-storage>

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### T10 DIF

- Verification, insertion and replacement of T10 DIF as defined by SBC-2

### Configurable Peripheral Interfaces

- Interfaces for NOR Flash memory and SEEPRO
- Four multi-master Two-Wire Interfaces (TWIs) support variable bit rates of up to 400 Kbps
- Two industry-standard 16750 UARTs
- Two SFF-8485-compliant Serial GPIO (SGPIO) ports
- 12 GPIO pins

### Test and Control

- Power and reset control

### Physical

- 27 mm × 27 mm 1071-pin FCBGA

### Applications

- External RAID storage systems
- Host bus adapters
- Servers

### Ordering Information

Order Number*	Format	Ports
PM8019C1-F3EI	SPCve	16
PM8009C1-F3EI	SPCve	8
PM8018C1-F3EI	SPCv	16
PM8008C1-F3EI	SPCv	8

\*C1/C: Revision number; I: industrial temperature; F3: package descriptor; E: Pb-free.

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