

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

## 8/16-Port SPCv and SPCve Controllers

### Summary

Microchip's SPCve and SPCv are part of the highly-integrated 12G SAS and 3G/6G/12G SATA protocol controller family optimized for fabric-attached RAID storage system applications and SAS/SATA HBA applications. This controller family significantly increases total system performance, diagnostics, scalability and manageability.



The SPCve and SPCv controllers each provide an efficient and scalable architecture that enables industry-leading system performance. They provide application-programming environments that are compatible with other members of the Tachyon® SAS/SATA controller family and Tachyon Fibre Channel controllers, enabling software leverage between controllers and protocols.

The controllers provide system designers 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 (HDD) or Solid-State Drive (SSD) by using these controllers in combination with market-leading SAS/SATA expanders, multiplexers and enclosure management solutions.

### Features

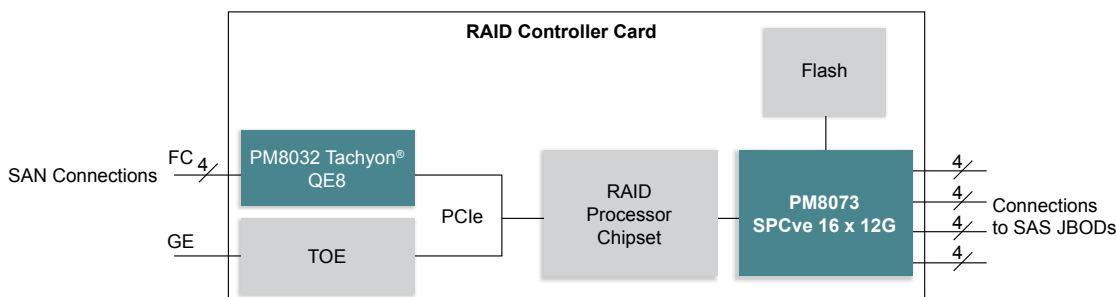
#### Support

- Support for up to 4K SAS addresses
- Support for up to 8K outstanding I/Os
- Wide target mode support enables high-performance, front-end SAS applications or can be used for host-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 Data Integrity Fields (DIF) as defined by SBC-2

### Highlights

- Enterprise-class system performance, availability and manageability
- End-to-end system diagnostics and error handling mechanisms from host to HDD
- 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 eight KEKs
- KMIP-compliant key blob support

## SAS/SATA

- SAS initiator, SAS target, or SATA HBA operation on a per-PHY basis
- SSP, SMP, STP and direct-attached SATA protocol support
- A single SAS PHY supports up to 1.2 GB/s of bandwidth
- Initiator and target mode configurable on a per-PHY basis
- 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)

## Support for Statistics and Performance Monitoring

- 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
- Decision feedback equalizer provides robust recovery of 12 Gbps SAS signals over lossy channels

## T10 DIF

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

## Test and Control

- Power and reset control

## Configurable Peripheral Interfaces

- Interfaces for NOR Flash memory and SEEPROM
- Four Two-Wire Interfaces (TWIs) support variable rates up to 400 kHz
- Two industry-standard 16750 UARTs
- Four SFF-8485-compliant Serial GPIO (SGPIO) ports
- 16 customer-configurable GPIO pins

## Physical

- 27 mm x 27 mm 1071-pin FCBGA

## Applications

- External RAID storage systems
- Host bus adapters and servers

## Ordering Information

Order Number*	Format	Ports
PM8073B1-F3EI	SPCve	16
PM8071B1-F3EI	SPCve	8
PM8072B1-F3EI	SPCv	16
PM8070B1-F3EI	SPCv	8

\*B1: Revision number; F3: package descriptor; E: Pb-free; I: industrial temperature.

## More Information

<https://www.microsemi.com/product-directory/sas-sata-i-o-controllers/4040-12g-sas-sata-i-o-controllers-storage#overview>

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