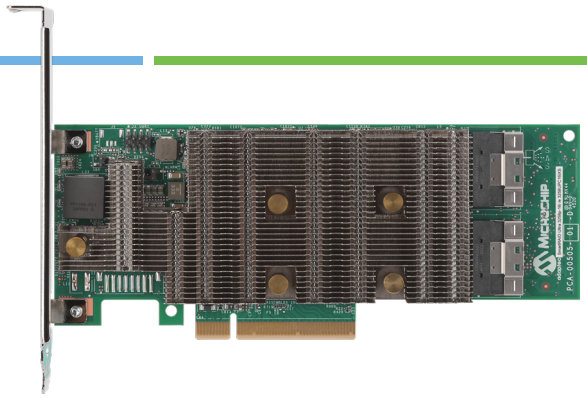
Adaptec® SmartRAID 3200 Series: 32i/16i/16e/8i/8e

Tri-Mode SAS/SATA/NVMe™ RAID Adapters
Host: x8/x16 PCIe® Gen 4
Media: 24G SAS, 6G SATA, PCIe Gen 4 NVMe



Maximum Performance and Security With Tri-Mode Functionality

The Adaptec® SmartRAID 3200 family is the industry's most versatile, fully featured and secure full RAID-enabled Tri-Mode SAS/SATA/NVMe server storage performance solution for server OEM, storage systems, data center and enterprise customers.

The SmartRAID 3200 series of PCIe® Gen 4 to Tri-mode RAID adapters come in a wide range of performance optimized configurations optimized for the lowest possible cost.

Built on Microchip's proven 5th generation storage controller, the SmartROC 3200, the SmartRAID 3200 product supports both x8 and x16 PCIe Gen 4 host interface adapters with 32, 16, and 8 media facing port variants for both internal and external Tri-mode connectivity. The SmartRAID 3200 Ultra products are specifically designed for the most demanding NVMe and multi-port SAS SSD applications. The SmartROC 3200 integrated PCIe Switch enables DirectPath technology - the industry's lowest latency and high bandwidth NVMe solution and the flexibility to support x1, x2, x4, and x8 wide NVMe SSDs.

These industry first 24G SAS adapters support SAS-4 connectivity as well as Microchip's Dynamic Channel Multiplexing (DCM) technology that aggregates expander attached SAS or SATA hard drives onto 24G SAS infrastructure with near 100% link efficiency for unparalleled throughput. Native host adapter modes, RAID mode and mixed (RAID and HBA/raw devices) for all media types are also supported.

Microchip's Trusted Platform support delivers a new level of compute and supply chain security based on a hardware root of trust that is aligned with the Open Compute Security Project. Microchip has expanded on its unique maxCrypto™ Controller-Based Encryption (CBE) solution to support SAS, SATA, and now NVMe media.

Best-in-Class Ultra Performance

The SmartRAID 3200 series delivers a comprehensive feature set for best-in-class performance. The distinctly labelled SmartRAID Ultra adapters offer a x16 host interface that doubles bandwidth to 29.6 GB/s, 4x the previous generation. Non-ultra adapters still double bandwidth compared to previous generations due to the Gen 4 PCIe interface. While SmartRAID adapters commonly use 72-bit high-speed DDR4 3200 MHz, SmartRAID Ultra boards ship with either 144-bit or 72-bit DDR4 3200 MHz memory, enabling the highest throughput on redundant RAID writes and NVMe Controller-Based Encryption (CBE). The 144-bit boards are marked with a "p" for performance (for example, SmartRAID 3258p-16i) and support up to 11.7 GB/s throughput on RAID5 redundant writes, which is 45% higher than 72-bit products and 17 GB/s throughput on NVMe CBE-enabled LDs using maxCrypto™ Technology.

maxCrypto Controller-Based Encryption

The SmartRAID encryption enabled adapters (denoted by /e) provide the industry's only data-at-rest CBE solution now enabled for NVMe in addition to SAS and SATA devices. maxCrypto technology encrypts data on RAID arrays and single-drive RAID 0 with AES 256 encryption. It is accelerated by silicon engines with all NVMe, SAS and SATA devices that are supported in RAID (SSDs and HDDs). It supports local encryption key management and is FIPS 140-2/Level 1 certification ready, providing a superior solution over self-encrypting drives.

Advanced Data Protection and Ease of Use

Microchip's industry-leading smart storage stack delivers maximum reliability and best-in-class performance at all RAID levels, plus unique features like mixed mode support (RAID and HBA devices can be used simultaneously), adapter power management (reduces power consumption up to 30%) and Triple Mirroring features that allow data migration from existing RAID arrays to new ones. SmartRAID 3200 series integrates Flash-based cache backup on most adapters to enable instant cache protection with an onboard capacitor module (ASCM) on popular board variants. The Adaptec ASCM capacitor module supports a five-year lifetime and is continuously monitored by the smart firmware to ensure a safe data backup to the onboard flash in case of a power loss.

All this is conveniently managed by the Adaptec maxView™ tools suite that includes arcconf CLI, maxView HTML5-based web GUI, and plug-ins for major storage management software suites for enterprise and data centers that allow remote and local management through standard desktops and mobile browsers.

Benefits

- Ideal for enabling PCIe Gen 4 storage capabilities for SMB, enterprise, and hyperscale applications, with proven reliability
- Tri-mode support for SAS/SATA/NVMe devices: 16G Gen 4 NVMe, 24G SAS4 and 6G SATA
- Built-in PCIe switch to enable lowest possible latency access to NVMe storage devices for HBA and RAID modes
- Superior performance and bandwidth enabling up to 29.6 GB/s throughput and 3.5M+ IOPs 4K RR
- 144-bit DDR4 3200 MHz memory option with enhanced throughput on redundant RAID writes and NVMe CBE (11.7 GByte/s for RAID5 writes and 17 GB/s for NVMe CBE)
- Accelerates storage with up to 8 GB of high-speed DRAM cache with integrated cache protection (SmartRAID 325x only)

Highlights

- Low profile, MD2 form factor on all boards with up to 16 ports, full-height, half-length form factor for 32 port variants
- 8-lane (x8) or 16-lane (x16 “ultra”) PCIe Gen4 host interface
- Internal SlimSAS (SFF-8654) and external mini-SAS HD connectors using SFF-9402 pinout to support U.2 and U.3)
- Secure boot, secure update and attestation
- maxCrypto CBE for SAS, SATA and NVMe devices
- Universal Backplane Management (UBM)
- Virtual Pin Port Management (VPP)
- SES (SAS expander-based backplanes), SGPIO (direct attached SAS/SATA backplanes)
- Dynamic adapter power management
- maxView tool suite support
- Support for 64 NVMe devices and up to 256 SAS/SATA and up to 64 LD/RAID arrays
- RAID 0, 1 Triple, 10 Triple, 5, 6, 50, 60
- RAID level migration and online capacity expansion
- Mixed mode and HBA mode support
- maxCache SSD caching (SmartRAID 325x only)
- Support for x86 platform
- Zero Maintenance Cache Protection (ZMCP) integrated with all SmartRAID 325x products
- Self-Encrypting Drive (SED) management software

Key Software Features	• maxCache caching software (except 3204-8i) adapter • Mixed mode allows devices connected to the same adapter to be used in RAID and HBA modes simultaneously • Support for up to 256 SAS/SATA target devices (238 SSDs/HDDs maximum support, remainder are reserved for expanders and enclosure management) • Support for NVMe target devices with Gen 3/4 interfaces (x1, x2, x4, and x8 wide interfaces) • Support for 64 logical drives/RAID arrays • Support for native 4K sector and 512-byte SAS/SATA/NVMe devices	• RAID 1 and 10 Triple enables triple mirroring, move array, and split mirroring • Online capacity expansion and RAID level migration • Dynamic caching algorithm • Native command queuing (NCQ) • Background initialization • Hot-plug drive support • RAID level migration • Hot spares—global, dedicated, and pooled (including copyback) • Enclosure management capabilities—SAS/SATA: SGPIO and SES • PBSI, MCTP and Platform Level Data Model (PLDM) and Redfish Device Enablement (RDE) for out-of-band (BMC) management • Universal Backplane Management (UBM) support • Virtual Pin Port Management (VPP) • Configurable stripe size	• S.M.A.R.T. support • Dynamic sector repair • Staggered drive spin-up • Bootable array support through legacy and uEFI bios • Smart PQI driver with multiple queue and MSI-X support for all supported operating system device drivers • Secure boot, secure update, and attestation support • Secure boot support for the uEFI host BIOS • USB image with offline maxView tools at www.adaptec.com/en-us/support/start
Management Utilities	**maxView Storage Manager** • Web-based GUI management utility • Windows®, Linux®, Solaris, VMware support • Remote configuration, monitoring and notification • Remote firmware updates • SMI-S support • SMTP	**ARCCONF** • Command-line interface • Local and remote support • arcconf for uEFI shell support • SMI-S support for VMware • ARCCONF CLI support for all supported operating systems	**uEFI BIOS Configuration Utility** • HII-based configuration utility • Flashable BIOS support **Event Monitor** • Lightweight event monitoring and logging tool • Distributes adapter events and notifies user
Operating Systems	Microsoft Windows Server, Windows 10, Red Hat Enterprise Linux®, CentOS, SuSE Linux Enterprise Server, Ubuntu Linux, Debian Linux, Oracle Linux, Citrix XenServer, Solaris, FreeBSD, VMware ESXi and open-source Linux drivers/inbox drivers (available from www.adaptec.com/en-us/support/start)		
Management Utilities (Out-of-Band)	PBSI, MCTP and PLDM/RDE		
Dimensions	2.713" H × 6.6" L (68.9 mm × 167.65 mm) for all boards up to 16 ports. 4.376" H × 6.6" L (111.15 mm × 167.65 mm) for all 32-port boards.		
Airflow (0°C to 55°C)	**330 LFM airflow** 3254U-16e /e	**300 LFM airflow** 3258Up-16i /e	**250 LFM airflow** 3258Up-32i /e 3258-16i /e 3254-16i /e 3254-16e /e 3254-8i 3252-8i 3204-8i Note: Temperature measured 1 inch from RAID adapter
Regulatory Certification	CE, FCC, UL, C-tick, VCCI, KCC, CNS		
Environmental Compliance	RoHS		

Ordering Information

Product Name	Part Number	RAID Levels	Host Interface	SAS/SATA/ NVMe Ports	Cache	Cache Width	Cache Backup (ZMCP)	maxCache™ 4.0	maxCrypto™ Support
SmartRAID Ultra 3258p-32i /e	3258UPC32IXS	0, 1 ,5, 6, 10, 50, 60, 1 Triple, 10 Triple	16-lane PCIe® Gen 4	32 internal	8 GB DDR4/3200 MHz	128-bit	Yes, integrated	Yes, integrated	Yes
SmartRAID Ultra 3258p-16i /e	3258UPC16IXS			16 internal					Yes
SmartRAID Ultra 3254-16e /e	3254UC16EXS			16 external	4 GB DDR4/3200 MHz	64-bit			Yes
SmartRAID 3258-16i /e	3258C16IXS		8-lane PCIe Gen 4	16 internal	8 GB DDR4/3200 MHz				Yes
SmartRAID 3254-16i /e	3254C16IXS			16 internal	4 GB DDR4/3200 MHz				Yes
SmartRAID 3254-16e /e	3254C16EXS			16 external					Yes
SmartRAID 3252-8i /e	3252C8IXS			8 internal	2 GB DDR4/3200 MHZ				Yes
SmartRAID 3254-8i	32548IXS			8 internal	4 GB DDR4/3200 MHz				No
SmartRAID 3204-8i	32048IXS			8 internal			No	No	No

*: All features may not be available with initial product release. Please contact Microchip for more information.

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