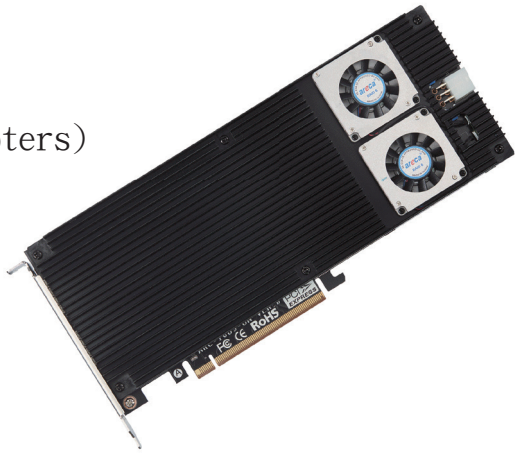
areca® At the Heart of Storage

ARC-1689-8N

(PCIe 5.0 x16 Fastest and Reliable NVMe H/W RAID Adapters)



The ARC-1689-8N presents advanced hardware RAID technology with enhanced performance using 8 Bays Gen5 x4 M.2 NVMe. The hardware RAID adapter supports off module power loss protection (PLP), and ARC-1689-CBM provides features for guaranteed data protection. This system is designed with a high performance RAID engine and PCIe Gen 5.0 host/device interface, and supports AIC mode or hardware RAID levels 0, 1 (Simple/Multi-Mirroring), 10, Single Disk (Single/Dual/Triple) or JBOD, allowing customers to build high-bandwidth, low-latency, scalable, cost-effective and robust performance storage solutions for ML/AI, HPC and enterprise applications

Highlights

- Supports up to 8 bays M.2
- PCIe Gen5 x4 interface at each M.2 bays (up to 4x 2280 FF and 4x 22110 FF)
- x16 PCIe Gen5.0 host interface
- Delivers high-speed performance with speeds of 60GB/s
- Advanced, intelligent thermal solution to control fan speed
- True hardware RAID protection for all valueable data
- RAID levels 0, 1 (Simple/Multi Mirroring), 10, Single Disk (Single/Dual/Triple) or JBOF/AIC Mode
- SED support for hardware NVMe encryption capable drives
- Support for UEFI secure boot
- Hardware secure boot ready
- Support off module power loss protection for Non PLP NVMe drive using ARC-1689-CBM (optional)
- View NVMe device and slot signal integrity status
- In-box driver support for Windows, Linux, FreeBSD and More

NVMe Performance Gains for Fast Data

Based on Broadcom's 48-Channel PEX89048 switch chip that provides x16 lanes of dedicated PCIe Gen 5.0 upstream bandwidth and x4 lanes of dedicated downstream bandwidth to each device interface, the ARC-1689-8N NVMe RAID adapter raises the standard to higher performance levels with several enhancements, including a new high performance RAID engine, outstanding performance PCIe Gen 5.0 host and PCIe Gen 5.0 (NVMe) interface bus interconnection. The ARC-1689-8N provides an extremely fast, reliable and ultra-compact solution for companies that need storage and is especially designed for accelerated computing, ML/AI, HPC and enterprise applications. This RAID adapter can support up to 8 NVMe drives on just one PCIe adapter, increasing capacity and speed as more NVMe drives are added. The ARC-1689-8N supports both up to 4x 2280 and 4x 22110 form factor NVMe drives and combines them on a RAID adapter to maximize I/O performance for database applications and streaming digital media environments. A drawback of software RAID is the consumption of expensive compute and memory bandwidth on the host. The ARC-1689-8N hardware RAID relieves the RAID function burden from the host and maximize application processing performance.

Guaranteed Data Protection

In Areca's high-performance RAID solution, ARC-1689-8N brings PCIe NVMe to superior performance hardware RAID with elevated throughput, high IOPs and low latency. It supports hardware RAID levels 0, 1 (Simple/Multi-Mirroring), 10, Single Disk (Single/Dual/Triple) or JBOD. ARC-1689-8N hardware secure boot helps ensure that the firmware code running on ARC-1689-8N hardware platforms is authentic and unmodified. The "Security Function" in the firmware supports Self-Encrypting Disks (SED) for protection of data against loss or theft of SEDs. Protection is achieved through the use of encryption technology on the NVMe drives. During the adapter firmware upgrade process, it is possible for a problem to occur, resulting in corruption of the controller firmware. With our redundant flash image feature, the adapter will revert back to the last known good firmware and continue operating. The ARC-1689-8N RAID adapter off module power loss protection (PLP) is optimized for datacenter environments. Its efficient PLP typically uses the capacitors on the NVMe SSD to provide hold-up power until the data is flushed from the NVMe internal DRAM to the NAND flash upon sudden power loss or any failure condition occurrence. The ARC-1689-CBM module (optional) supports the supercapacitor to provide off module hold-up power, eliminating the need for capacitors on the NVMe SSDs which helps reduce cost. The ARC-1689-8N advanced thermal solution employs a full-length aluminum heatsink and two low-profile cooling fans to effectively cool the installed M.2 NVMe SSDs so they always operate and perform within their operating temperature rating to maximize reliable performance and endurance.

Maximum Interoperability

The ARC-1689-8N RAID adapter enables support for maximum interoperability using standard system UEFI secure boot and OS in-box driver. The in-box plug-and-play function allows automatic installation of the best-matched driver with no user intervention required for driver media insertion. The ARC-1689 RAID supports in-box NVMe drivers for most major operating systems, including Windows, Linux, FreeBSD, VMware and more, along with key system monitoring features such as enclosure management, SMTP and SNMP functions. ARC-1689 products and technology are based on extensive testing and validation processes, optimizing RAID adapters in field-proven compatibility with operating systems, motherboards, applications and device drivers.

Intuitive RAID Management

McBIOS RAID is a BIOS based utility used to simplify configurations and manage RAID adapters via firmware built-in EFI Shell (UEFI OS) at M/B BIOS boot-up screen. Without deploying an agent, users can still configure, deploy, update, and monitor the ARC-1689-8N via the GUI or through the CLI utility. Customers can launch the firmware browser based McRAID GUI through ArcHttp proxy server for Windows, Linux, FreeBSD and macOS. Additionally, the Areca ArcSAP storage manager allows users to scan multiple RAID units in the network and perform GUI management operations across multiple RAID units.

Adapter Architecture

- PEX 89048 Gen5 Switch/ High Performance RAID Engine
- PCIe Gen5 x16 lane host interface
- Support both 4x 2280 and 4x 22110 form factor M.2 NVMe drives
- Support 8 bays M.2 (PCIe Gen5 x4 per bay)
- Drive interface at each M.2 bay - PCIe Gen5 at 32GT/per lane
- Hardware secure boot
- Multi-adapter support for large storage requirements
- Delivers 64GB/s bandwidth & sustained transfer speeds up to 60GB/s
- Advanced intelligent dual cooling fan control
- Support External PCIe standard 2x3 power connector
- Support for UEFI secure boot
- NVRAM for RAID event & transaction log
- Redundant flash image for controller availability
- Support NVMe off module power loss protection using ARC-1689-CBM supercapacitor module (optional)

Monitors/Notification

- System status indication through individual M2 status LED and alarm buzzer
- SMTP support for email notification
- Bracket LED for each NVMe activity/fault status
- SNMP support for remote manager

RAID Management

- Field-upgradeable firmware in flash ROM
- UEFI OS to launch McBIOS RAID manager
- Web browser-based McRAID storage manager via Archttp utility for Windows, Linux, FreeBSD and macOS
- Support command-line interface (CLI)
- Single Admin Portal (ArcSAP) storage manager
- API library for developers to configure RAID adapters with their own utility

RAID Features

- RAID levels 0, 1(Simple/Multi Mirroring), 10, Single Disk (Single/Dual/Triple) or JBOD/AIC Mode
- Multiple RAID selections
- Array roaming
- RAID level/stripe size migration
- Capacity expansion and RAID level migration simultaneous
- Instant availability and background initialization
- Support global and dedicated hot spare
- NVMe-RAID TRIM support for Host
- Support NVMe S.M.A.R.T command
- Multiple pairs NVMe disk clone function
- NVMe automatic monitor clone (AMC)
- SED support for hardware NVMe encryption capable drives
- Support slot link control capabilities, link status and error count monitoring for signal integrity

Operating System

OS Native NVMe Driver Support

- Windows 11/10 / Server 2025/2022/2019/2016
- Linux (kernel 3.10 or later)
- FreeBSD
- macOS (one zoned Namespace and W/O in band management)

Note: macOS (Areca legacy driver for multi-volumess and in band management)

Note: *NVMe Driver only supports Message Signaled Interrupts, MSI and MSI-X*

For more information & latest supported OS listing visit **www.areca.com.tw**

Environmental Specifications

Operating Voltage	12V
Temperature	Operating: 0˚c to 55˚c Storage: -20˚c to 80˚c
Humidity	Operating: 10-85%, relative humidity Non-operating: 5-90%, relative humidity
Compliance Certification	CE, FCC, RoHS, REACHE

Model Name		ARC-1689-8N H/W RAID Adapter	ARC-1389-8N Switch Adapter
PCIe Switch		PEX89048 48 Lanes Gen5 Switch/High Performance RAID Engine	
Host Interface		PCIe Gen5 x16 Lanes	
Form Factor		107.2(H) x 262(L) mm	
Device Connector		8 x M.2 Connector	
Max M.2 Devices Support		4 x 2280 FF + 4 x 22110 FF	
RAID Level		0, 1(Simple/Multi Mirroring), 10, Single Disk(Single/Dual/Triple)	N/A (W/O RAID function on GUI)
Device Interface		PCIe Gen 5 x4 (NVMe)	
Management Port		In-Band: PCIe	
Power Loss Protection (PLP) Support		Yes (need to install ARC-1689-CBM)	
Hold-up Supercapacitor		ARC-1689-CBM(optional)	
Device Driver		In-Box(Native) NVMe driver	
Software Package		Same as ARC-1886 Tri-Mode RAID Adapter	
Power Consumption	Each M.2 slot	Peak Current: 6.0A（3.3V）*	
	Controller	Worst Case: 23.7 Watts Typical: 18 Watts	
Products View			

* ***NOTE:*** Please check the M.2 vendor about the peak current of the device when operating.

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