

## ARC-1389-32I

(PCIe 5.0 x16 Fastest and Reliable Switch Adapter)

The ARC-1389-32I presents advanced Gen5 switch technology in enhanced performance using 4x MCIO ports (dedicated PCIe Gen5 x8 per MCIO) device interface. The switch adapter is designed with a high performance management engine and PCIe Gen 5.0 host/device interface, and supports internal synthetic switch mode, allowing customers to build high-bandwidth, low-latency, scalable, cost-effective and robust performance storage for ML/AI, HPC and enterprise applications.



### Highlights

- Supports up to 4x MCIO ports (PCIe Gen5 x8 per MCIO)
- Connection for up to 8x4, 16x2 and 32x1 NVMe SSD connect via direct cable or back/mid-plane
- x16 PCIe Gen5.0 host interface
- Delivers high-speed performance with speeds of 60GB/s
- Surprise Add and Remove (Hot-Plug) SSD support
- M.2, U.2, U.3 and EDSFF NVMe drives support
- Support for UEFI secure boot
- Hardware secure boot ready
- Flexible reconfiguration downstream station port widths: x1, x2, x4, x8, and x16 via GUI (update to ARC-1289-32I firmware)
- In-box (native) driver support
- View NVMe device and slot signal integrity status
- In-band Management utility for Windows, Linux, and FreeBSD
- Out-of-band management from on-board Lan port

### 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, ARC-1389-32I NVMe switch adapter raises the standard to higher performance levels with several enhancements including a new high performance management engine, outstanding performance PCIe Gen 5.0 host and PCIe Gen 5.0 (NVMe) interface bus interconnection. ARC-1389-32I provides an extremely fast, reliable and ultra-compact solution for companies that need storage and is especially designed for accelerated computing, ML/AI and HPC applications. This switch adapter can support up to 8x Gen5 x4 NVMe on just one PCIe adapter, increasing capacity and speed as more NVMe devices are added. The ARC-1389-32I supports 8x4, 16x2 or 32x1 NVMe SSD connect and combines them on a switch adapter for high-capacity, high-performance, low latency storage array environments.

### Unsurpassed Advantages

In Areca's high-performance PCIe switch solution, ARC-1389-32I brings PCIe NVMe to a superior performance switch adapter at an elevated throughput, and low latency. ARC-1389-32I hardware secure boot helps ensure that the firmware code running on ARC-1389-32I hardware platforms is authentic and unmodified. 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-1389-32I switch adapter includes several innovative features, including true surprise add and removal, Downstream Port Containment and Read Tracking, which can avoid typical situations that would cause a kernel panic or blue screen event. The advanced intelligent cooling continuously adapts to environmental conditions by automatically controlling the speed of the cooling fans. This super silent design, optimizing balance between noise reduction and necessary cooling. Also, with LED status for each individual NVMe channel on the bracket is closely monitored to help your business continuity. Firmware can monitor and check the current attached NVMe device and slot signal status. User can use it to test new designs or watch over active systems to prevent problems. An error count refers to the number of bit errors detected by the physical layer transceivers within the PCIe switch. These errors can be correctable, where the system can recover without data loss or intervention, or uncorrectable, which negatively impact the interface's function and a high rate can indicate underlying signal integrity issues that may impact performance (latency, bandwidth) or system failures

### Maximum Interoperability

The ARC-1389-32I switch adapter enables support for maximum interoperability using standard system UEFI secure boot and OS in-box NVMe 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-1389-32I supports in-box (native) NVMe driver for most major operating systems, including Windows, Linux, FreeBSD, VMare and more, along with key system monitoring features such as enclosure management, SMTP and SNMP functions. ARC-1389-32I products and technology are based on extensive testing and validation processes, optimizing switch adapter in field-proven compatibility with operating systems, motherboards and applications.

### Intuitive Management Access

Modern IT infrastructure relies heavily on efficient storage management to ensure optimal performance, reliability, and longevity of hardware components. Software management provides critical insights into adapter drive health, and predictive failure analysis. By leveraging these metrics, organizations can optimize storage efficiency, reduce downtime, and extend hardware lifespan. McBIOS switch manager is a BIOS based utility used to simplify manage Areca switch adapter. The switch adapter firmware contains a browser-based switch storage manager which can be accessed through the ArcHttp proxy server in Windows, Linux, FreeBSD and on-board Lan port. The switch storage manager allows local and remote to configure from standard web browser. The adapter's serial interface connector can add optional Areca LCD module for information, status indication, or menus or adapter LED indicator for at-a-glance status checks. The adapter also supports CLI and API libraries for custom configurations.

## Adapter Architecture

- PEX89048 Gen5 Switch/High-performance management engine
- PCIe Gen5 x16 lane host interface
- Connection for up to 8x4, 16x2 and 32x1 NVMe SSD connect via direct cable or back/mid-plane
- Support 4x MCIO (PCIe Gen5 x8 per MCIO)
- Drive interface at each MCIO - PCIe Gen5 at 32GT/s per lane
- Hardware secure boot
- Multi-adapter support for large storage requirements
- Delivers 64GB/s bandwidth & sustained transfer speeds up to 60GB/s
- Support SFF-9402 compliant connector pin-out
- Support backplanes based on the SFF-TA-1005 specification (UBM) and VPP

## Monitors/Notification

- System status indication through alarm buzzer
- SMTP support for email notification
- Bracket LED for each NVMe activity status
- SNMP support for remote manager
- Support for multiple backplanes, including VPP and UBM

## Adapter Management

- Field-upgradeable firmware in flash ROM
- UEFI OS to launch McBIOS switch setup utility
- Web browser-based switch storage manager via Archttp utility and on-board Lan port
- Support command-line interface (CLI)
- API library for developers to monitor switch adapters with their own utility
- Support Areca push button and LCD display panel module

## Firmware Features

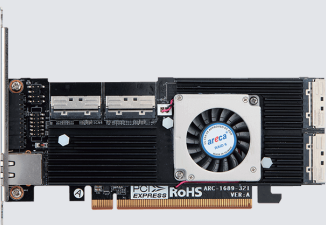
- SRIS and REFCLK support
- Downstream port containment
- Read tracking
- Surprise Add and Remove (Hot-Plug ) SSD support
- Synthetic Hierarchy generation
- Support for UEFI secure boot
- Redundant flash image for adapter availability
- NVRAM for switch adapter event & transaction log
- Web GUI device information(included S.M.A.R.T) via Archttp utility inquiry from Host OS
- Support out-of-band PCIe VDM
- Support slot link control capabilities, link status and error count monitoring for signal integrity
- Flexible reconfiguration downstream station port widths: x1, x2, x4, x8, and x16 using GUI interface (update to ARC-1289-32I firmware package)

## Operating System

### OS In-box (Native) NVMe Driver Support

## Environmental Specifications

|                          |   |
|--------------------------|---|
| Operating Voltage        | 12V   |
| Temperature              | Operating: 0°C to 55°C<br>Storage: -20°C to 80°C                                |
| Humidity                 | Operating: 10-85%, relative humidity<br>Non-operating: 5-90%, relative humidity |
| Compliance Certification | CE, FCC, RoHS, REACHE   |

| Model Name               | ARC-1389-32I Switch Adapter  | ARC-1689-32I H/W RAID Adapter                                     |
|--------------------------|--|---|
| PCIe Switch              | PEX89048 48 Lanes Gen5 Switch /High-performance Management Engine                    |   |
| Host Interface           | PCIe Gen5 x16 Lanes  |   |
| Form Factor              | LP-MD2 : 64.41(H) x 167.65(L) mm   |   |
| Device Connector         | 4x MCIO (PCIe 5.0 x8 per MCIO) Connector   |   |
| Max NVMe Devices Support | Up to 8x4, 16x2 and 32x1 NVMe SSD Connection via Direct Cable or Back/mid-plane      |   |
| RAID Level               | N/A (W/O RAID function on GUI)   | 0, 1(Simple/Multi Mirroring), 10, Single Disk(Single/Dual/Triple) |
| Device Interface         | PCIe Gen 5 x4 (NVMe)   |   |
| Management Port          | In-Band: PCIe/Out-of_Band:Lan Port & PCIe VDM  |   |
| Device Driver            | In-Box(Native) NVMe Driver   |   |
| Software Package         | Same as ARC-1886 Tri-Mode RAID Adapter   |   |
| Power Consumption        | Worst Case: 23.7 Watts<br>Typical: 18 Watts  |   |
| Products View            |  |   |



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1F., No.9, Alley 2, Lane 35, Ji-Hu Rd., 114Taipei, Taiwan, R.O.C.  
TEL: 886-2-87974060 FAX: 886-2-87975970 <http://www.areca.com.tw>  
Technical Support: [support@areca.com.tw](mailto:support@areca.com.tw) Sales Information: [sales@areca.com.tw](mailto:sales@areca.com.tw)