# The Power Behind the Storage

ATTO
Product Brochure
www.atto.com

ATTO

# ATTO Technology, Inc.

**Corporate Vision**

For more than 35 years, ATTO has been an innovator in network and storage connectivity, from developing the first solid-state storage device to the latest data center appliances. ATTO develops high-performance products that manage latency in the most demanding real-time environments resulting in accelerated application performance and enhanced transaction processing. ATTO delivers performance-based solutions to applications, infrastructure, data center, cloud and virtualized environments, including:

- Enterprise - Database, Web Servers, Back-Office Operations, AI/ML
- Departmental - Business Analytics, Supply Chain, Asset Management
- Business Continuity - Stretch, Metro and Campus Clusters
- Workgroup - CAD/CAE, Video Production/Finishing, Scientific, Energy, Medical, AI/ML

ATTO manufactures the industry's broadest portfolio of high-performance network and storage connectivity products, designed and optimized to work together to help customers better store, manage, analyze and deliver data.

- Fibre Channel, SAS/SATA, iSCSI, Ethernet, Thunderbolt™, NVMe, NVMe over Fabric, Host Bus Adapters, Smart Network Interface Cards, Intelligent bridges, Thunderbolt adapters and software

ATTO delivers tested solutions which are qualified and certified with industry leading workstation, server, storage and application vendors. This ensures:

- Faster access to new technology
- Features that improve your workflow
- Maximized solution performance and productivity

**ATTO provides a unique level of partnership with customers, solution providers and OEMs.**



*ATTO founders Dave Snell, CTO, and Tim Klein, CEO*

# The Power Behind the Storage

# ATTO Product Lines

### Host Bus Adapters
ExpressSAS® SAS/SATA HBAs, Celerity™ Fibre Channel HBAs and ExpressNVM™ NVMe HBAs provide faster transfers and architectural flexibility

### Network Interface Cards
FastFrame™ 10/25/40/50/100 Gb Smart Ethernet NICs provide flexible and scalable unified LAN and SAN storage connectivity.

### Intelligent Bridges
XstreamCORE® Intelligent bridges allow users to connect virtually any type of block storage over Fibre Channel or Ethernet networks

### SiliconDisk™
SiliconDisk is a scalable, state-of-the-art RAM-based storage appliance that delivers faster performance than flash-based SSD storage solutions, and with much lower latency.

### Thunderbolt™ Adapters
ThunderLink® adapters enable high-performance, low latency Thunderbolt connectivity to desktop and mobile workstations for storage and network connectivity.
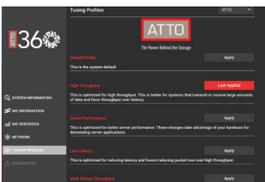
### Software
ATTO software applications and tools help users maximize productivity.

# Technology Leadership

**Technology at its fastest**

## Designed for Performance in Real-Time Environments

At ATTO, we believe in designing with a purpose. Our products are specifically built to address the real-world challenges of today's data-rich environments, which is why we pay particular attention to the following key design principles.

### Performance

Speed is just one factor in performance. Efficiency, reliability and capability are just as essential. World-class product design demands exacting specifications while ensuring consistency and simplicity in function. From the drawing board to final manufacturing, our products are engineered for optimal performance by any measure.

### Ease of Use

High-performance doesn't have to mean impossible to use. We go to great lengths to ensure our products work as expected straight out of the box with software and drivers that make sense. Our management suites with analytics give real-time access to diagnostic and transfer data making it easier to resolve issues even before they occur.

### Software Integration

Inspired software programming breathes life into our innovative hardware designs to deliver renowned ATTO performance. Our drivers, management suites and software tools are easy to use and optimized for a wide range of operating systems including Linux®, Windows®, macOS®, FreeBSD®, illumos™ and more.

### How Do We Do It?

These design principles are present in some of our most advanced product designs, including:

### ATTO Advanced Data Streaming (ADS™) Technology

At ATTO, we believe in designing with a purpose. Our products are specifically built to address the real-world challenges of today's data-rich environments, which is why we pay particular attention to the following key design principles.

From high I/O transactions to large bandwidth real-time streaming, ADS reduces interruptions and maximizes the amount of data processed per CPU cycle.

## Featured Products:

- ATTO Celerity™ Fibre Channel host bus adapters (HBAs)
- ATTO ExpressSAS® SAS/SATA HBAs
- ATTO FastFrame™ Ethernet Smart NICs
- ATTO ThunderLink® Thunderbolt™ adapters

**Competitor's Product**
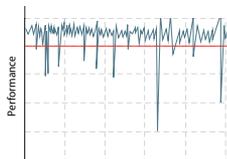


Performance

- Disrupted transfer with peaks and drops
- Transfer rate dips below optimal performance levels

**ATTO Products with ADS Technology**



Performance

- Data transfer performance is smooth and reliable

### *ATTO MultiPath Director™*

This specialized driver recognizes and takes advantage of all paths within a Fibre Channel storage network. When connected to enterprise-class storage systems, data is moved across multiple paths ensuring it is available for anyone who needs it, when they need it.

ATTO MultiPath Director enables failover and load balancing capabilities for high-availability storage. Load balancing across multiple paths increases overall system performance. It also can mix Windows®, macOS® and Linux® workstations in a heterogeneous environment.

### **Featured Products:**

- ATTO Celerity Fibre Channel host bus adapters
- ATTO ThunderLink Thunderbolt adapters
- ATTO XstreamCORE Intelligent bridge

### *Offload Processing*

Working together, xCORE and eCORE offload processors unleash the full potential of software defined storage, making it possible to add common, open storage services and industry standard API integration and maximize the gains of all-flash storage architectures.

xCORE Data Acceleration manages the data path and assures that all reads and writes are processed as fast as possible. xCORE is a key ATTO technology that enables low latency data transfers.

eCORE Control Engine manages the control path so XstreamCORE can handle all non-data requests from the host and process them in the background while xCORE handles data transfers.

### **Featured Products:**

- ATTO XstreamCORE Intelligent bridge

### *ATTO PowerCenter Pro™*

A software interface built into ATTO 12 Gb/s ExpressSAS SAS/SATA HBAs and ATTO ThunderLink Thunderbolt adapters. ATTO PowerCenter Pro™ adds RAID functionality, protection and performance without the need or cost of additional hardware RAID components.

Supports RAID 0, 1, 1e or 10 via integrated software and features a simple, fully scriptable "set it and forget it" CLI and EFI interface for RAID group creation, monitoring and management. Provides full boot support as well as support for hot spares.

Easy-to-use, powerful, yet lightweight, PowerCenter Pro software provides the protection, capacity expansion and performance improvements needed for today's SSD storage platforms.

### **Featured Products:**

- ATTO ExpressSAS® SAS/SATA HBAs
- ATTO ThunderLink Thunderbolt adapters

ATTO Technology

HBAs

NICs

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Thunderbolt™ Adapters

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Resources

# 64Gb, 32Gb,16Gb and 8Gb Fibre Channel HBAs

**ATTO Celerity™ Host Bus Adapters**

ATTO Celerity™ Fibre Channel host bus adapters (HBAs) are designed to cover the full performance spectrum from enterprise to workgroup and server to workstation environments. This highly integrated, fully scalable family of adapters is engineered to optimize data transfer using a combination of features that enhance the data delivery process and is fully scalable. ATTO Celerity HBAs further enhance speed and reliability in high-bandwidth environments. Celerity HBAs address the need for high-performing, scalable and secure storage to support exponential data growth. With features including forward error correction, the Celerity portfolio ensures high reliability in demanding high-speed networks.

- PCIe 4.0 Gen 4 support for next generation performance

- Optimized for extremely low latency and high-bandwidth transfers

- Engineered to meet today's high-performance applications, servers and SSD demands.

- Designed to support real-time virtual environments resulting in higher application performance, better transaction processing and the ability to handle larger workloads

- Enterprise storage-ready compatible with major storage vendors

- ATTO MultiPath Director™ is the industry's only solution that allows servers and workstations access to high-availability, high-performance, enterprise-class storage for shared workflows

- Standard 3-year warranty

- Developer's kit available for OEM integration, including Target Mode API

**Supports:**

- Linux®, macOS®, Windows®, Windows Server Hyper-V®, VMware®, FreeBSD, illumos
- Direct fabric/switch attach and point-to-point
- Certified with industry leading platforms and applications
- N-Port ID Virtualization and Virtual Fabric
- Initiator and Target Mode support

**Includes:**

- ATTO Advanced Data Streaming (ADS™) Technology
- Pluggable optical SFP+ included
- ATTO ConfigTool™ for customized performance settings

**Complementary Products:**

- ATTO XstreamCORE®
- ATTO ThunderLink® adapters
- ATTO premium cables

## ATTO Celerity™ 64Gb Gen 7 PCIe 4 Fibre Channel Host Bus Adapters

| Product Features | FC-642E | FC-641E |
|---|---|---|
| Part Number | CTFC-642E-000 | CTFC-641E-000 |
| Fibre Channel Ports | 2 | 1 |
| Max. Transfer Rate | 12.8GB/sec per port | 12.8GB/sec per port |
| Bus Type | PCIe 4.0 x8 | PCIe 4.0 x8 |
| Connector Type | Optical LC SFP+ | Optical LC SFP+ |
| Low-Profile Form Factor | Yes | Yes |

## ATTO Celerity™ 32Gb Gen 7 PCIe 4 Fibre Channel Host Bus Adapters

| Product Features | FC-324P | FC-322P | FC-321P |
|---|---|---|---|
| Part Number | CTFC-324P-000 | CTFC-322P-000 | CTFC-321P-000 |
| Fibre Channel Ports | 4 | 2 | 1 |
| Max. Transfer Rate | 12800MB/s | 6400MB/s | 3200MB/s |
| Bus Type | PCIe 3.0 x16 | PCIe 4.0 x8 | PCIe 4.0 x8 |
| Connector Type | Optical SFP+ LC | Optical SFP+ LC | Optical SFP+ LC |
| Low-Profile Form Factor | No | Yes | Yes |

## ATTO Celerity™ 32Gb Gen 6 Fibre Channel Host Bus Adapters

| Product Features | FC-324E | FC-322E | FC-321E |
|---|---|---|---|
| Part Number | CTFC-324E-000 | CTFC-322E-000 | CTFC-321E-000 |
| Fibre Channel Ports | 4 | 2 | 1 |
| Max. Transfer Rate | 12800MB/s | 6400MB/s | 3200MB/s |
| Bus Type | PCIe 3.0 x16 | PCIe 3.0 x8 | PCIe 3.0 x8 |
| Auto Negotiation | 32Gb, 16Gb, 8Gb | 32Gb, 16Gb, 8Gb | 32Gb, 16Gb, 8Gb |
| Connector Type | Optical SFP+ LC | Optical SFP+ LC | Optical SFP+ LC |
| Low-Profile Form Factor | No | Yes | Yes |

## ATTO Celerity™ 16Gb Gen 6 Fibre Channel Host Bus Adapters

| Product Features | FC-164P | FC-162P | FC-161P |
|---|---|---|---|
| Part Number | CTFC-164P-000 | CTFC-162P-000 | CTFC-161P-000 |
| Fibre Channel Ports | 4 | 2 | 1 |
| Max. Transfer Rate | 6400MB/s | 3200MB/s | 1600MB/s |
| Bus Type | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 |
| Connector Type | Optical SFP+ LC | Optical SFP+ LC | Optical SFP+ LC |
| Low-Profile Form Factor | Yes | Yes | Yes |

## ATTO Celerity™ 8Gb Fibre Channel Host Bus Adapters

| Product Features | FC-84EN | FC-82EN | FC-81EN |
|---|---|---|---|
| Part Number | CTFC-84EN-000 | CTFC-82EN-000 | CTFC-81EN-000 |
| Fibre Channel Ports | 4 | 2 | 1 |
| Max. Transfer Rate | 3200MB/s | 1600MB/s | 800MB/s |
| Bus Type | PCIe 2.0 x8 | PCIe 2.0 x8 | PCIe 2.0 x8 |

For additional specifications please visit www.atto.com/products/fc-adapters

[1] Available for qualified OEM sales only. Please contact your ATTO representative.
Compatible intelligent bridge available - see page 10.
Compatible software available - see page 16.
Compatible cables & accessories available.

ATTO Technology

HBAs
Fibre Channel

NICs

intelligent Bridges

SiliconDisk

Thunderbolt™ Adapters

Software & Management

Resources

# 24Gb and 12Gb SAS/SATA HBAs

**ATTO ExpressSAS® Host Bus Adapters**

ATTO ExpressSAS® host bus adapters (HBAs) leverage the performance and scalability enhancements of serial attached SCSI (SAS) technology to deliver the fastest available connection to SAS/SATA storage. They offer a reliable direct-attached storage connectivity solution that is interoperable with a wide range of internal and external disk and tape products. ExpressSAS HBAs feature PCI Express 4.0 bus technology in a low-profile form factor with miniSAS HD connectors for improved cable management and monitoring.

- PCIe 4.0 Gen 4 support for next generation performance

- Optimized for extremely low latency and high-bandwidth transfers for both data-intensive and high-transaction rate applications

- Compatible with all major SAS/SATA solid-state disk, hard disk and tape drives

- Low power consumption expands system performance resources and extends processing capabilities

- Integrated software RAID support via PowerCenter Pro™

**Supports:**

- macOS®, Windows®, Linux®, VMware®, FreeBSD®, illumos
- PowerCenter Pro RAID 0, 1, 10, 1e
- Up to 2048 end point devices
- Certified with industry leading platforms and applications
- Initiator and Target Mode support

**Includes:**

- ATTO Advanced Data Streaming (ADS™) Technology
- ATTO ConfigTool™ for customized performance settings
- ATTO WriteStop™ technology for data security in digital forensic applications

**Complementary Products:**

- ATTO ThunderLink® adapters
- ATTO premium cables



ExpressSAS® H1280GT

*ATTO ExpressSAS® HBAs are available with a wide selection of port options to support varying connections to storage from servers and workstations in datacenters, data warehousing, video on demand and other high availability, high performance applications.*

## ATTO ExpressSAS® 24Gb SAS/SATA Host Bus Adapters

| Product Features | H240F | H24F0 | H240N |
|---|---|---|---|
| Part Number | ESAH-240F-000 | ESAH-24F0-000 | ESAH-240N-000 |
| Port Config. (Ext/Int) | 0/16 | 16/0 | 0/24 |
| Bus Type[1] | PCIe 4.0 x16 | PCIe 4.0 x16 | PCIe 4.0 x8 |
| Connector Type | (4) 24Gb miniSAS HD (x4) SFF 8643 Internal | (4) 24Gb miniSAS HD (x4) SFF 8644 External | (6) 24Gb miniSAS HD (x4) SFF 8643 Internal |
| Low-Profile Form Factor | Yes | Yes | Yes |
| Developer's Kit[2] (Target Mode) | Yes | Yes | Yes |
| Warranty | 3 year | 3 year | 3 year |

## ATTO ExpressSAS® 12Gb SAS/SATA Host Bus Adapters

| Product Features | H12F0 GT | H120F GT | H1280 GT | H1208 GT | H1244 GT |
|---|---|---|---|---|---|
| Part Number | ESAH-12F0-000 | ESAH-120F-000 | ESAH-1280-000 | ESAH-1208-000 | ESAH-1244-000 |
| Port Config. (Ext/Int) | 16/0 | 0/16 | 8/0 | 0/8 | 4/4 |
| Bus Type[1] | PCIe 4.0 x8 | PCIe 4.0 x8 | PCIe 4.0 x8 | PCIe 4.0 x8 | PCIe 4.0 x8 |
| Connector Type | (4) 12Gb mini SAS HD (x4) SFF 8644 External | (4) 12Gb mini SAS HD (x4) SFF 8643 Internal | (2) 12Gb mini SAS HD (x4) SFF 8644 External | (2) 12Gb mini SAS HD (x4) SFF 8643 Internal | (1) 12Gb miniSAS HD (x4) SFF 8644 External (1) 12Gb miniSAS HD (x4) SFF 8643 Internal |
| Low-Profile Form Factor | Yes | Yes | Yes | Yes | Yes |
| Developer's Kit[2] (Target Mode) | Yes | Yes | Yes | Yes | Yes |
| Warranty | 3 year | 3 year | 3 year | 3 year | 3 year |

[1] Cross-compatible with PCIe 3.0
[2] Available for qualified OEM sales only. Please contact your ATTO representative.
Compatible software available - see page 16.
Compatible cables available.

ATTO Technology

HBAs SAS/SATA

NICs

intelligent Bridges

SiliconDisk

Thunderbolt™ Adapters

Software & Management

Resources

# PCIe Gen 4.0 NVMe HBAs

## ATTO ExpressNVM™ Smart NVMe Switch Host Bus Adapters

ExpressNVM host bus adapters (HBAs) allow end users to build comprehensive storage for compute-intensive environments. A high-performance, ultra-low latency solution designed for applications like Artificial Intelligence, Machine Learning, the Internet of Things, Edge Computing, and Virtualization, ExpressNVM HBAs connect up to 16 PCIe Gen 4 NVMe drives, adding complete enterprise-grade management and scalability that is otherwise unavailable. ExpressNVM delivers a cost-effective large-capacity solution that allows users to enjoy the high performance of NVMe SSDs and provides the scalability, flexibility and management capabilities missing in onboard NVMe connectivity options.

- PCIe Gen 4.0 x16 host connection for superior performance

- Supports all NVMe drive types, including M.2, U.2, U.3 and EDSFF

- Direct cable and backplane options

- FPGA-based management engine

- Management driver for visualization, sharing as well as aggregation of management and analytics information

**Supports:**

- Windows®, Linux® and VMware® via inbox driver
- Up to 16 NVMe drivers per adapter
- Certified with industry-leading platforms and backplanes
- ATTO CLI Tools with NVMe-MI through SMBus
- Secure UEFI boot

**Includes:**

- ATTO Advanced Data Streaming (ADS™) technology
- Management driver for Windows and Linux

**Complementary Products:**

- ATTO premium cables



ExpressNVM™ S48F

*ATTO ExpressNVM™ HBAs offer a unique option to create shareable NVMe storage pools with unparalleled storage performance—all while delivering enterprise-level management and configuration capabilities.*

## ATTO ExpressNVM™ NVMe Host Bus Adapters

| Product Features | S48F | S4FF |
|---|---|---|
| Part Number | ENVM-S48F-000 | ENVM-S4FF-000 |
| Host Bus Type | X16 PCIe Gen 4.0 | X16 PCIe Gen 4.0 |
| # Drives Supported | 8 (x4 lanes/drive) | 16 (x2 lanes/drive) |
| Drive Types | Any NVMe drive via direct connect or backplane | Any NVMe drive via direct connect or backplane |
| Connector Type | SlimSAS SFF-8654 | SlimSAS SFF-8654 |
| Low Profile | Yes | Yes |
| Max. Throughput | 32GB/sec | 32GB/sec |
| Warranty | 3 year | 3 year |

## Smart NVMe Storage Management

Out-of-band management (SMBus) provides full device control with no impact on I/O stream or reliance on PCIe interface. Offers base management as well as services such as inventory, VPD, configuration, monitoring, OS integration, firmware upgrades and more. Enhanced management such as device isolation, faulty device containment and health & reliability monitoring also available
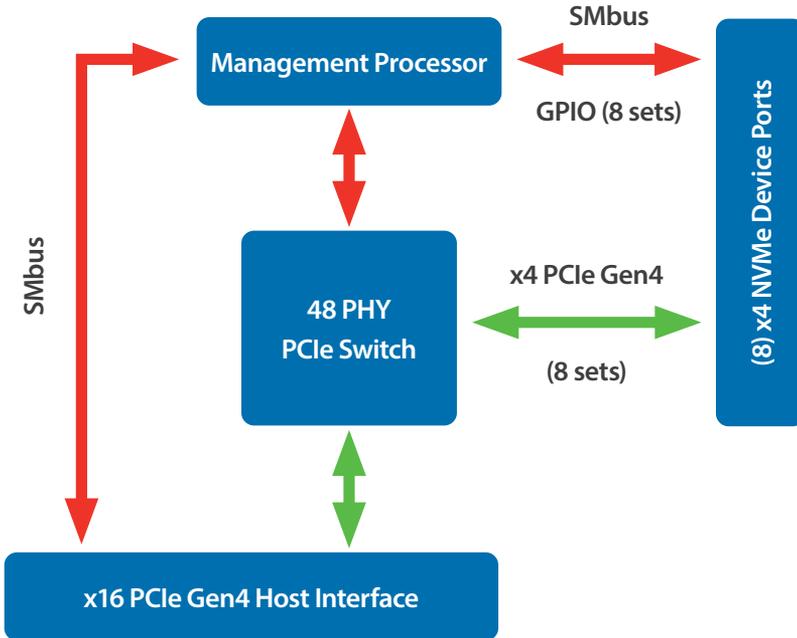
ATTO Technology

HBAs NVMe

NICs

intelligent Bridges

SiliconDisk

Thunderbolt™ Adapters

Software & Management

Resources

# 10/25/40/50/100 Gigabit Ethernet Adapters

## ATTO FastFrame™ Smart Network Interface Cards (NICs)

ATTO FastFrame™ smart network interface cards provide unmatched performance, industry-lowest latency and the versatility needed to support the most demanding and complex ecosystems. Supporting line speeds of up to 100GbE and latency as low as 1µs, FastFrame NICs are suitable for media & entertainment applications such as video post-production, finishing, imaging, archiving and workgroup file sharing, as well as IT applications such as data analytics, high performance computing (HPC) clusters, hyperconverged servers and large database analysis.

ATTO uses the latest technology to accelerate data I/O and deliver industry-leading performance. With end-to-end Quality of Service algorithms built in, network congestion is greatly reduced even over long distances. FastFrame have built-in hardware offload engines, including CPU transport layer offload and NVMe over Fabric target offload to accelerate data and reduce server overhead.

- ATTO 360™ performance tuning, monitoring, and analytics application offers comprehensive tools that unlock the full potential of FastFrame NICs.

- FastFrame NICs leverage ATTO Advanced Data Streaming (ADS™) Technology to provide high-bandwidth and managed latency for high-performance, enterprise-level storage as well as standard network infrastructures.

- FastFrame cards support "energy efficient Ethernet" and are up to 30% more energy efficient than competitive products.

- Available in a variety of port configurations, including single, dual, and quad channel options.

### Supports:
- macOS®, Windows®, Linux®, FreeBSD, VMware® and illumos
- Smart Offloads for TCP and NVMe-oF
- Accelerated RDMA/RoCE and iSER Support
- iSCSI initiator software (optional)
- Certified with industry leading platforms and applications
- NVMe over Fabrics

### Includes:
- ATTO 360™ Tuning, Monitoring and Analytics application
- ATTO Advanced Data Streaming (ADS™) Technology
- Pluggable optical SFP+/QSFP+/QSFP28/SFP 28 support

### Complementary Products:
- ATTO ThunderLink® adapters
- ATTO XstreamCORE® Intelligent bridge
- ATTO XtendSAN™ iSCSI initiator
- ATTO premium cables
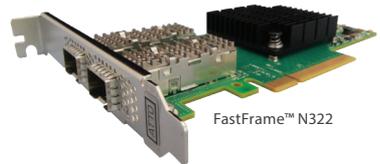
FastFrame™ N322

*Based on industry-standard Ethernet technology, ATTO FastFrame™ Smart NICs are available in single, dual, and quad-port configurations.*

## ATTO FastFrame™ 4 Optical Network Interface Cards

| Product Features | N412 | N422 | N4S2 | N4T2 |
|---|---|---|---|---|
| Part Number | FFRM-N412-000 | FFRM-N422-000 | FFRM-N4S2-000 | FFRM-N4T2-000 |
| Max. Data Rate | 100Gb/s | 25Gb/s | 10Gb/s | 10Gb/s |
| Supported Speeds | 100/50/40/25/10 Gb/s | 25/10 Gb/s | 10Gb/s | 10Gb/s |
| Bus Type | PCIe 4.0 x16 | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 |
| Connector Type | QSFP28 | SFP28 | Optical SFP+ LC | RJ45 |
| Low-Profile Form Factor | Yes | Yes | Yes | Yes |
| OS Support | Windows, Linux, macOS | Windows, Linux, macOS | Windows, Linux, macOS | Windows, Linux, macOS |
| Warranty | 3 year | 3 year | 3 year | 3 year |

## ATTO FastFrame™ 3 Optical Network Interface Cards

| Product Features | N322 | N312 |
|---|---|---|
| Part Number | FFRM-N322-000 | FFRM-N312-000 |
| Max. Data Rate | 25Gb/s | 100Gb/s |
| Supported Speeds | 1/10/25 Gb/s | 1/10/25/40/50/100 Gb/s |
| Bus Type | PCIe 3.0 x8 | PCIe 3.0 x16 |
| Connector Type | SFP28 | QSFP28 |
| Low-Profile Form Factor | Yes | Yes |
| OS Support | Windows, Linux | Windows, Linux |
| Warranty | 3 year | 3 year |

[1] Cross-compatible with PCIe 3.0
Compatible software available - see page 16.
Compatible cables available.

# ATTO Xtend SAN™ iSCSI Initiator

ATTO Xtend SAN iSCSI Initiator enables macOS® users to have a reliable, secure, highly interoperable connection to any iSCSI storage. iSCSI allows users to take advantage of an existing Ethernet infrastructure while reaping the benefits of network attached storage.



Mac Pro® with FastFrame 3/4

Windows® client with FastFrame 3/4

Linux® client with FastFrame 3/4

iMac Pro with Xtend SAN iSCSI Initiator

ATTO ThunderLink NS 3252

10/25/40/50/100Gb Ethernet Switch

iSCSI Storage with FastFrame N322 NICs

| iSCSI | |
| Thunderbolt | |

ATTO Technology

HBAs

NICs Ethernet

intelligent Bridges

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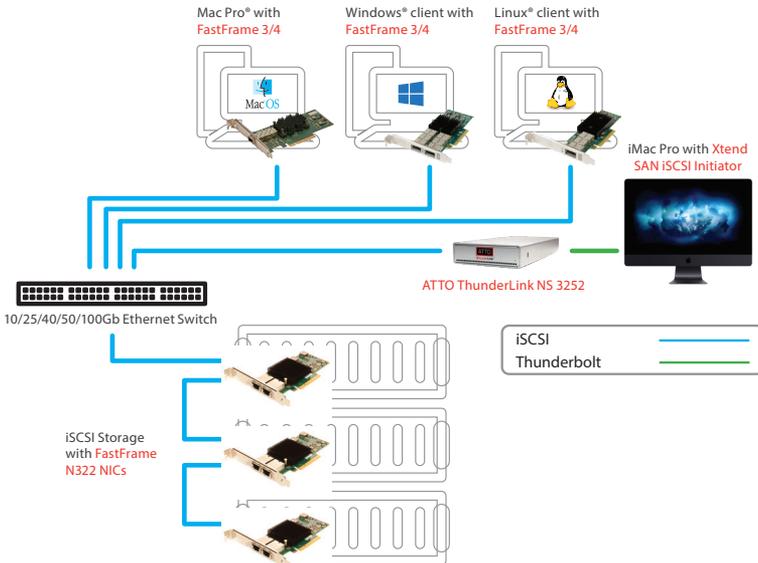
# Intelligent Bridges

## ATTO XstreamCORE® Fibre Channel or Ethernet to SAS Intelligent Bridge

ATTO XstreamCORE® Intelligent bridges are high-performance, accelerated conversion appliances that enable SAS storage to reach longer distances and connect to up to 64 hosts. XstreamCORE enables the disaggregation of storage from server hardware adding JBOD, JBOF, RAID or tape storage. Use cases include creating connection points from drives to space-limited rack or blade servers, adding shared management capabilities to direct-attached storage, disaggregating storage into shared, remote  pools, as well as locating direct-attached SAS disk or tape devices over Ethernet or Fibre Channel.

- ATTO Intelligent bridge keeps overall storage solutions flexible without locking users into proprietary hardware implementaions. ATTO Intelligent bridge are a modular building block with technology that allows admins to reduce resource load while decoupling storage from server resources.

- Optimized for high-performance with ATTO xCORE™ Data Acceleration, XstreamCORE provides deterministic performance for up to 64 hosts with less than two microseconds of added latency. Users will benefit from very high, reliable throughput and IOPS.

- ATTO eCORE™ offload processor adds common services and features, integrates with open storage services, APIs and offloads non-data I/O to maintain consistent performance.

**Supports:**
- Full-duplex data transfers
- Error recovery
- Certified with industry leading platforms and applications
- Data Mover functionality
- VMware® Ready

**Includes:**
- ATTO xCORE Data Acceleration Processor
- ATTO eCORE Offload Processor
- Parallel Data Processing
- Pluggable optical SFP+/QSFP+ modules
- In and out of band management of XstreamCORE functions

**Complementary Products:**
- ATTO Celerity™ Fibre Channel HBAs
- ATTO FastFrame™ Ethernet NICs
- ATTO ThunderLink® adapters

XstreamCORE FC 7600

*"ATTO XstreamCORE® has allowed Torcon the flexibility to expand our storage without having to completely re-architect the current setup."*

*– Shawn Winters*
*Director of Technology, Torcon*

## ATTO XstreamCORE® Fibre Channel and Ethernet Intelligent bridge

| Product Features | 8200 / 8200T | 8100T | 7600 |
|---|---|---|---|
| Part Number | XCET-8200-002 / XCET-8200-TP2 | XCET-8100-TN0 (RJ45 Copper)/ XCET-8100-TS0 (SFP+ Optical) | XCFC-7600-002 |
| Max Sustained Transfer Rate | 6000 MB/s (iSER) | 2000 MB/s | 6000 MB/s |
| 4K IOPS | 1,100,000 | N/A | 1,100,000 |
| Input Connectors | (2) 40Gb Ethernet QSFP+ (iSER / iSCSI support) | (2) 10Gb Ethernet SFP+/ RJ45 (iSCSI support) | (2) 32Gb Fibre Channel SFP+ |
| Output Connectors | (4) 12Gb HD Mini SAS (x4) SFF 8644 | (1) 12Gb miniSAS HD (x4) SFF-8644 | (4) 12Gb HD Mini SAS (x4) SFF 8644 |
| Management Ports | RS-232/RJ45/USB | RJ45 | RS-232/RJ45 |
| In Band/Out of Band Management | Yes | Yes | Yes |
| xCORE Data Acceleration | Yes | No | Yes |
| eCORE Offload | Yes | No | Yes |
| Data Mover Support | Yes | Yes | Yes |
| Devices supported | Up to 960 | 4 | Up to 960 |
| Active initiator Support | 64 | N/A | 64 |
| Event Log Protection | NVRAM | NVRAM | NVRAM |
| Expander/Port Multiplier support | Yes | No | Yes |
| Form Factor | 1U Rackmount | 1U External Desktop | 1U Rackmount |
| Power Supplies | Dual Hot Swap | (1) external | Dual Hot Swap |
| Disk Support | Yes (8200 only) | No | Yes |
| Tape Support | Yes | Yes | Yes |
| Warranty | 2 year | 3 year | 2 year |

Compatible cables and accessories available.
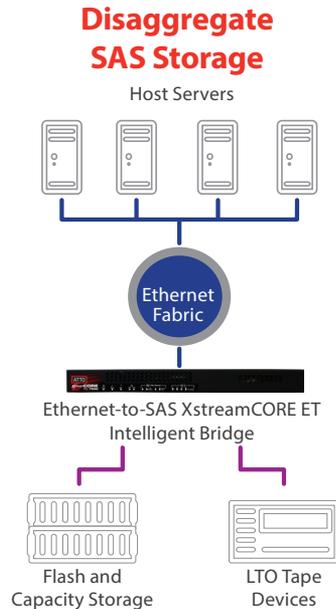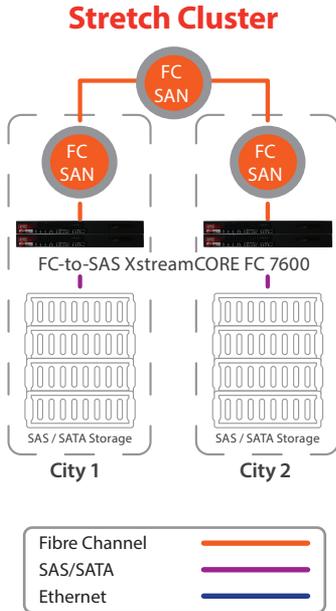


## Stretch Cluster

FC-to-SAS XstreamCORE FC 7600

SAS / SATA Storage — City 1
SAS / SATA Storage — City 2

Fibre Channel
SAS/SATA
Ethernet

## Disaggregate SAS Storage

Host Servers

Ethernet Fabric

Ethernet-to-SAS XstreamCORE ET Intelligent Bridge

Flash and Capacity Storage

LTO Tape Devices

ATTO Technology

HBAs

NICs

intelligent Bridges

SiliconDisk

Thunderbolt™ Adapters

Software & Management

Resources

# SiliconDisk™

## ATTO SiliconDisk RAM-based Storage Appliance

ATTO SiliconDisk™ changes the way enterprise architects design for the ultimate performance in storage solutions. With just nanosecond latency and four 100Gb Ethernet ports for 400Gb of bandwidth, SiliconDisk storage blows away current SSD solutions for performance.

With guaranteed latency in a shared ethernet fabric, ATTO SiliconDisk is the next step in the evolution of storage and will change the way your applications store and use data. Data is instantly stored and retrieved with incredible speed letting you edit more streams of video, capture more data instances for AI / ML, manipulate more data sets quicker, and provides incredible performance to index look-ups.

**Features:**
- 6.4M 4k IOPS
- 35GB/sec sustained throughput
- (4) 100GbE ports
- Predictable latency of <600 nanoseconds
- Full NVME-oF RoCE v2 support
- Direct attach or Fabric connectivity
- 1U rackmount - Enterprise ready!

Performance levels are unparalleled with up to 6.4M 4K IOPS and throughput of up to 35 GBytes per second. Access times at 4K block sizes is deterministic and consistent with a latency of fewer than 600 nanoseconds. Additionally, ATTO SiliconDisk features technology that eliminates the small write penalties or latency gaps often seen on SSD type devices.

Deficiencies in write endurance have made using traditional SSD storage solutions in mission critical applications difficult. Device writes per day, or DWPD, is an endurance calculation that NAND flash products use to predict when the device will become unreliable. RAM Memory in ATTO SiliconDisk™ has no "per write" flash performance penalties or worry of memory wear-out.

By moving RAM-level storage data externally to a shared fabric for high availability configurations every node can have easy access to share that data. Should cluster node failures occur, another node can have quick access to that data for better resiliency. System architects can re-imagine their solution to add n-1 performance models using additional nodes for better overall performance. And for composability, ATTO SiliconDisk can be scaled up or down and reassigned on demand.

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## ATTO SiliconDisk™ RAM-based Storage Appliance

| Product Features | | |
|---|---|---|
| Part Number | SDSK-0512-000 | SDSK-1024-000 |
| *Capacity | 512 GB | 1024 GB |
| 4K IOPs | 6,400,000 IOPs | 6,400,000 IOPs |
| Latency | <600ns | <1ms |
| Bandwidth | 35 GBytes/s | 35 GBytes/s |
| Input Connectors | (4) 100GbE | (4) 100GbE |
| Insight Analytics | Yes | Yes |
| Infinite Write Endurance™ | Yes | Yes |
| xCORE Data Acceleration | Yes | Yes |
| eCORE Offload | Yes | Yes |
| Form Factor | 1U Rackmount/ Desktop | 1U Rackmount/ Desktop |
| Power Supply | Dual Hot Swap | Dual Hot Swap |
| Warranty | 3 year | 3 year |

* For larger capacities, please contact ATTO

**ATTO Insight Analytics™** application delivers real-time performance analytics on your storage network connections, storage utilization as well as overall SiliconDisk data performance allowing you to quickly assess issues and optimize your solution. Analytics capabilities are hardware-based, allowing users to dig deep without impacting system performance.

## Applications

- Financial Data Analysis
- Workgroup & Cloud Architectures
- Artificial Intelligence/Machine Learning
- Imaging and Rendering
- Database Indexes
- Parallel Computing Environments
- Server Clusters
- Composable Infrastructures

### A New Storage Tier

The unique architecture of ATTO SiliconDisk provides breakthrough performance that is both faster and more consistent than SSD storage effectively filling the gap between system memory and the first tier of JBOFs.

Internal Memory
~0.1nsec to 100nsec

ATTO SiliconDisk
600 nsec

External NVMe Storage
~50-80 usec

External SAS SSD Storage
~80-100 usec

External HDD Storage
~10 – 100msec

ATTO SiliconDisk

Server

*Direct-attached for 400 GbE performance.*

ATTO SiliconDisk
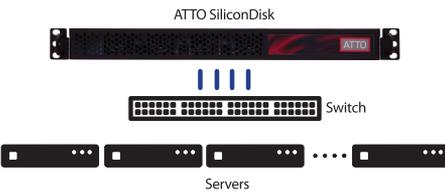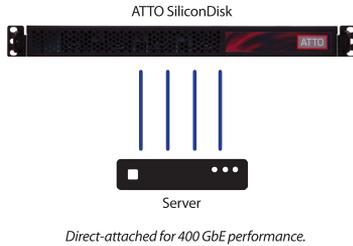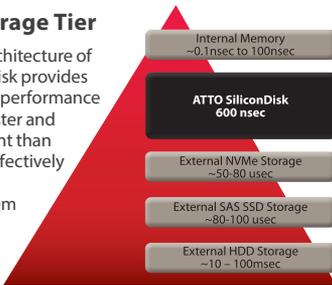
Switch

Servers

*Fabric-attached for greater scalability.*

ATTO SiliconDisk
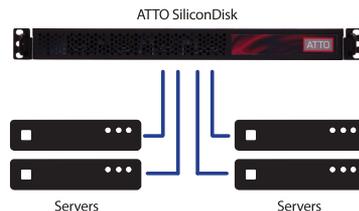
Servers

Servers

*Switch-less direct-connect server configuration.*

# Thunderbolt™ Adapters

**ATTO ThunderLink® Adapters**

Delivering creative, engineering and technical professionals a high-performance and low latency Thunderbolt™ connectivity solution engineered for applications where optimized performance and high throughput are essential. ATTO ThunderLink® adapters allow today's Thunderbolt enabled desktop and mobile workstations to connect into high-performance storage or networks. ATTO provides the widest portfolio of Fibre Channel, Ethernet and SAS/SATA adapters.

- Purpose built to be low profile, cool, ultra-quiet and simple to deploy into existing environments

- All units are equipped with any needed SFP+/QSFP+/ SFP28 locking power supply and Kensington™ security slot

- Widest portfolio available of tested and certified solution components including storage systems, switches, hosts and software applications



ATTO ThunderLink®

**Supports:**
- macOS®, Windows®, VMware® vSphere
- Certified with industry leading platforms and applications

**Includes:**
- ATTO Advanced Data Streaming (ADS™) Technology
- ATTO ConfigTool™ for customized performance settings
- ATTO MultiPath Director™
- ATTO 360™

**Complementary Products:**
- ATTO Celerity™ Fibre Channel HBAs
- ATTO ExpressSAS® HBAs
- ATTO FastFrame™ NICs
- ATTO XstreamCORE® Intelligent bridge
- ATTO premium cables and accessories

*"With Thunderbolt Macs, you can't put a Fibre Channel card in, so ATTO ThunderLink® adapters ended up being really crucial for both moving material around, and doing a conform and grade."*

*– Marcus Von Holtzendorff*
*Mel Hoppenheim School of Cinema*

## ATTO ThunderLink® Adapters - Thunderbolt 3

| Product Features | 25GbE | 10GbE | 10GbE |
|---|---|---|---|
| Part Number | TLNS-3252-D00/DE0 | TLN3-3102-D00/DE0 | TLN3-3102-T00/TE0 |
| Input Connectors | (2) 40Gb/s Thunderbolt 3 (USB-C) | (2) 40Gb/s Thunderbolt 3 (USB-C) | (2) 40Gb/s Thunderbolt 3 (USB-C) |
| Output Connectors | (2) 25GbE | (2) 10GbE | (2) 10GbE |
| Connector Type | (2) Optical SFP+28 (Included) | (2) Optical SFP+LC (Included) | (2) RJ45 SFP+ (Included) |
| Warranty | 3 year | 3 year | 3 year |

## ATTO ThunderLink® Adapters - Thunderbolt 3

| Product Features | SAS/SATA | Fibre Channel | Fibre Channel |
|---|---|---|---|
| Part Number | TLSH-3128-D00/DE0 | TLFC-3322-D00/DE0 | TLFC-3162-D00/DE0 |
| Input Connectors | (2) 40Gb/s Thunderbolt 3 (USB-C) | (2) 40Gb/s Thunderbolt 3 (USB-C) | (2) 40Gb/s Thunderbolt 3 (USB-C) |
| Output Connectors | (2) 12Gb SAS/SATA | (2) 32Gb/s Fibre Channel | (2) 16Gb/s Fibre Channel |
| Connector Type | (2) mini SAS (x4) SFF 8644 External | (2) Optical SFP+LC (Included) | (2) Optical SFP+LC (Included) |
| Warranty | 3 year | 3 year | 3 year |

[1] Includes UK/EMEA power components, accessories
Compatible cables and accessories available.

## Use Case
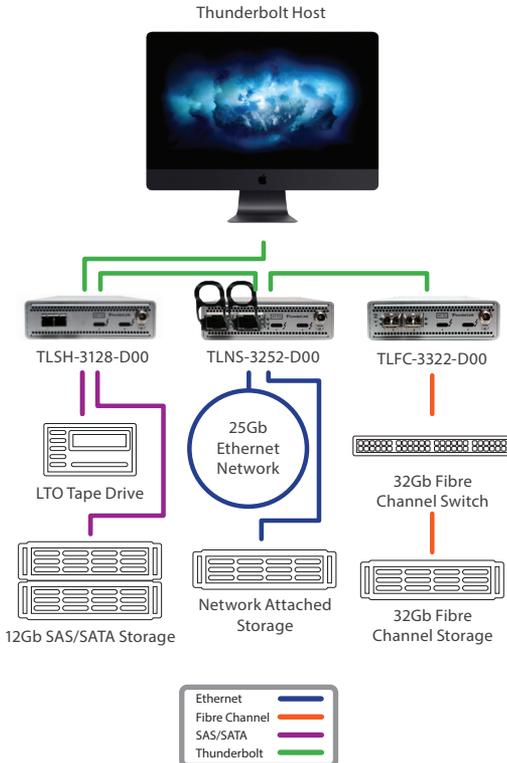


Thunderbolt Host

TLSH-3128-D00    TLNS-3252-D00    TLFC-3322-D00

LTO Tape Drive

25Gb Ethernet Network

32Gb Fibre Channel Switch

12Gb SAS/SATA Storage

Network Attached Storage

32Gb Fibre Channel Storage

| | |
|---|---|
| Ethernet | |
| Fibre Channel | |
| SAS/SATA | |
| Thunderbolt | |

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# Software and Management
## ATTO Xtend SAN™ and Disk Benchmark

**ATTO Xtend SAN™** iSCSI Initiator for macOS® software connects workstations with built-in Ethernet to multiple direct-attached storage servers across long distances. It provides users network access to block-level storage without the cost and complexity of a Fibre Channel SAN. With iSCSI, small businesses and workgroups gain the advantages of a SAN on a manageable budget.

- Easy setup and management features make implementing an iSCSI SAN simple

- High performance for demanding applications

- Volume and enterprise licensing available

**Supports:**
- Up to 1024 targets
- Header/Data digest with class 1 error recovery
- SNS client login redirect function
- CHAP iSCSI security
- iSNS client
- Certified with industry leading platforms and applications

**Includes:**
- Easy-to-use GUI simplifies set-up, configuration and management
- Advanced CLI for addressing iSCSI targets
- Voluming Licensing available

**Complementary Products:**
- ATTO FastFrame™ NICs
- ATTO ThunderLink® adapters

**ATTO Disk Benchmark** is the world's most widely used performance measurement tool. Measure your storage system performance with various transfer sizes and test lengths for reads and writes. Several options are available to customize your measurement including a comparison mode to analyze various performance tests. Use Disk Benchmark to test HDD and SSD drives and to tune for maximum performance.

- Transfer sizes from 512KB to 8MB

- Transfer lengths from 64KB to 2GB

- Support for overlapped I/O

- Supports a variety of queue depths

ATTO Disk Benchmark for macOS

*Visit **atto.com** to find the right software to maximize the performance of your storage connection.*

# Management Tools
## ATTO ConfigTool™, vConfigTool™ and ATTO 360™

**ATTO ConfigTool™** helps customize the settings of your ATTO host bus adapter (HBA) to maximize the performance of your storage connection. ConfigTool comes standard with all ATTO HBAs and Thunderbolt™ adapters.

• Custom utility settings to optimize performance

• Available on macOS®, Windows® and Linux®

• Advanced troubleshooting and monitoring

**ATTO vConfigTool™** for VMware® vCenter Server is a software plug-in that integrates centralized management and monitoring of ATTO Celerity™ and ATTO ExpressSAS® host bus adapters into VMware virtual environments. This accelerates adapter deployments, optimizes configurations, improves system availability. vConfigTool includes ATTO Latency Scout™, an I/O latency statistic feature that enables IT administrators to monitor storage I/O latency and isolate bottlenecks.

• Custom utility settings to optimize performance

• Advanced troubleshooting and monitoring

**ATTO 360™** Ethernet Tuning, Monitoring, and Analytics software unlocks the true potential of ATTO FastFrame™ and ATTO ThunderLink® Ethernet products for macOS®, Windows® and Linux®. This unique application allows you to tune Ethernet for performance as well as diagnose performance and connection issues behind a simple, easy to use management interface. Being undeterministic by nature, Ethernet requires qualified technical resources to understand network topology, identify obstacles to proper data flow, and tuning for optimal performance.

• Performance tuning for ATTO Smart NICs with 1-click setup for specific use cases and workflows including custom tuning profiles for partners like Dell, Avid, and Autodesk.

• Diagnose common issues that cause poor performance and take corrective actions to fix problems before they occur.

• Monitor all Ethernet traffic and run packet statistics.

• Manage driver settings, MTU sizes, buffers, flow control and several offloads from one convenient and easy to use management interface.

# Industry Partners

# Resources

**How to Buy, Interoperability, Support, Partner Programs**

ATTO Resources page contains our latest press releases, videos, success stories, case studies, images and more. Please visit www.atto.com/resources/

## How to Buy

**On the web:** www.atto.com/howtobuy
**Main Number:** +1.716.691.1999
**Direct Sales:** www.atto.com
**ATTO Web Store:** shop.atto.com

## Interoperability

ATTO continually certifies our products with third-party vendor products to ensure full compatibility. Please visit www.atto.com/support/interoperability for compatibility listings.

## Support

ATTO provides customers with the finest in technical support for the lifetime of all product lines. It is our priority to understand customer workflows and their specific needs to provide the best technical assistance in the industry. Contact ATTO Technical Support at **+1.716.691.1999**, or to submit an inquiry please visit our website: www.atto.com/corporate/contact-us/.

## Partner Programs

**ATTO Technology Access™ Partner Program** offers technical partners opportunities to engage in high-performance markets with fully tested solutions. Access Partner Program members benefit from interoperability testing, technology access and co-marketing support.

**ATTO Technology Accelerate™ Partner Program** rewards our dedicated solution providers with outstanding support in all key collaborative areas such as sales, marketing, training and more. The program provides a higher level of engagement and tools to help you reach your business objectives.

# Always have the latest edition

See the newest additions to the ATTO product portfolio
by visiting **atto.com/ProductBrochure**

**Be sure to follow us on Social Media**

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