30ᵀᴴ Edition

ATTO
Resource Guide
The Power Behind the Storage

ATTO

ATTO Technology, Inc.

Corporate Overview

For nearly 30 years, ATTO has been an innovator in storage and network 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, big data, cloud and virtualized environments.

- Enterprise - Database, Web Servers, Back-Office Operations
- Departmental - Business Analytics, Supply Chain, Asset Management
- Workgroup - CAD/CAE, Video Production, Scientific, Energy, Medical

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

- Fibre Channel, SAS/SATA, iSCSI, Ethernet, FCoE, Thunderbolt
- HBAs, RAID Adapters, NICs, Storage Controllers, Switches, Thunderbolt™ adapters, Software

ATTO provides tested solutions qualified and certified with industry leading workstation, server, storage and application vendors.

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

A unique level of partnership with customers, solution providers and OEMs

The Power Behind the Storage

ATTO Founders Dave Snell, CTO, and Tim Klein, CEO

"We would like to thank our valued industry partners and loyal customers for your continued support. ATTO's primary mission is to provide the best possible customer experience while offering the highest performing, industry leading products and technologies available."

-Timothy J. Klein, President and CEO, ATTO Technology, Inc.

Host Bus and RAID Adapters
Celerity™ 32Gb/s, 16Gb/s and 8Gb/s Fibre
Channel HBAs, ExpressSAS™ 12Gb/s and 6Gb/s
SAS/SATA HBAs and RAID adapters provide
faster and more efficient data transfers

Network Interface Cards
FastFrame™ 40Gb and 10Gb NICs provide flexible and
scalable unified LAN and SAN storage connectivity

ThunderLink™ and ThunderStream™ Devices
ThunderLink™ and ThunderStream™ devices
enable high-performance, low latency
Thunderbolt™ connectivity to all-in-one systems,
laptops, workbooks and mobile workstations
for storage and network connectivity

Storage Controllers
ATTO XstreamCORE™ Fibre Channel storage
controllers add enterprise Fibre Channel
and management features to direct-
attached RAID and JBOD enclosures

Bridges
ATTO FibreBridge™ products allow IT
administrators to connect SAS HDD, JBOD and
Tape devices into storage area networks

Switches
FibreConnect™ 16Gb/s and 8Gb/s Fibre
Channel switches provide high-performance,
scalable connectivity with enterprise-level
features for small to mid-range SANs

Software
ATTO software and downloadable tools
help to maximize the productivity of
a number of ATTO products

Cables and Accessories
ATTO high-quality cables maximize product
performance and data integrity

HBAs/NICs

RAID
Adapters

Storage
Controllers

Thunderbolt™
Devices

Bridges

Switches

Software

Cables

Technology Leadership

ATTO Product Differentiators

Advanced Data Streaming (ADS™)

ADS latency management technology is built into every ATTO host bus adapter (HBA) and RAID controller, providing the fastest, most consistent time-to-data, delivering the best-in-industry aggregate bandwidth and predictable data transfers for high-performance applications.

ATTO Products with ADS™ Technology
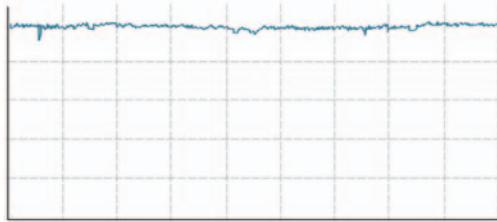
Data transfer performance is smooth and reliable

Competitor's Product

Disrupted transfer with peaks and drops

Transfer rate dips below optimal performance levels

ATTO's heritage of pioneering solid-state storage technology means all products are engineered to manage latency in real-time environments:

• Higher application performance = improved productivity
• Better transaction processing = faster time to revenue and critical business decisions
• Ability to handle larger workloads and client counts

"ATTO is our go-to company for connectivity. We rely on the performance and reliability ATTO products provide and use their products in all of our solutions."

-James McKenna, Vice President, Marketing and Pre Sales, Facilis Technology, Inc.

Adaptive Path Optimization
Intelligently senses multiple paths to drives and increases I/O for up to a 70 percent performance improvement. Also eliminates single points of failure in storage connections

CacheAssure™
Uses supercap technology to protect cached data for up to 10 years. Manages data during power up and power down. Eliminates battery-related maintenance, reducing IT costs

Data Mover
Patented technology that pre-processes data to allow for accelerated movement of data between storage devices while freeing up server CPU, memory and storage interfaces

Drive Map Director™
Provides a logical, static topology and enables login parameters, access management and security for racks of SAS/SATA storage during configuration or maintenance, reducing additional administration costs and resources

DriveAssure™
Repairs drives to prevent premature failures and slowdowns to maximize system uptime. Also ensures 100 percent throughput during data rebuilds

DVRAID™
Technology optimized for digital content creation environments which require protection in the event of a disk failure without the performance penalty traditionally seen with parity RAID

*i*ntelligent Controller Architecture™
Combines powerful hardware with an efficient data engine to create a platform that delivers performance with a rapid IO ramp and extremely low latency

Latency Scout™
Enables IT administrators to quickly isolate data center bottlenecks with real-time latency histograms, ensuring maximum infrastructure uptime and optimal performance

MultiPath Director™
A proprietary technology available on ATTO's Fibre Channel host bus adapters and Thunderbolt™ adapters that enables Linux®, Mac® and Windows® workstations and servers to connect directly to enterprise-class storage with redundant controllers, providing failover and load balancing capabilities across multiple paths to the storage

xCORE Acceleration Platform
Features multiple parallel I/O acceleration engines with end-to-end I/O processing, hardware buffer allocation management and real-time performance and latency analytics

eCORE Control Engine
Adds common, open storage services, integrates with industry standard APIs, handles reservations, storage routing and host and LUN mapping functions

Power Center Pro
Easy-to-use, integrated software RAID solution that brings the performance and protection of RAID 0, 1, 1e and 10 to storage devices connected to ATTO host adapters

Virtual Device Manager
Virtualizes devices in one protocol so they can be managed by a controller of a different protocol

WriteStop™
Ensures data security in digital forensics applications by blocking writes to hard disks, while providing read-only protection at the system level

ATTO Solutions

HBAs/NICs

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

Adaptive Path Optimization

Performance Plus Protection

ATTO's Adaptive Path Optimization has built-in intelligence to sense when multiple paths to drives are available and directs I/O accordingly. For the cost of a cable, you can see up to a 70 percent performance improvement. The ExpressSAS RAID adapter automatically configures and reconfigures for optimum I/O balance and is scalable to work with cascaded arrays and expanders.

Maximum Availability

Up to two-thirds of storage failures are caused by interconnect issues. Adaptive Path Optimization eliminates single points of failure in storage connections by creating redundant data paths. Fast, dynamic rebalancing minimizes disruptions and quickly restores a balanced configuration that delivers predictable access to data.

ATTO Products with Adaptive Path Optimization Technology - ExpressSAS SAS/SATA RAID Adapters and ThunderStream and ThunderLink Thunderbolt™ Devices

CacheAssure™

No Batteries, Lifetime Backup

Power and system failures can cause data located in cache memory to become permanently lost. Traditionally, battery backup units (BBUs), which typically last one to two years, have been used to protect and recover cached data but they require constant monitoring, maintenance and replacement and only protect data for up to 72 hours after a failure. ATTO's RAID products with CacheAssure technology deliver a long-lasting and reliable cached data protection solution all without the worries associated with battery-based technology.

Zero Maintenance Data Protection

CacheAssure saves time and money by eliminating the need to install, monitor, maintain, dispose of and replace batteries. It provides protection within a few minutes of installation while batteries can take six to eight hours to recharge, which can put data at risk. Contents in cache memory get saved immediately in the event of a system failure or power loss and can remain protected for up to 10 years. Unlike other solutions that transfer data immediately upon power restoration, CacheAssure ensures storage is back online before restoring and synchronizing data.

ATTO Products with CacheAssure Technology - ExpressSAS SAS/SATA RAID Adapters

"Extremely satisfied... we're noticing astronomical speed in transfer rates."

-Zoltan Kiraly, Senior SAN/Solutions Architect, Mercedes-Benz

DriveAssure™

Extend the Life of Your Drives

Studies show that up to 60 percent of IT budgets are spent on maintenance. DriveAssure searches for bad sectors or slow spots and repairs them without failing the drive, preventing the loss of critical assets and ensuring drives run longer, smoother and faster. Drives are groomed to effectively extend their useful life, reducing maintenance costs.

Maximize System Uptime

Fast access to, and rapid delivery of, data is critical in today's virtualized and big data environments. DriveAssure compensates for a slow drive in a RAID group to keep data moving smoothly within a guaranteed response time. In the event of a drive failure, the RAID group is rebuilt up to 50 percent faster than competitive solutions, all while providing 100 percent data delivery performance to the client.

ATTO Products with DriveAssure Technology - ExpressSAS SAS/SATA RAID Adapters and ThunderStream adapters

MultiPath Director™

Enhancing High Performance Applications

Workstation-based applications in high-performance workgroup environments require fast throughput and uninterrupted access to data. In a typical workgroup setup, a server links workstations to storage with data residing on shared resources in a storage area network, or SAN — a configuration that adds latency, increases complexity and generally does not support the high performance level required by today's data-intensive workstation applications, like seismic exploration, scientific research, CAD/CAE, medical imaging and media production. The only other alternative is to use direct-attached storage for each workstation, an option that creates islands of unprotected data and makes it difficult to share projects.

Superior Performance

MultiPath Director solves performance problems by offering the unique option to bypass servers and connect Windows®, Linux® and Mac® workstations directly to enterprise-class storage, providing a completely redundant, high-availability, high-performance storage solution for workstation applications. Redundant data paths with failover protection automatically route data to a secondary path in the event of a primary link, cable or switch failure, guaranteeing uninterrupted access for mission-critical applications. Load-balancing features use multiple paths to optimize data transfers, effectively eliminating bottlenecks that can drag down application performance. Load balancing and failover protection do not exist in most workstation operating systems. By incorporating these features at the driver level, ATTO provides the only solution that allows Windows, Linux, and Mac workstations to work together in a heterogeneous SAN.

ATTO Products with MultiPath Director Technology – Celerity Fibre Channel HBAs and ThunderLink adapters

ATTO Solutions

HBAs/NICs

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

32Gb, 16Gb and 8Gb Fibre Channel HBAs

Celerity™ Host Bus Adapters

Celerity Fibre Channel 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's Celerity 32Gb Gen 6 single- and dual-channel HBAs further enhance speed and reliability in high-bandwidth work environments. Celerity 16Gb Gen 6 single-, dual- and quad-channel cards address the need for high-performing, scalable and secure storage to support exponential data growth from applications. With features including Forward Error Correction, the Gen 6 portfolio ensures high reliability in demanding, high-speed networks. Built with the PCIe 3.0 computer interface, Gen 6 host adapters are compatible with all Fibre Channel 32, 16 and 8Gb devices.

- Optimized for extremely low latency and high-bandwidth transfers
- Engineered to meet today's high-performance applications, PCIe 3.0 servers and SSD demands with up to 1.6 million IOPS on a single port
- 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 Dell®, EMC®, HP®, Hitachi Data Systems, IBM®, NetApp®, Quantum® and other major storage vendors
- MultiPath Director™ is the industry's only solution to allow servers and workstations access to high-availability, high-performance, enterprise-class storage for shared workflows
- MultiPath Director implemented across all clients (servers and workstations) improves overall efficiency of the Fibre Channel SAN infrastructure
- Low power consumption expands system performance resources to extend processing capabilities
- Complete SAN connectivity solution when combined with an ATTO FibreConnect™ Fibre Channel switch
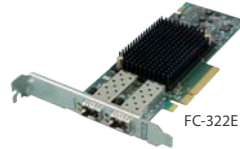
FC-322E

Supports:
- Linux®, Mac®, Windows®, Windows Server Hyper-V®, VMware®, FreeBSD (32Gb and 16Gb only), illumos (32Gb and 16Gb only)
- Direct fabric/switch attach and point-to-point
- Certified with industry leading platforms and applications
- N-Port ID Virtualization and Virtual Fabric

Includes:
- Advanced Data Streaming (ADS™) technology
- Pluggable optical SFP+
- ATTO Config™ Tool for customized performance settings

Complementary Products:
- ATTO XstreamCORE™ Storage Controllers
- ATTO FibreBridge™ Fibre Channel Storage Controllers
- ATTO FibreConnect™ Fibre Channel Switches
- ATTO ThunderLink™ Devices
- ATTO premium cables

"ATTO is an industry leader and long-standing technology partner of Infortrend. Their innovative 16Gb Fibre Channel connectivity products offer seamless compatibility and maximum performance with our EonStor DS 3000 and DS 4000 Storage Systems and prove to be essential for data-intensive, low-latency applications covering enterprise to data center environments."

-Thomas Kao, Senior Director of Product Planning, Infortrend

ATTO Celerity™ Host Bus Adapters

Product Features	322E (Gen 6)	321E (Gen 6)	164P (Gen 6)	162P (Gen 6)	161P (Gen 6)
Part Number	CTFC-322E-000	CTFC-321E-000	CTFC-164P-000	CTFC-162P-000	CTFC-161P-000
Fibre Channel Ports	2	1	4	2	1
Max. Data Rate	32Gb/s	32Gb/s	16Gb/s	16Gb/s	16Gb/s
Max. Transfer Rate	6400MB/s	3200MB/s	6400MB/s	3200MB/s	1600MB/s
Bus Type	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Auto Negotiation	32Gb, 16Gb, 8Gb	32Gb, 16Gb, 8Gb	16Gb, 8Gb, 4Gb	16Gb, 8Gb, 4Gb	16Gb, 8Gb, 4Gb
Connector Type	Optical SFP+ LC	Optical SFP+ LC	Optical SFP+ LC	Optical SFP+ LC	Optical SFP+ LC
Max. Cable Length (OM3)	100m - 16Gb 50m - 32Gb	100m - 16Gb 50m - 32Gb	150m - 8Gb 100m - 16Gb	150m - 8Gb 100m - 16Gb	150m - 8Gb 100m - 16Gb
Low-Profile Form Factor	Yes	Yes	Yes	Yes	Yes
Developer's Kit[1] (Target Mode API)	Yes	Yes	Yes	Yes	Yes
Warranty	3 year	3 year	3 year	3 year	3 year

Product Features	164E[1]	162E	161E
Part Number	CTFC-164E-000	CTFC-162E-000	CTFC-161E-000
Fibre Channel Ports	4	2	1
Max. Data Rate	16Gb/s	16Gb/s	16Gb/s
Max. Transfer Rate	6400MB/s	3200MB/s	1600MB/s
Bus Type	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Auto Negotiation	16Gb, 8Gb, 4Gb	16Gb, 8Gb, 4Gb	16Gb, 8Gb, 4Gb
Connector Type	Optical SFP+ LC	Optical SFP+ LC	Optical SFP+ LC
Max. Cable Length (OM3)	150m - 8Gb 100m - 16Gb	150m - 8Gb 100m - 16Gb	150m - 8Gb 100m - 16Gb
Low-Profile Form Factor	No	Yes	Yes
Developer's Kit[1] (Target Mode API)	Yes	Yes	Yes
Warranty	3 year	3 year	3 year

Product Features	84EN	82EN	81EN
Part Number	CTFC-84EN-000	CTFC-82EN-000	CTFC-81EN-000
Fibre Channel Ports	4	2	1
Max. Data Rate	8Gb/s	8Gb/s	8Gb/s
Max. Transfer Rate	3200MB/s	1600MB/s	800MB/s
Bus Type	PCIe 2.0 x8[2]	PCIe 2.0 x8[2]	PCIe 2.0 x8[2]
Auto Negotiation	8Gb, 4Gb, 2Gb	8Gb, 4Gb, 2Gb	8Gb, 4Gb, 2Gb
Connector Type	Optical SFP+ LC	Optical SFP+ LC	Optical SFP+ LC
Max. Cable Length (OM3)	500m - 2Gb 380 m - 4Gb 150 m - 8Gb	500m - 2Gb 380 m - 4Gb 150 m - 8Gb	500m - 2Gb 380 m - 4Gb 150 m - 8Gb
Low-Profile Form Factor	No	Yes	Yes
Developer's Kit[1] (Target Mode API)	Yes	Yes	Yes
Warranty	3 year	3 year	3 year

[1] Available for qualified OEM sales only. Please contact your ATTO representative.
[2] Cross-compatible with PCIe 3.0
Compatible storage controllers available - see page 16.
Compatible Fibre Channel switch available - see page 22.
Compatible software available - see page 24.
Compatible cables & accessories available - see page 26.

ATTO Solutions

HBAs/NICs Fibre Channel

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

12Gb and 6Gb SAS/SATA HBAs

ExpressSAS™ Host Bus Adapters

ExpressSAS host bus adapters 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 12Gb SAS/SATA HBAs feature PCI Express 3.0 bus technology in a low-profile form factor and offer the latest miniSAS HD connectors for improved cable management and monitoring.

- 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
- Uses up to 40 percent less power than competitive HBAs, reducing overall power and cooling costs
- Low power consumption expands system performance resources and extends processing capabilities
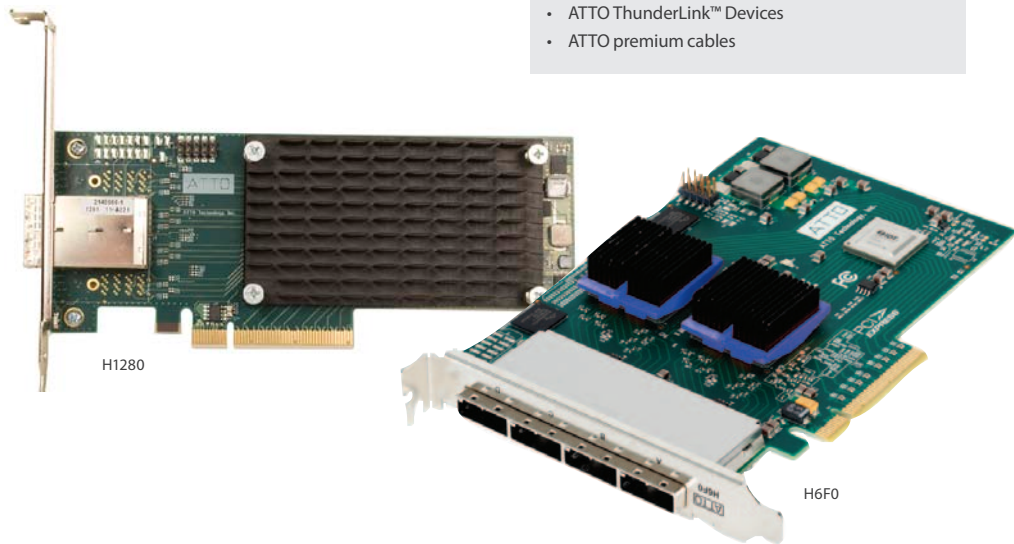
Supports:
- Mac® (6Gb only), Windows®, Linux®, VMware®, FreeBSD® (12Gb only), illumos (12Gb only)
- Power Center Pro RAID 0, 1, 10, 1e (12Gb Only)
- Up to 2048 end point devices
- Certified with industry leading platforms and applications

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

Complementary Products:
- ATTO ThunderLink™ Devices
- ATTO premium cables

H1280

H6F0

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ATTO ExpressSAS™ Host Bus Adapters

Product Features	H12F0	H120F	H1280	H1208
Part Number	ESAH-12F0-000	ESAH-120F-000	ESAH-1280-000	ESAH-1208-000
SAS/SATA Ports	16	16	8	8
Port Config. (Ext/Int)	16/0	0/16	8/0	0/8
Max. Data Rate	12Gb/s	12Gb/s	12Gb/s	12Gb/s
Bus Type	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 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
Max. Cable Length (SAS/SATA)[1]	100m/1m	100m/1m	100m/1m	100m/1m
Low-Profile Form Factor	Yes	Yes	Yes	Yes
Developer's Kit[2] (Target Mode)	Yes	Yes	Yes	Yes
End Devices Supported	2048	2048	1024	1024
Warranty	3 year	3 year	3 year	3 year

Product Features	H1244	H1248	H12888
Part Number	ESAH-1244-000	ESAH-1248-000	ESAH-1288-000
SAS/SATA Ports	8	12	16
Port Config. (Ext/Int)	4/4	4/8	8/8
Max. Data Rate	12Gb/s	12Gb/s	12Gb/s
Bus Type	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Connector Type	(1) 12Gb miniSAS HD (x4) SFF 8644 External (1) 12Gb miniSAS HD (x4) SFF 8643 Internal	(1) 12Gb miniSAS HD (x4) SFF 8644 External (2) 12Gb miniSAS HD (x4) SFF 8643 Internal	(2) 12Gb miniSAS HD (x4) SFF 8644 External (2) 12Gb miniSAS HD (x4) SFF 8643 Internal
Max. Cable Length (SAS/SATA)[1]	100m/1m	100m/1m	100m/1m
Low-Profile Form Factor	Yes	Yes	Yes
Developer's Kit[2] (Target Mode)	Yes	Yes	Yes
End Devices Supported	1024	2048	1024
Warranty	3 year	3 year	3 year

Product Features	H6F0	H60F	H680	H608	H644
Part Number	ESAS-H6F0-000	ESAS-H60F-000	ESAS-H680-000	ESAS-H608-000	ESAS-H644-000
SAS/SATA Ports	16	16	8	8	8
Port Config. (Ext/Int)	16/0	0/16	8/0	0/8	4/4
Max. Data Rate	6Gb/s	6Gb/s	6Gb/s	6Gb/s	6Gb/s
Bus Type	PCIe 2.0[3] x8	PCIe 2.0[3] x8	PCIe 2.0[3] x8	PCIe 2.0[3] x8	PCIe 2.0[3] x8
Connector Type	(4) 6Gb mini SAS (x4) SFF 8088 External	(4) 6Gb mini SAS (x4) SFF 8087 Internal	(2) 6Gb mini SAS (x4) SFF 8088 External	(2) 6Gb mini SAS (x4) SFF 8087 Internal	(1) 6Gb mini SAS (x4) SFF 8088 External (1) 6Gb mini SAS (x4) SFF 8087 Internal
Max. Cable Length (SAS/SATA)[1]	10m/1m	10m/1m	10m/1m	10m/1m	10m/1m
Low-Profile Form Factor	—	Yes	Yes	Yes	Yes
Developer's Kit[2] (Target Mode)	Yes	Yes	Yes	Yes	Yes
End Devices Supported	1024	1024	1024	1024	1024
Warranty	3 year	3 year	3 year	3 year	3 year

[1] 10m maximum for 12Gb passive copper cables; ATTO supports up to 100m max for active optical cables
[2] Available for qualified OEM sales only. Please contact your ATTO representative.
[3] Cross-compatible with PCIe 3.0
Compatible software available - see page 24.
Compatible cables available - see page 26.

ATTO Solutions

HBAs/NICs SAS/SATA

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

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6Gb SAS/SATA RAID Adapters

ExpressSAS™ RAID Adapters

ExpressSAS 6Gb/s SAS/SATA RAID adapters provide high-performance data protection to direct-attached SAS and SATA JBOD storage. With a wide variety of port configurations and RAID levels, these cards offer flexibility for the most diverse range of applications. For nearly 30 years, ATTO's time-tested RAID technology has provided "no compromise" solutions with the highest performance and data integrity.

- Optimized for extremely low latency and high-bandwidth transfers for both data-intensive and high-transaction rate applications
- 100 percent performance, even during rebuilds
- Rebuilds RAID groups up to 50 percent faster than competitive solutions
- Uses up to 70 percent less power than competitive adapters, reducing overall power and cooling costs
- DriveAssure™ improves system uptime because drivers run longer, smoother and faster; drives are groomed to effectively extend their useful life, maximizing investment value
- CacheAssure™ securely protects data in non-volatile memory during a power interruption and ensures that storage is online and stable before restoring and synchronizing data

Supports:
- Mac®, Windows® and Linux®
- RAID levels 0, 1, 4, 5, 6, 10, 40, 50, 60, JBOD and DVRAID™
- Certified with industry leading platforms and applications

Includes:
- Advanced Data Streaming (ADS™) technology
- DriveAssure™ technology
- CacheAssure™ technology (optional)
- Adaptive Path Optimization
- ATTO ConfigTool™ for customized performance settings

Complementary Products:
- ATTO ThunderLink™ Devices
- CacheAssure™ Technology
- ATTO premium cables

R680 with CacheAssure™ Technology
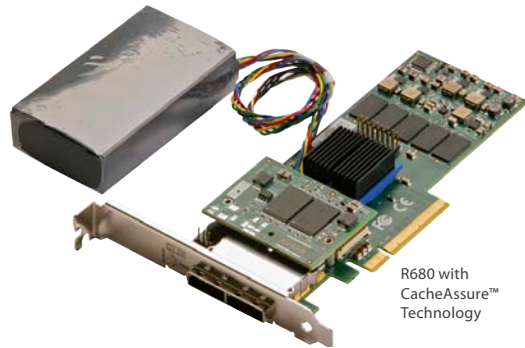
ATTO ExpressSAS™ RAID Adapters

Product Features	R60F	R680	R608	R644
Part Number	ESAS-R60F-000	ESAS-R680-000	ESAS-R608-000	ESAS-R644-000
Part Number w/ CacheAssure™	ESAS-R60F-C00	ESAS-R680-C00	ESAS-R608-C00	ESAS-R644-C00
SAS/SATA Ports	16	8	8	8
Port Config. (Ext/Int)	0/16	8/0	0/8	4/4
Max. Data Rate	6Gb/s	6Gb/s	6Gb/s	6Gb/s
Max. Transfer Rate	9600MB/s	4800MB/s	4800MB/s	4800MB/s
Bus Type	PCIe 2.0[1] x8	PCIe 2.0[1] x8	PCIe 2.0[1] x8	PCIe 2.0[1] x8
Connector Type	(4) 6Gb mini SAS (x4) SFF 8087 Internal	(2) mini SAS (x4) SFF 8088 External	(2) mini SAS (x4) SFF 8087 Internal	(1) mini SAS (x4) SFF 8088 External (1) mini SAS (x4) SFF 8087 Internal
Max. Cable Length (SAS/SATA)	10m/1m	10m/1m	10m/1m	10m/1m
Low-Profile Form Factor	Yes	Yes	Yes	Yes
End Devices Supported	256	256	256	256
Memory (ECC)	1GB	1GB	1GB	1GB
Warranty	3 year	3 year	3 year	3 year

[1] Cross-compatible with PCIe 3.0
Compatible software available - see page 24.
Compatible cables available - see page 26.
Note: CacheAssure™ is available as a field upgradable unit for existing 6Gb RAID users. Contact your ATTO representative.

ATTO Solutions

HBAs/NICs

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

40Gb and 10Gb Ethernet Optical and 10GBASE-T NICs

FastFrame™ Network and Storage Interface Cards

The ATTO family of 10/40GbE network and storage interface cards is available in single-, dual- and quad-port (10GbE only) configurations and can be used anywhere in your infrastructure, including workstations, storage, servers and data center racked servers. Mac®, Windows®, VMware®, FreeBSD and Linux® driver support ensures that FastFrame cards are suitable for applications ranging from M&E post-production environments to NAS installations serving medical imaging, big data analytics environments, high-performance computing clusters (HPCs) and more.

As a pioneer in iSCSI, ATTO designed its FastFrame family for the rigorous data transfer and reliability standards required for storage interconnect. The flexibility of the FastFrame product line extends from both support for 10- and 40GbE optical options (SFP+ for 10GbE, QSFP+ for 40GbE), to connectivity options including Direct Attach Copper (DAC) and 10GBASE-T. Optical cards also feature DAC support*, while 10GBASE-T cards work with standard low-cost Cat6a cabling. ATTO's 10GbE quad-port NIC also provides more VMs per PCIe bus than dual- or single-port competitive products.

- FastFrame leverages ATTO's exclusive Advanced Data Streaming (ADS™) technology to provide high-bandwidth and managed latency for high-performance, enterprise-level iSCSI storage as well as standard 10GbE network infrastructures
- ATTO's 40GbE NICs provide RDMA/RoCE support with best-in-class 1us MPI ping latency for HPC and HFT environments
- FastFrame cards support Energy Efficient Ethernet and are up to 30 percent more efficient in their power consumption, drastically reducing data center operating costs
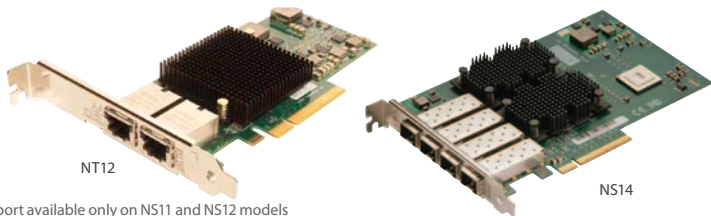
Supports:
- Mac OS® X, Windows®, Linux®, FreeBSD and VMware®
- Data Center Bridging Ethernet
- RDMA/RoCE Support
- iSER
- iSCSI initiators
- Certified with industry leading platforms and applications

Includes:
- Advanced Data Streaming (ADS™) technology
- Pluggable optical SFP+/QSFP+ (NS and NQ Models Only)

Complementary Products:
- ATTO ThunderLink™ Devices
- ATTO premium cables

NT12

NS14

*DAC support available only on NS11 and NS12 models

"Including ATTO as the storage connectivity and networking interfaces in our solution is an easy choice for us. Combining proven performance and stability of their 10GbE NICs and RAID adapters with our solutions provides our customers with an ideal high-performance and reliable method of digital asset management."
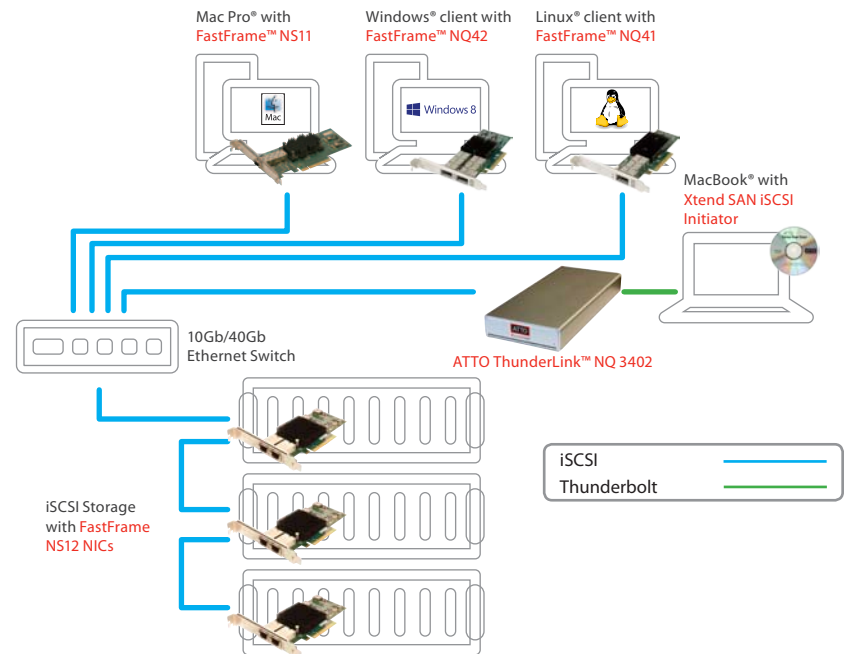
-Tim Jones, President and CTO, TOLIS Group

ATTO FastFrame™ Optical Network Interface Cards

Product Features	NS14	NS12	NS11	NQ42	NQ41
Part Number	FFRM-NS14-000	FFRM-NS12-000	FFRM-NS11-000	FFRM-NQ42-000	FFRM-NQ41-000
10GbE Ports	4	2	1	0	0
40GbE Ports	0	0	0	2	1
Max. Data Rate	10Gb/s	10Gb/s	10Gb/s	40Gb/S	40Gb/S
Bus Type	PCIe 2.0[1] x8	PCIe 2.0[1] x8	PCIe 2.0[1] x8	PCIe 3.0 x8	PCIe 3.0 x8
Connector Type	Optical SFP+ LC	Optical SFP+ LC	Optical SFP+ LC	Optical QSFP+	Optical QSFP+
Low-Profile Form Factor	—	Yes	Yes	Yes	Yes
Warranty	3 year	3 year	3 year	3 year	3 year

ATTO FastFrame™ 10GBASE-T Network Interface Cards

Product Features	NT12	NT11
Part Number	FFRM-NT12-000	FFRM-NT11-000
10GbE Ports	2	1
Max. Data Rate	10Gb/s	10Gb/s
Bus Type	PCIe 2.0[1] x8	PCIe 2.0[1] x8
Connector Type	RJ45	RJ45
Low-Profile Form Factor	Yes	Yes
Warranty	3 year	3 year
Warranty	3 year	3 year

[1] Cross-compatible with PCIe 3.0
Compatible software available - see page 24.
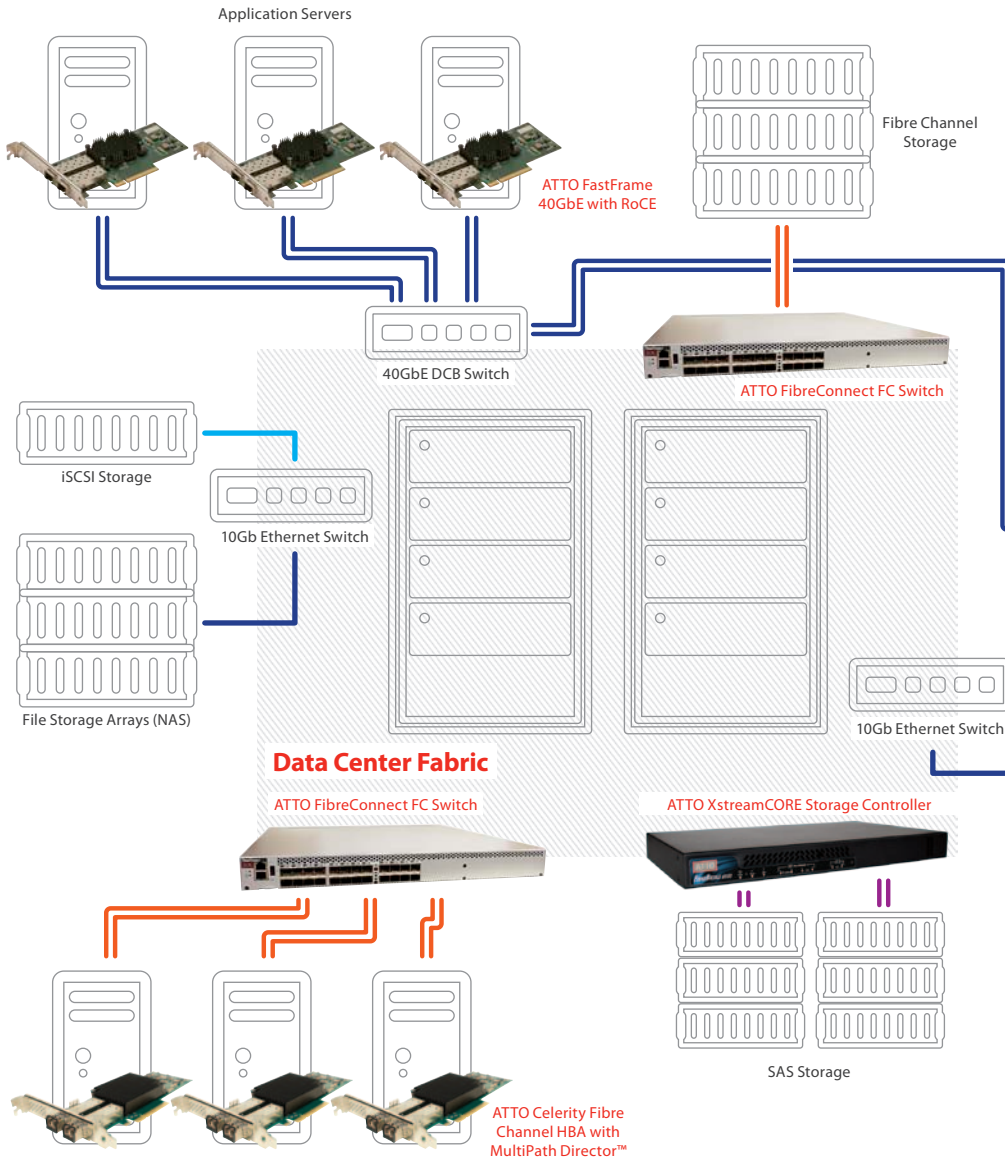Compatible cables available - see page 26.

Use Case
iSCSI SAN Configuration

Mac Pro® with **FastFrame™ NS11**

Windows® client with **FastFrame™ NQ42**

Linux® client with **FastFrame™ NQ41**

MacBook® with **Xtend SAN iSCSI Initiator**

10Gb/40Gb Ethernet Switch

ATTO ThunderLink™ NQ 3402

iSCSI Storage with **FastFrame NS12 NICs**

| iSCSI | |
| Thunderbolt | |

ATTO Solutions

HBAs/NICs Ethernet

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

ATTO develops high-performance products that manage latency in the most demanding, real-time environments resulting in accelerated application performance, enhanced transaction processing and the ability to handle large workloads and client counts.
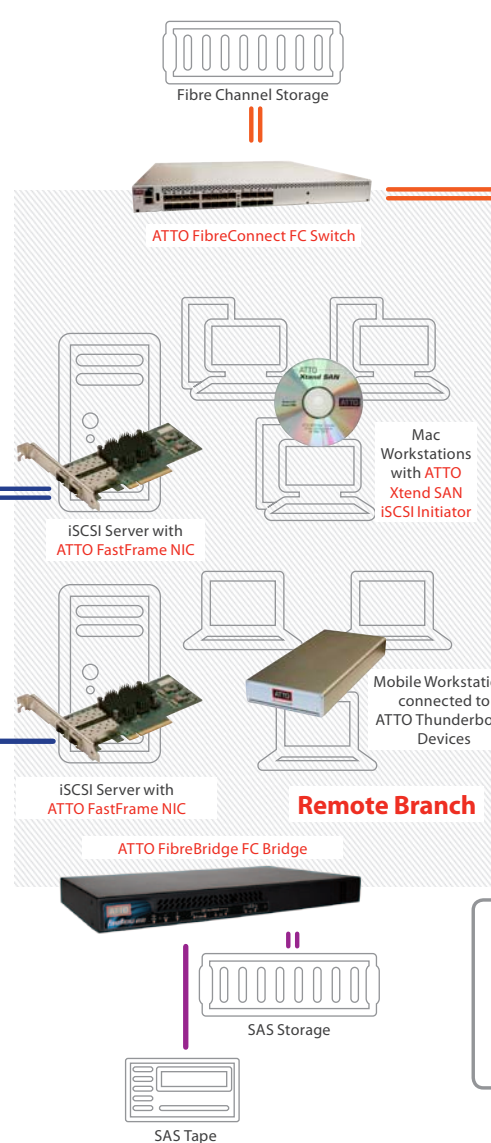
Enterprise - IOPS

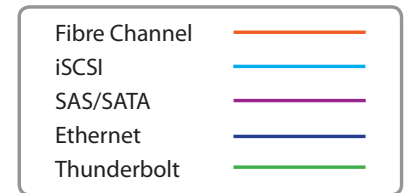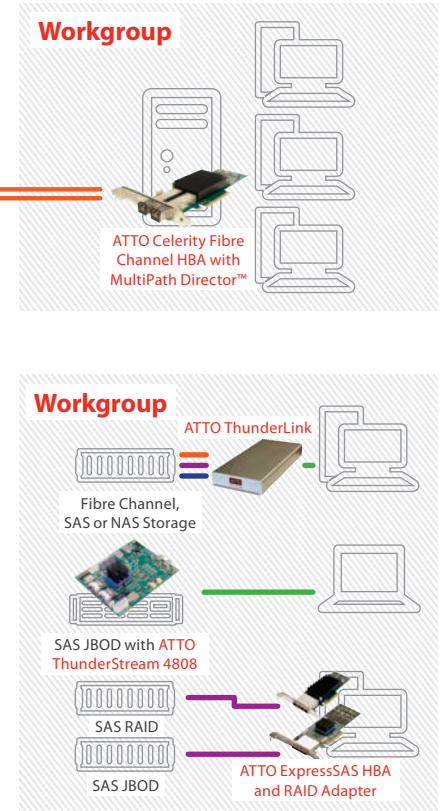Database | ERP | Web Servers | Email Servers | Back-Office Operations

Application Servers

ATTO FastFrame
40GbE with RoCE

Fibre Channel
Storage

40GbE DCB Switch

iSCSI Storage

10Gb Ethernet Switch

File Storage Arrays (NAS)

Data Center Fabric

ATTO FibreConnect FC Switch

ATTO XstreamCORE Storage Controller

ATTO FibreConnect FC Switch

10Gb Ethernet Switch

SAS Storage

ATTO Celerity Fibre
Channel HBA with
MultiPath Director™

Departmental - Mixed Environment

Business Analytics | Financial/OLTP
Supply Chain | Asset Management | Operations

Fibre Channel Storage

ATTO FibreConnect FC Switch

iSCSI Server with
ATTO FastFrame NIC

Mac
Workstations
with ATTO
Xtend SAN
iSCSI Initiator

Mobile Workstations
connected to
ATTO Thunderbolt™
Devices

iSCSI Server with
ATTO FastFrame NIC

Remote Branch

ATTO FibreBridge FC Bridge

SAS Storage

SAS Tape

Workgroup - MB/sec

CAD/CAE | Video Production/Broadcast
Medical Imaging | Seismic/Oil & Gas

Workgroup

ATTO Celerity Fibre
Channel HBA with
MultiPath Director™

Workgroup

ATTO ThunderLink

Fibre Channel,
SAS or NAS Storage

SAS JBOD with ATTO
ThunderStream 4808

SAS RAID

SAS JBOD

ATTO ExpressSAS HBA
and RAID Adapter

Connection	
Fibre Channel	————
iSCSI	————
SAS/SATA	————
Ethernet	————
Thunderbolt	————

ATTO components are designed to work seamlessly together to deliver maximum performance for bandwidth-intensive environments from application-specific workgroups to large-scale enterprise infrastructures. ATTO delivers the most extensive portfolio of high-performance storage and network connectivity products that are certified for interoperability with industry leading server, tape and disk storage, and workstation, server and application vendors.

Storage Controllers
XstreamCORE™ Fibre Channel to SAS and Ethernet to SAS Storage Controllers

ATTO XstreamCORE storage controllers enable storage architects to build modular storage solutions with servers running software defined storage software and JBOD, JBOF or RAID storage. Optimized to take advantage of flash capabilities, XstreamCORE enables sharing of storage while adding less than four microseconds of latency. Engineered with an open design, XstreamCORE storage controllers are storage-independent devices that provide a common set of services and features to storage and offload functions from server CPU, memory, networks and storage fabrics enabling a wide range of use cases while reducing resource utilization and increasing overall performance.

- xCORE Data Acceleration technology, featuring multiple parallel I/O acceleration engines with end-to-end I/O processing, hardware buffer allocation management, deterministic latency and real-time performance and latency analytics. Users will benefit from very high, reliable throughput and IOPS while adding less than four microseconds of latency
- eCORE Control Engine adds common, open storage services, integrates with industry standard APIs, handles reservations, storage routing and host and LUN mapping functions. eCORE also manages traffic for data mover offload functions with error handling and diagnostic tools, adding value to any storage infrastructure while tightly integrating with any server-based software
- XstreamVIEW™ System Manager, the XstreamCORE user interface, allows administrators to remotely manage, set up and configure the storage controller while providing storage performance metrics, data mover traffic statistics, storage and host LUN mapping and diagnostic tools

Supports:
- Full-duplex data transfers
- Error recovery
- Certified with industry leading platforms and applications
- Data Mover functionality
- VMware® ready (VAAI)

Includes:
- XstreamVIEW™ web-based GUI simplifies management, monitoring and diagnostics
- xCORE Data Acceleration
- eCORE Control Engine
- Parallel Data Processing
- Pluggable optical SFP+/QSFP+ modules

Complementary Products:
- ATTO Celerity™ Fibre Channel HBAs
- ATTO FibreConnect™ switches
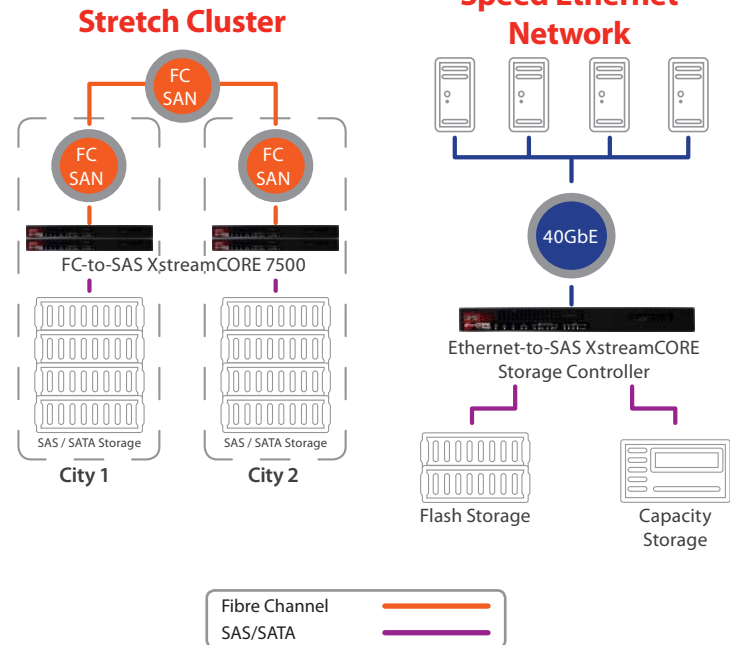- ATTO FastFrame™ NICs

XstreamCORE 7500

ATTO XstreamCORE™ Fibre Channel and Ethernet Storage Controllers

Product Features	7550	7500	8200
Part Number	XCFC-7550-004	XCFC-7500-002	XCET-8200-002
Max Sustained Transfer Rate	6000 MB/s	3200 MB/s	6000 MB/s
4K IOPS	1,500,000	750,000	1,500,000
Input Connectors	(4) 16Gb Fibre Channel SFP+	(2) 16Gb Fibre Channel SFP+	(2) 40Gb Ethernet QSFP+
Output Connectors	(4) 12Gb HD Mini SAS (x4) SFF 8644	(4) 12Gb HD Mini SAS (x4) SFF 8644	(4) 12Gb HD Mini SAS (x4) SFF 8644
Management Ports	RS-232/RJ45	RS-232/RJ45	RS-232/RJ45
Ethernet Management Protocols	IPv4, IPv6	IPv4, IPv6	IPv4, IPv6
xCORE Data Acceleration	Yes	Yes	Yes
eCORE Control Engine	Yes	Yes	Yes
Data Mover	Yes	Yes	Yes
Devices supported	Up to 240 (960 OEM)	Up to 240 (960 OEM)	Up to 240 (960 OEM)
Active initiator Support	64	64	Up to 1024
Event Log Protection	NVRAM	NVRAM	NVRAM
Expander/Port Multiplier support	Yes	Yes	Yes
Form Factor	1U Rackmount	1U Rackmount	1U Rackmount
Power Supplies	2 Hot Swap	2 Hot Swap	2 Hot Swap
Disk Support	Yes	Yes	Yes
Tape Support	Future	Future	Future
Warranty	2 year	2 year	2 year

Compatible cables and accessories available - see page 26.

Stretch Cluster

Servers and High Speed Ethernet Network

FC-to-SAS XstreamCORE 7500

City 1   City 2

Ethernet-to-SAS XstreamCORE Storage Controller

Flash Storage   Capacity Storage

| Fibre Channel | ———— |
| SAS/SATA | ———— |

XstreamCORE is deployed in thousands of data centers worldwide

Thunderbolt™ Devices

ThunderLink™ and ThunderStream™

ATTO ThunderLink and ThunderStream Devices allow today's Thunderbolt technology enabled platforms to connect into high-performance storage and networks, including SAS, SATA, Fibre Channel and Ethernet infrastructures. ThunderLink and ThunderStream products are focused on applications where performance and latency management are essential. With Thunderbolt connectivity, creative, engineering and scientific professionals now have access to storage and networks at speeds not previously available. ATTO's exclusive Advanced Data Streaming (ADS™) technology provides the fastest, most consistent time-to-data, delivering best-in-industry aggregate bandwidth and predictable data transfers for high-performance applications or mobile platform users.

- Widest portfolio of connectivity for Thunderbolt technology enabled all-in-one systems, workbooks and workstations into high-performance storage and networks
- Makes the ATTO portfolio of solutions, with full features and functionality, available to Thunderbolt technology-enabled platforms in a low-profile desktop form factor
- Daisy-chaining, combined with hot-plug capability, allows addition of devices or reconfiguration of the entire system on-the-fly
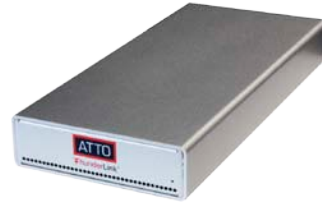
ThunderLink

ThunderLink Supports:
- Mac®, Windows®, Linux®
- Certified with industry leading platforms and applications
- DisplayPort (including 4K), hot plug, daisy chain

Includes:
- Advanced Data Streaming (ADS™) technology
- ATTO ConfigTool™ for customized performance settings

Complementary Products:
- ATTO Celerity™ Fibre Channel HBAs
- ATTO ExpressSAS™ HBAs and RAID Adapters
- ATTO FastFrame™ NICs
- ATTO XstreamCORE™ Storage Controllers
- ATTO FibreBridge™ Fibre Channel Bridges
- ATTO FibreConnect™ Fibre Channel Switches
- ATTO premium cables and accessories

ThunderStream Supports:
- Mac® and Windows®
- RAID Levels 0, 1, 5, 6, 10
- DisplayPort (including 4K), hot plug, daisy chain, autonomous operation

Includes:
- Advanced Data Streaming (ADS™) technology
- Adaptive Path Optimization technology
- DriveAssure™ technology
- ATTO ConfigTool™, an easy to use management and monitoring interface
- Automatic drive initialization and verification to identify drives with soft errors or performance issues
- RAID export functionality

"The ATTO Technology 10GbE ThunderLink lets Mac users connect to powerful Seagate storage systems. These products combined create an excellent solution for the Media and Entertainment industry."

-Cooper Cowart, Senior Director Marketing and PLM, Seagate Cloud Systems

ATTO ThunderLink™ Devices

Product Features	40GbE	40GbE	Fibre Channel	Fibre Channel	10GbE	10GbE
Part Number	TLNQ-3402-D00/DE0[1]	TLNQ-3401-D00/DE0	TLFC-3322-D00/DE0	TLFC-3162-D00/DE0	TLNS-3102-D00/DE0	TLNS-3101-D00/DE0
Input Connectors	(2) 40Gb/s Thunderbolt™ (USB-C)	(2) 40Gb/s Thunderbolt™ (USB-C)	(2) 40Gb/s Thunderbolt™ (USB-C)	(2) 40Gb/s Thunderbolt™ (USB-C)	(2) 40Gb/s Thunderbolt™ (USB-C)	(2) 40Gb/s Thunderbolt™ (USB-C)
Output Connectors	(2) 40GbE	(1) 40GbE	(2) 32Gb/s Fibre Channel	(2) 16Gb/s Fibre Channel	(2) 10GbE	(1) 10GbE
Connector Type	(2) QSFP (Included)	(1) QSFP+ (Included)	(2) Optical SFP+LC (Included)	(2) Optical SFP+LC (Included)	(1) Optical SFP+LC (Included)	(2) Optical SFP+LC (Included)
Warranty	3 year	3 year	3 year	3 year	3 year	3 year

ATTO ThunderLink™ Devices

Product Features	Fibre Channel	Fibre Channel	SAS/SATA	10GBASE-T	10GbE	10GbE
Part Number	TLFC-2162-D00/DE0[1]	TLFC-2082-D00/DE0[1]	TLSH-2068-D00/DE0[1]	TLNT-2102-D01/DE1[1]	TLNS-2102-D01/DE1[1]	TLNS-2101-D00/DE0[1]
Input Connectors	(2) 20Gb/s Thunderbolt™	(2) 20Gb/s Thunderbolt™	(2) 20Gb/s Thunderbolt™	(2) 20Gb/s Thunderbolt™	(2) 20Gb/s Thunderbolt™	(2) 20Gb/s Thunderbolt™
Output Connectors	(2) 16Gb/s Fibre Channel	(2) 8Gb/s Fibre Channel	(2) x4 6Gb/s SAS/SATA	(2) 10GbE	(2) 10GbE	(1) 10GbE
Connector Type	(2) Optical SFP+ LC (Included)	(2) Optical SFP+ LC (Included)	(2) mini SAS (x4) SFF 8088 External	(2) RJ45	(2) Optical SFP+ LC (Included)	(1) Optical SFP+ LC (Included)
Warranty	3 year	3 year	3 year	3 year	3 year	3 year

ATTO ThunderStream™ Devices - RAID

Product Features	4808D
Part Number	TSSC-4808-D00/DE0[1]
Input Connectors	(2) 20Gb Thunderbolt™
Output Connectors	(2) x4 6Gb SAS/SATA RAID
Connector Type	(2) mini SAS (x4) SFF 8088 External
Devices supported	128
Expander/Port Multiplier support	Yes
Warranty	3 year

[1] Includes UK/EMEA power components, accessories
Compatible cables and accessories available - see page 26.
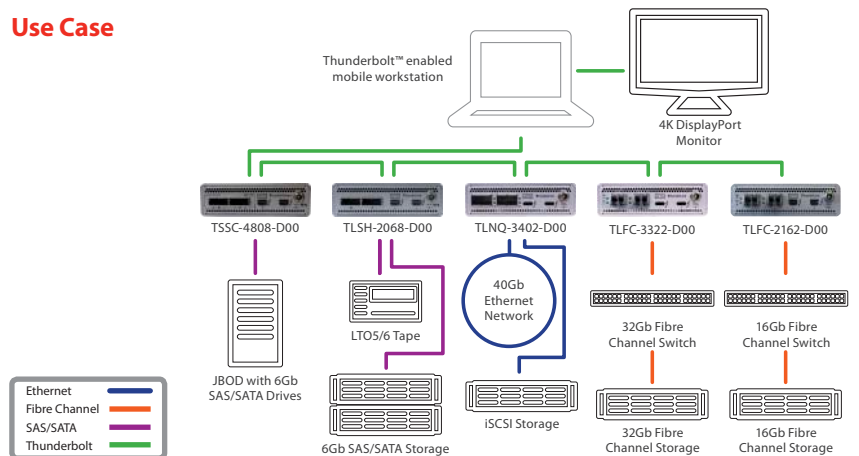
Use Case

Thunderbolt™ enabled mobile workstation

4K DisplayPort Monitor

TSSC-4808-D00 | TLSH-2068-D00 | TLNQ-3402-D00 | TLFC-3322-D00 | TLFC-2162-D00

JBOD with 6Gb SAS/SATA Drives

LTO5/6 Tape

40Gb Ethernet Network

32Gb Fibre Channel Switch

16Gb Fibre Channel Switch

Ethernet
Fibre Channel
SAS/SATA
Thunderbolt

6Gb SAS/SATA Storage

iSCSI Storage

32Gb Fibre Channel Storage

16Gb Fibre Channel Storage

ATTO Solutions

HBAs/NICs

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

Fibre Channel-to-SAS Bridges

FibreBridge™ Fibre Channel to SAS Bridges

The ATTO FibreBridge allows the use of direct attached SAS/SATA disk or tape storage devices in a Fibre Channel SAN environment while providing management and monitoring capabilities not available in direct connect or native technologies. ATTO bridges are engineered to integrate with and are fully compliant with Fibre Channel and SAS specifications to assure easy installation and flawless operation. ATTO offers enterprise-class intelligent bridging products that allow you to keep your infrastructure in place without the need to rip and replace and allow the use of existing technology as the industry changes and new technology as your organizational needs change.

- Compatible with all storage devices including JBODs, hard disk drives, SSD, tape libraries, RAID arrays and RAID controllers
- Includes patent-pending Drive Map Director™, which reduces down time during drive maintenance by keeping the exiting network topology available without having to re-map the LUN structure of the SAN
- Lower solution and operational costs with reduced need for many fibre channel components and low power consumption which reduces overall electric and cooling costs

6500 1U Rackmount

6500E

Supports:
- Full-duplex Fibre Channel data transfers
- Error recovery
- Certified with industry leading platforms and applications
- Data Mover functionality
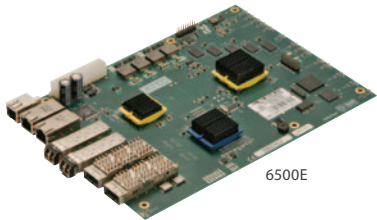- VMware® ready (VAAI)

Includes:
- ExpressNAV™ web-based GUI simplifies management, monitoring and diagnostics
- Hardware acceleration
- Parallel Data Processing
- Pluggable optical SFP+ modules
- Dual Power Supplies

Complementary Products:
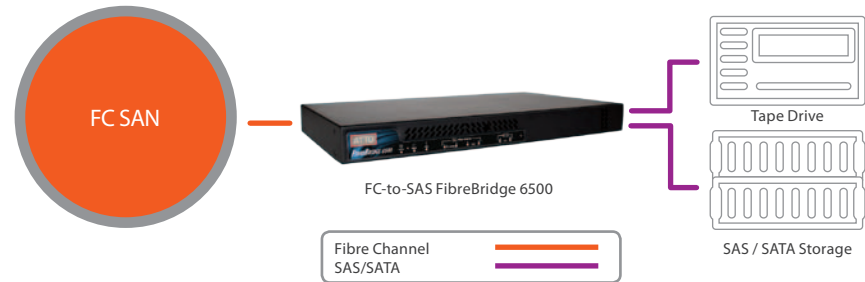- ATTO Celerity™ Fibre Channel HBAs
- ATTO FibreConnect switches

ATTO FibreBridge™ Fibre Channel Bridges

Product Features	6500	6500E*
Part Number	FCBR-6500-D00	FCBR-6500-E00
Max Sustained Transfer Rate	1200 MB/s	1200 MB/s
Input Connectors	(2) 8Gb Fibre Channel SFP+	(2) 8Gb Fibre Channel SFP+
Output Connectors	(2) 6Gb Mini SAS (x4) SFF 8088 External	(2) 6Gb Mini SAS (x4) SFF 8088 External
Devices supported	240	240
Active initiator Support	64	64
Event Log Protection	NVRAM	NVRAM
Expander/Port Multiplier support	Yes	Yes
Form Factor	1U Desktop/Rackmount	MicroATX
Disk Support	Yes	Yes
Tape Support	Yes	Yes
Warranty	2 year	1 year

* Embedded models available to OEMs only
Compatible Cables & Accessories Available - See Page 26.

Use Case
Adding next generation, low cost storage technology to a SAN

FC SAN

FC-to-SAS FibreBridge 6500

Tape Drive

| Fibre Channel | |
| SAS/SATA | |

SAS / SATA Storage

The FibreBridge™ 6500 will allow you to connect newer, faster and higher capacity SAS or SATA drive technology to your existing Fibre Channel SAN. Since SAS/SATA technology does not natively connect to Fibre Channel SANs, a bridge must be used to allow coexistence on the SAN. The FibreBridge 6500 also provides extensive manageability and troubleshooting features not found in direct attached technology.

"ATTO storage controllers give us more than just basic connectivity... advanced troubleshooting and tuning features are invaluable in the field."

-Dave Griffith, Vice President, Operations & Business Development, Qualstar

ATTO Solutions

HBAs/NICs

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

16Gb and 8Gb Fibre Channel Switches

FibreConnect™ Switches

ATTO FibreConnect Fibre Channel Switches combine high performance with exclusive latency management features for a completely scalable end-to-end SAN connectivity solution. This combination ensures smooth and reliable data transfers on a SAN to keep pace with growing business demands. FibreConnect switches streamline workflow processes and are ideal for streaming media, virtualized environments and backup/recovery applications.

- Designed, built and tested for low latency to ensure smooth and reliable transfers
- Guaranteed uninterrupted bandwidth for time-sensitive applications
- Facilitates collaborative workflows allowing multiple users to share resources, increasing productivity
- Pay-as-you-grow options enable organizations to grow at their own pace in an affordable, flexible and non-disruptive manner
- Simplifies administration with easy implementation and comprehensive management tools
- Maximizes infrastructure uptime with advanced monitoring, management and diagnostic tools
- Fully tested and interoperable SAN solution

Supports:
- 4, 8 and 16Gb/s devices
- Ports-On-Demand scalability (increments of 8 or 12)
- Certified with industry leading platforms and applications

Includes:
- Pluggable optical LC SFP+
- Web Tools interface simplifies configuration and management
- Mounting hardware

Complementary Products:
- ATTO Celerity™ Fibre Channel HBAs
- ATTO XstreamCORE™ Storage Controllers
- ATTO FibreBridge™ Fibre Channel Bridges
- ATTO ThunderLink™ Devices
- ATTO premium cables

FibreConnect™ 1612

"Our high-performance audio and video systems are designed for very diverse and demanding groups of people. ATTO products are an integral part in many of the media solutions we offer our customers."

-Peyman Dadpanah, Business Director, MediaCast

ATTO FibreConnect™ Switches

Product Features	1612	8324	8316	8308
Part Number	FCSW-1612-D00 (Single Power) FCSW-1612-D02 (Dual Power)	FCSW-8324-D00	FCSW-8316-D00	FCSW-8308-D00
Fibre Channel Ports	12 [1]	24	16	8
Max. Data Rate	16Gb/s	8Gb/s	8Gb/s	8Gb/s
Aggregate Bandwidth	192Gb/s [2]	192Gb/s	128Gb/s	64Gb/s
Auto-Sensing	2, 4, 8, 16Gb/s	2, 4, 8Gb/s	2, 4, 8Gb/s	2, 4, 8Gb/s
Form Factor	1U Desktop/ Rackmount	1U Desktop/ Rackmount	1U Desktop/ Rackmount	1U Desktop/ Rackmount
Low Power <2.5W/Port	Yes	Yes	Yes	Yes
Web Tools	Yes	Yes	Yes	Yes
Warranty	1 Year [3]	1 Year [3]	1 Year [3]	1 Year [3]

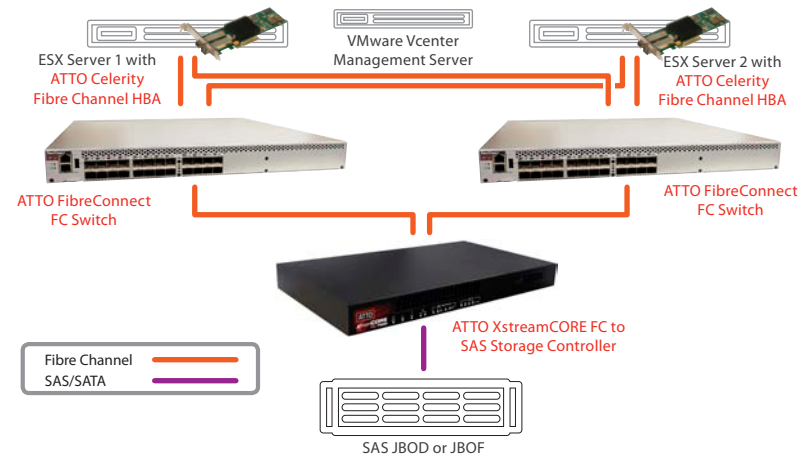[1] 12 port expansion available for a total of 24 ports
[2] 384Gb/s with 24 active ports
[3] Extended warranty available
Compatible cables and accessories available - see page 26.

Use Case

Improving performance with existing storage

ESX Server 1 with ATTO Celerity Fibre Channel HBA

VMware Vcenter Management Server

ESX Server 2 with ATTO Celerity Fibre Channel HBA

ATTO FibreConnect FC Switch

ATTO FibreConnect FC Switch

ATTO XstreamCORE FC to SAS Storage Controller

Fibre Channel
SAS/SATA

SAS JBOD or JBOF

ATTO FibreConnect 16Gb Gen 5 powered switches provide a critical building block for today's highly virtualized data center environments and offer low-cost access to industry-leading storage area network (SAN) technology. FibreConnect is designed to maximize application uptime with "five nines" availability and delivers consistent optimum performance while reducing overall operational expenses. Celerity HBAs and XstreamCORE Fibre Channel storage controllers provide a completely flexible, high-performance and scalable end-to-end virtualized SAN connectivity solution.

ATTO Solutions
HBAs/NICs
RAID Adapters
Storage Controllers
Thunderbolt™ Devices
Bridges
Switches
Software
Cables

Software

Xtend SAN™ and Disk Benchmark

Xtend SAN

Xtend SAN iSCSI Initiator for Mac® software connects workstations with built-in Ethernet to multiple direct-attached storage servers across long distances. It provides users with 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
- EMC® E-Lab Certified
- Compatible with 32/64 bit Mac OS® X
- 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™ Devices

Part Number:
- INIT-MAC0-001

ATTO Disk Benchmark

The 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 ATTO 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

"We found that Xtend SAN was a hassle-free initiator that just worked and was easy to implement and integrate."

  -Ed Casaccia, Senior Director of Product Marketing for Servers and Storage, Grass Valley

Management Tools

ConfigTool™, vConfigTool™ and XstreamVIEW™

ConfigTool

ATTO ConfigTool helps customize the settings of your ATTO host bus adapter (HBA) to maximize the performance of your storage connection. Standard on all ATTO HBAs and Thunderbolt™ Devices, ATTO ConfigTool is available for Mac®, Windows® and Linux® operating systems. While the factory settings on your host adapter provide excellent performance for a wide range of applications, some specialized applications may benefit from adjustment of the adapter settings to tune for a specific performance range.

- Custom utility settings to optimize performance
- Available on Mac, Windows and Linux
- Advanced troubleshooting and monitoring
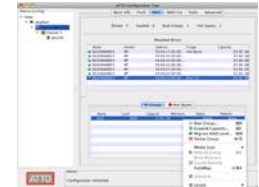
vConfigTool

ATTO's vConfigTool for VMware vCenter Server is a software plug-in that integrates centralized management and monitoring of Celerity™ and ExpressSAS™ host adapters into VMware virtual environments. This accelerates adapter deployments, optimizes configurations, improves system availability and reduces infrastructure costs. vConfigTool includes Latency Scout, an I/O latency statistic feature that enables IT administrators to quickly make adjustments within the data center to maximize performance. Real-time histograms allow administrators to monitor storage I/O latency and isolate bottlenecks.

- Custom utility settings to optimize performance
- Available for VMware vCenter Server
- Advanced troubleshooting and monitoring

XstreamVIEW

The ATTO XstreamVIEW™ System Manager user interface allows administrators to remotely manage, set up and configure the storage controller while providing storage performance metrics, data mover traffic statistics, storage and host LUN mapping and diagnostic tools. XstreamCORE Fibre Channel Storage Controllers equipped with XstreamVIEW help manage complete storage infrastructures via a single user interface.

- Advanced performance tuning
- Email notification for monitoring
- Event logging

ATTO Cables and Accessories
Premium Connectivity Components

For nearly 30 years, ATTO has conducted in-depth testing on the effects of noise, interference and cable lengths on connectivity solutions. ATTO premium cables are specifically designed to optimize connections between high-performance storage, servers and workstations and are recommended for use with all ATTO products to ensure the highest levels of performance and data reliability.

Utilizing high-quality shielding, equipment-specific cable lengths and extensive pull testing to verify connection integrity, these premium cables ensure the best performance and data integrity from your ATTO-enabled infrastructure.
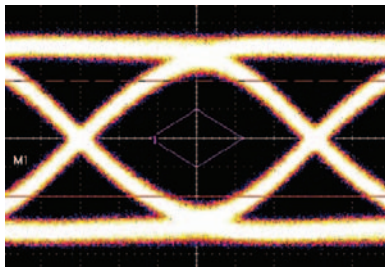
SAS Cable, External SFF-8088 to SFF-8088

SAS/SATA	External SFF-8088 to SFF-8088	External SFF-8088 to SFF-8470	External SFF-8644 to SFF-8088	External SFF-8436 to SFF-8088	Internal SFF-8087 to (4) x1 SATA	Internal SFF-8087 to SFF-8087	Internal I2C 3-Pos to 3-Pos	External SFF-8644 to SFF-8644
Length	1 and 3 meters[1]	1 and 3 meters[1]	1 meter	1 and 3 meters[1]	.5 meters	.5 meters	.5 meters	3 meters
For use with	ESAS-H6F0 ESAS-R680 ESAS-H680 ESAS-R644 ESAS-H644 TLSH-2068 TSSC-4808	ESAS-H6F0[2] ESAS-R680[2] ESAS-H680[2] ESAS-R644[2] ESAS-H644[2] TLSH-2068[2] TSSC-4808[2]	ESAS-1244 ESAH-1248 ESAH-1288 ESAH-12F0 ESAH-1280 ESAR-1280 ESAR-1244	ESAS-H6F0 ESAS-H680 ESAS-H644 ESAS-R644 FCBR-6500/7500	ESAS-H60F ESAS-H608 ESAS-H644 ESAS-R60F ESAS-R608 ESAS-R644 TSSC-4808[3]	ESAS-H60F ESAS-H608 ESAS-H644 ESAS-R60F ESAS-R608 ESAS-R644 TSSC-4808[3]	ESAS-H6F0 ESAS-H608 ESAS-R60F ESAS-R608	ESAH-1244 ESAH-1248 ESAH-1288 ESAH-12F0 ESAH-1280 ESAR-1280 ESAR-1244
Part #	CBL-8088-EX1 CBL-8088-EX3	CBL-8470-EX1 CBL-8470-EX3	CBL-4488-E1X	CBL-QSFP-EP1 CBL-QSFP-EP3	CBL-SATA-INT	CBL-8087-INT	CBL-SI2C-KI2	CBL-8644-EX3

[1] SATA limited to 1 meter, use with SAS targets only
[2] Also supported by External SFF-8644 to SFF-8088
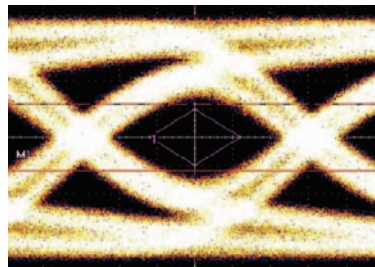[3] Embedded models only

Pure Signal Integrity

ATTO Technology has been manufacturing storage connectivity products for nearly 30 years, becoming experts in the art of developing clean board design for smooth data streaming. ATTO engineers focus on signal integrity, designing to minimize jitter, crosstalk, reflections and power supply noise, resulting in the cleanest signals in the industry.

This is one of the reasons why ATTO is the most trusted storage connectivity solution provider for high speed streaming applications. Signal quality is the best indicator of performance and could be the difference between completing projects on time, missing deadlines, or losing critical data. ATTO products can be relied upon for uninterrupted, reliable and high-performance data transfers.

Fibre Channel	LC to LC 50 µm OM 2	LC to LC 50 µm OM 2	32Gb/s SFP+ LC SW Optical	16Gb/s SFP+ LC SW Optical	8Gb/s SFP+ LC SW Optical
Length	10 meters	3 meters	Standard	Standard	Standard
For use with	CTFC-164E/162E/161E CTFC-84EN/82EN/81EN TLFC-2082/2162 TLNS-1101 FF-NS14/NS12/NS11 XCFC-7500 FCBR-6500 FC 8308/8316/8324/1612	CTFC-164E/162E/161E CTFC-84EN/82EN/81EN TLFC-2082/2162 TLNS-1101 FF-NS14/NS12/NS11 XCFC-7500 FCBR-6500 FC 8308/8316/8324/1612	CTFC-322E/321E TLFC-3322	CTFC-164P/162P/161P CTFC-164E/162E/161E TLFC-2162 XCFC-7500	CTFC-84EN/82EN /81EN FCBR-6500 TLFC-2082
Part Number	CBL-LCLC-R10	CBL-LCLC-R03	SFPA-0032-000	SFPX-0016-R00	SFP8-0000-R00

ATTO Cable Signal:
Clean eye pattern = tighter signal strength
Smooth and reliable data transfers

Substandard Cable Signal:
Distorted eye pattern = weaker signal integrity
Possible data loss, errors

40GbE	Ethernet Cable, QSFP Active	Ethernet Cable, QSFP Copper Passive
Length	5 and 20 meters	1 and 3 meters
For use with	NQ41-D00 NQ41-DA0 NQ42-D00 NQ42-DA0	NQ41-D00 NQ41-DA0 NQ42-D00 NQ42-DA0
Part Number	CBL-0310-005 CBL-0310-020	CBL-0130-001 CBL-0128-001

Thunderbolt™	
Length	1 and 3 Meters
For use with	TLSH-2068 TLFC-2082 TLNS-2102 TLNS-2101 TLNT-2102 TLFC-2162 TSSC-4808
Part Number	CBL-TBT2-R01 CBL-TBT2-R03

ATTO Cable Finder

Please visit the ATTO website to best determine the cable for your configuration.

ATTO Solutions
HBAs/NICs
RAID Adapters
Storage Controllers
Thunderbolt™ Devices
Bridges
Switches
Software
Cables

Resources

How to Buy, Interoperability, Support, Partner Programs

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

How to Buy

On the web: www.attotech.com/howtobuy

Main Number: +1.716.691.1999

Channel Sales: Extension 240

International Sales: Extension 239

OEM Sales: Extension 241

Direct Sales: www.attotech.com

VARs and System Integrators can also purchase ATTO products from the How To Buy page.

Interoperability

ATTO continually certifies our products with third-party vendor products to ensure full compatibility. Please visit www.attotech.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, extension 242, or to submit an inquiry, please visit our website: www.attotech.com/support/techsuptmail.html

Partner Programs

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

The 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. It provides a higher level of engagement and tools to help you reach your business objectives.

"The real joy of working with ATTO is the solid support that they offer while continuing to drive the industry standard for IT professionals in audio, video post-production and other creative environments."

-Frank Altschuler, Product Marketing Manager, Other World Computing

Industry Partners

ATTO Solutions

HBAs/NICs

RAID Adapters

Storage Controllers

Thunderbolt™ Devices

Bridges

Switches

Software

Cables

Always Have the Latest Edition

See the newest additions to the ATTO product portfolio by scanning
the QR code or visiting **attotech.com/ResourceGuide**

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