Performance you can trust.
ATTO Technology, Inc.

Corporate Vision

For more than 30 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, big data, cloud and virtualized environments, including:

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

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, Network Interface Cards, storage controllers, 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.

The Power Behind the Storage

“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.
ATTO Product Lines

**Host Bus Adapters**
Celerity™ Fibre Channel HBAs and ExpressSAS® SAS/SATA HBAs provide faster and more efficient data transfers.

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

**Storage Controllers**
XstreamCORE® Ethernet and Fibre Channel storage controllers disaggregate storage from compute by enabling remote access and sharing of SAS JBOD, JBOF, RAID, tape and optical devices.

**Thunderbolt™ Adapters**
ThunderLink® adapters enable high-performance, low latency Thunderbolt connectivity to desktop and mobile workstations for network and storage connectivity.

**Software**
ATTO software and downloadable tools help to maximize the productivity of a number of ATTO products.
Technology Leadership
Technology at its fastest

ATTO Advanced Data Streaming (ADS™) Technology

ATTO ADS™ is proprietary latency management technology built into all ATTO network and storage connectivity solutions. ADS works transparently to smooth data transfers through controlled acceleration. Data moves more efficiently giving ATTO users an unmistakable edge in total system performance.

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 adapters
- ATTO ThunderLink ® Thunderbolt™ adapters

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®, Mac® and Linux® workstations in a heterogeneous environment.

Featured Products:
- ATTO Celerity™ Fibre Channel host bus adapters
- ATTO ThunderLink ® Thunderbolt™ adapters

ATTO xCORE Hardware Acceleration Processor / eCORE Offload Processor

xCORE is hardware-based data acceleration technology that manages the data path and assures that all reads and writes are processed software-free with minimal overhead. Latency is limited to a consistent two to four microseconds.

eCORE provides software-based virtualization and management services. ATTO eCORE supplements xCORE to maintain deterministic latency by enabling software functionality only where and when needed.

Working together, xCORE and eCORE 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.

**Featured Products:**
- ATTO XstreamCORE® SAN storage controller

**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, ATTO PowerCenter Pro software provides the protection, capacity expansion and performance improvements needed for today’s SSD storage platforms.

**Featured Products:**
- ATTO ExpressSAS® SAS/SATA host bus adapters

**ATTO SpeedWrite™**

Exclusive performance-enhancing capability that significantly boosts tape performance by efficiently managing read and write commands between host and tape, resulting in continuous operation, shorter back-up times and higher overall throughput.

SpeedWrite is a mode of operation in which SCSI Write commands are processed using ‘Write-Behind’ and ‘Deferred Error’ handling to return completion status back to the host prior to actual command completion.

**Featured Products:**
- ATTO XstreamCORE® storage controller
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 32, 16 and 8Gb, Gen 6, single, dual and quad channel HBAs further enhance speed and reliability in high-bandwidth work environments. Celerity Gen 6 HBAs address the need for high-performing, scalable and secure storage to support exponential data growth. With features including forward error correction, the Gen 6 portfolio ensures high reliability in demanding high-speed networks. Built for the PCIe 3.0 computer interface, Gen 6 host adapters are compatible with all Fibre Channel 32, 16, 8 and 4Gb 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™, HPE®, Hitachi Data Systems, IBM®, NetApp®, Quantum® and other 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
- 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

ATTO is the leader in providing world-class HBAs, so we’re pleased to be able to offer these options to our customers.”

– Gary Watson
CTO, Nexsan
# ATTO Celerity™ 32Gb Fibre Channel Host Bus Adapters

<table>
<thead>
<tr>
<th>Product Features</th>
<th>FC-324E</th>
<th>FC-322E</th>
<th>FC-321E</th>
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<td>100m - 16Gb, 50m - 32Gb</td>
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<td>Yes</td>
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# ATTO Celerity™ 16Gb Fibre Channel Host Bus Adapters

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<td>Max. Transfer Rate</td>
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<td>PCIe 3.0 x8</td>
<td>PCIe 3.0 x8</td>
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<td>16Gb, 8Gb, 4Gb</td>
<td>16Gb, 8Gb, 4Gb</td>
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<td>Connector Type</td>
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<td>Optical SFP+ LC</td>
<td>Optical SFP+ LC</td>
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<tr>
<td>Developer's Kit (Target Mode API)</td>
<td>Yes</td>
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# ATTO Celerity™ 8Gb Fibre Channel Host Bus Adapters

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<th>FC-81EN</th>
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<td>PCIe 2.0 x8</td>
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<td>8Gb, 4Gb, 2Gb</td>
<td>8Gb, 4Gb, 2Gb</td>
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<tr>
<td>Connector Type</td>
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<td>Optical SFP+ LC</td>
<td>Optical SFP+ LC</td>
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<td>500m - 2Gb, 380 m - 4Gb, 150 m - 8Gb</td>
<td>500m - 2Gb, 380 m - 4Gb, 150 m - 8Gb</td>
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<tr>
<td>Low-Profile Form Factor</td>
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<td>Yes</td>
</tr>
<tr>
<td>Developer's Kit (Target Mode API)</td>
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<td>Yes</td>
</tr>
<tr>
<td>Warranty</td>
<td>3 year</td>
<td>3 year</td>
<td>3 year</td>
</tr>
</tbody>
</table>

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1 Available for qualified OEM sales only. Please contact your ATTO representative.

Compatible storage controllers available - see page 14.

Compatible software available - see page 18.

Compatible cables & accessories available.
12Gb and 6Gb 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 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
- Use up to 40% less power than competitive HBAs, reducing overall power and cooling costs
- Low power consumption expands system performance resources and extends processing capabilities

**Supports:**
- macOS®, Windows®, Linux®, VMware®, FreeBSD® (12Gb only), illumos (12Gb only)
- PowerCenter Pro RAID 0, 1, 10, 1e (12Gb Only)
- 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® H1280**

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® SAS/SATA Host Bus Adapters

<table>
<thead>
<tr>
<th>Product Features</th>
<th>H12F0</th>
<th>H120F</th>
<th>H1280</th>
<th>H1208</th>
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<tr>
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<td>ESAH-12F0-000</td>
<td>ESAH-120F-000</td>
<td>ESAH-1280-000</td>
<td>ESAH-1208-000</td>
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<td>16</td>
<td>8</td>
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<td>Developer’s Kit</td>
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<td>Port Config. (Ext/Int)</td>
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<td>Developer’s Kit</td>
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<td>End Devices Supported</td>
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<tr>
<td>Warranty</td>
<td>3 year</td>
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1. **H12F0**
   - 10m maximum for 12Gb passive copper cables; ATTO supports up to 100m max for active optical cables
   - Available for qualified OEM sales only. Please contact your ATTO representative.
   - Cross-compatible with PCIe 3.0
   - Compatible software available - see page 18.
   - Compatible cables available.

2. **H120F**
   - 10m maximum for 12Gb passive copper cables; ATTO supports up to 100m max for active optical cables
   - Available for qualified OEM sales only. Please contact your ATTO representative.
   - Cross-compatible with PCIe 3.0
   - Compatible software available - see page 18.
   - Compatible cables available.

3. **H1280**
   - 10m maximum for 12Gb passive copper cables; ATTO supports up to 100m max for active optical cables
   - Available for qualified OEM sales only. Please contact your ATTO representative.
   - Cross-compatible with PCIe 3.0
   - Compatible software available - see page 18.
   - Compatible cables available.

4. **H1208**
   - 10m maximum for 12Gb passive copper cables; ATTO supports up to 100m max for active optical cables
   - Available for qualified OEM sales only. Please contact your ATTO representative.
   - Cross-compatible with PCIe 3.0
   - Compatible software available - see page 18.
   - Compatible cables available.
ATTO FastFrame™ Network Interface Cards (NICs)

ATTO FastFrame™ 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.

In addition to FastFrame, we offer a full line of legacy NICs, that provide end-to-end connectivity options for the most cost-effective and flexible network solutions.

- FastFrame NICs leverage ATTO 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.
- 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.
- FastFrame performance tuning, monitoring, and diagnostic tool is a comprehensive software application that unlocks the full potential of FastFrame NICs

Supports:
- macOS®, Windows®, Linux®, FreeBSD, VMware® and illumos
- Data Center Bridging (DCB) Ethernet
- Accelerated RDMA/RoCE and iSER Support
- iSCSI initiator software (optional)
- Certified with industry leading platforms and applications
- NVMe over Fabrics

Includes:
- ATTO Advanced Data Streaming (ADS™) Technology
- Pluggable optical SFP+/QSFP+/QSFP28/SFP 28 support

Complementary Products:
- ATTO ThunderLink® adapters
- ATTO XstreamCORE® storage controllers
- ATTO XtendSAN™ iSCSI initiator
- ATTO premium cables

Based on industry-standard Ethernet technology, ATTO FastFrame™ NICs are available in single, dual, and quad-port configurations.
## ATTO FastFrame™ 3 Optical Network Interface Cards

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<thead>
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<th>N352</th>
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<td>Max. Data Rate</td>
<td>50Gb/s</td>
<td>50Gb/s</td>
<td>25Gb/s</td>
<td>100Gb/s</td>
<td>100Gb/s</td>
</tr>
<tr>
<td>Supported Speeds</td>
<td>1/10/25/40/50 Gb/s</td>
<td>1/10/25/40/50 Gb/s</td>
<td>1/10/25 Gb/s</td>
<td>1/10/25/40/50/100 Gb/s</td>
<td>1/10/25/40/50/100 Gb/s</td>
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<tr>
<td>Bus Type</td>
<td>PCIe 3.0 x8</td>
<td>PCIe 3.0 x8</td>
<td>PCIe 3.0 x8</td>
<td>PCIe 3.0 x16</td>
<td>PCIe 3.0 x16</td>
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<tr>
<td>Connector Type</td>
<td>QSFP28</td>
<td>QSFP28</td>
<td>SFP28</td>
<td>QSFP28</td>
<td>QSFP28</td>
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<tr>
<td>Low-Profile Form Factor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Warranty</td>
<td>3 year</td>
<td>3 year</td>
<td>3 year</td>
<td>3 year</td>
<td>3 year</td>
</tr>
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</table>

## ATTO FastFrame™ Optical Network Interface Cards

<table>
<thead>
<tr>
<th>Product Features</th>
<th>N512</th>
<th>N511</th>
<th>NQ42</th>
<th>NQ41</th>
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<tbody>
<tr>
<td>Part Number</td>
<td>FFRM-N512-000</td>
<td>FFRM-N511-000</td>
<td>FFRM-NQ42-000</td>
<td>FFRM-NQ41-000</td>
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<tr>
<td>10GbE Ports</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>40GbE Ports</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Max. Data Rate</td>
<td>10Gb/s</td>
<td>10Gb/s</td>
<td>40Gb/s</td>
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<td>Bus Type</td>
<td>PCIe 2.0 x8</td>
<td>PCIe 2.0 x8</td>
<td>PCIe 3.0 x8</td>
<td>PCIe 3.0 x8</td>
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<tr>
<td>Connector Type</td>
<td>Optical SFP+ LC</td>
<td>Optical SFP+ LC</td>
<td>Optical QSFP+</td>
<td>Optical QSFP+</td>
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<tr>
<td>Low-Profile Form Factor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Warranty</td>
<td>3 year</td>
<td>3 year</td>
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<td>3 year</td>
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## ATTO FastFrame™ 10GBASE-T Network Interface Cards

<table>
<thead>
<tr>
<th>Product Features</th>
<th>NT12</th>
<th>NT11</th>
</tr>
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<tbody>
<tr>
<td>Part Number</td>
<td>FFRM-NT12-000</td>
<td>FFRM-NT11-000</td>
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<tr>
<td>10GbE Ports</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Max. Data Rate</td>
<td>10Gb/s</td>
<td>10Gb/s</td>
</tr>
<tr>
<td>Bus Type</td>
<td>PCIe 2.0 x8</td>
<td>PCIe 2.0 x8</td>
</tr>
<tr>
<td>Connector Type</td>
<td>RJ45</td>
<td>RJ45</td>
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<tr>
<td>Low-Profile Form Factor</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Warranty</td>
<td>3 year</td>
<td>3 year</td>
</tr>
<tr>
<td>Warranty</td>
<td>3 year</td>
<td>3 year</td>
</tr>
</tbody>
</table>

### Use Case

**iSCSI SAN Configuration**

- **Linux® client with FastFrame NQ41**
- **Windows® client with FastFrame NQ42**
- **Mac Pro® with Xtend SAN iSCSI Initiator**
- **iMac Pro with Xtend SAN iSCSI Initiator**
- **10Gb/40Gb Ethernet Switch**
- **ATTO ThunderLink NQ 3402**
- **iSCSI Storage with FastFrame NS12 NICs**
Storage Controllers

ATTO XstreamCORE® Fibre Channel to SAS and Ethernet to SAS storage controllers

ATTO XstreamCORE® storage controllers are high-performance accelerated protocol conversion appliances which 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 a point to point connection from drives to space-limited rack or blade servers, remapping attached drives from failed servers to replacement servers, adding shared capabilities to direct-attached storage, creating mass shared storage using commodity storage and remotely locating direct-attached SAS disk or tape devices over Ethernet or Fibre Channel.

• 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.
• ATTO storage controllers keep overall storage solutions flexible without locking users into proprietary hardware implementations. ATTO storage controllers are a modular building block with technology that allows admins to reduce resource load while decoupling storage from server resources.

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

"ATTO XstreamCORE® FC 7550 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 Storage Controllers

<table>
<thead>
<tr>
<th>Product Features</th>
<th>8200</th>
<th>7600</th>
<th>7550</th>
<th>7500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
<td>XCET-8200-002</td>
<td>XCFC-7600-002</td>
<td>XCFC-7550-004</td>
<td>XCFC-7500-002</td>
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<tr>
<td>Max Sustained Transfer Rate</td>
<td>6000 MB/s (iSER)</td>
<td>6400 MB/s</td>
<td>6400 MB/s</td>
<td>3200 MB/s</td>
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<tr>
<td>4K IOPS</td>
<td>1,100,000</td>
<td>1,200,000</td>
<td>1,200,000</td>
<td>750,000</td>
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<tr>
<td>Input Connectors</td>
<td>(2) 40Gb Ethernet QSFP+ (iSER / iSCSI support)</td>
<td>(2) 12Gb Fibre Channel SFP+</td>
<td>(4) 16Gb Fibre Channel SFP+</td>
<td>(2) 16Gb Fibre Channel SFP+</td>
</tr>
<tr>
<td>Output Connectors</td>
<td>(4) 12Gb HD Mini SAS (4x) SFF 8644</td>
<td>(4) 12Gb HD Mini SAS (4x) SFF 8644</td>
<td>(4) 12Gb HD Mini SAS (4x) SFF 8644</td>
<td>(4) 12Gb HD Mini SAS (4x) SFF 8644</td>
</tr>
<tr>
<td>In Band/Out of Band Management</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>xCORE Data Acceleration</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>eCORE Offload</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Data Mover Support</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Devices supported</td>
<td>Up to 240 (960 OEM)</td>
<td>Up to 240 (960 OEM)</td>
<td>Up to 240 (960 OEM)</td>
<td>Up to 240 (960 OEM)</td>
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<tr>
<td>Active initiator Support</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
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<tr>
<td>Event Log Protection</td>
<td>NVRAM</td>
<td>NVRAM</td>
<td>NVRAM</td>
<td>NVRAM</td>
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<tr>
<td>Expander/Port Multiplier support</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Form Factor</td>
<td>1U Rackmount</td>
<td>1U Rackmount</td>
<td>1U Rackmount</td>
<td>1U Rackmount</td>
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<td>Power Supplies</td>
<td>2 Hot Swap</td>
<td>2 Hot Swap</td>
<td>2 Hot Swap</td>
<td>2 Hot Swap</td>
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<tr>
<td>Disk Support</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Tape Support</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Warranty</td>
<td>2 year</td>
<td>2 year</td>
<td>2 year</td>
<td>2 year</td>
</tr>
</tbody>
</table>

Compatible cables and accessories available.

---

**Stretch Cluster**

- **FC SAN**
  - FC-to-SAS XstreamCORE FC 7500
  - City 1: SAS / SATA Storage
  - City 2: SAS / SATA Storage

**Disaggregate SAS Storage**

- **Ethernet Fabric**
- **Ethernet-to-SAS XstreamCORE ET Storage Controller**
- **Flash and Capacity Storage**
- **LTO Tape Devices**
- **Host Servers**
Thunderbolt™ Adapters
ATTO ThunderLink®

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 for both Thunderbolt 3 and Thunderbolt 2 connectivity.

- 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+, locking power supply and Kensington™ security slot
- Widest portfolio available of tested and certified solution components including storage systems, switches, hosts and software applications

Supports:
- macOS®, Windows®, VMware® vSphere
- Certified with industry leading platforms and applications
- DisplayPort (including 5K), hot plug, daisy chain

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

Complementary Products:
- ATTO Celerity™ Fibre Channel HBAs
- ATTO ExpressSAS® HBAs
- ATTO FastFrame™ NICs
- ATTO XstreamCORE™ storage controllers
- 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

<table>
<thead>
<tr>
<th>Product Features</th>
<th>40GbE</th>
<th>40GbE</th>
<th>Fibre Channel</th>
<th>Fibre Channel</th>
<th>25GbE</th>
<th>10GbE</th>
<th>SAS/SATA</th>
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</thead>
<tbody>
<tr>
<td>Part Number</td>
<td>TLNQ-3402-000/DE0</td>
<td>TLNQ-3401-000/DE0</td>
<td>TLFC-3322-000/DE0</td>
<td>TLFC-3162-000/DE0</td>
<td>TLNS-3252-000/DE0</td>
<td>TLNS-3102-000/DE0</td>
<td>TSLH-3128-000/DE0</td>
</tr>
</tbody>
</table>

**Input Connectors**
- (2) 40Gb/s Thunderbolt 3 (USB-C)
- (2) 40Gb/s Thunderbolt 3 (USB-C)
- (2) 40Gb/s Thunderbolt 3 (USB-C)
- (2) 40Gb/s Thunderbolt 3 (USB-C)
- (2) 40Gb/s Thunderbolt 3 (USB-C)
- (2) 40Gb/s Thunderbolt 3 (USB-C)

**Output Connectors**
- (2) 40GbE
- (1) 40GbE
- (2) 32Gb/s Fibre Channel
- (2) 16Gb/s Fibre Channel
- (2) 25GbE
- (2) 10GbE
- (2) 12Gb SAS/SATA

**Connector Type**
- (2) QSFP+(Included)
- (1) QSFP+(Included)
- (2) Optical SFP+LC (Included)
- (2) Optical SFP+LC (Included)
- (2) Optical SFP+LC (Included)
- (2) Optical SFP+LC (Included)
- (2) mini SAS (w) SFF-8644 External

**Warranty**
- 3 year
- 3 year
- 3 year
- 3 year
- 3 year
- 3 year
- 3 year

ATTO ThunderLink® Adapters - Thunderbolt 2

<table>
<thead>
<tr>
<th>Product Features</th>
<th>Fibre Channel</th>
<th>Fibre Channel</th>
<th>10GBASE-T</th>
<th>10GbE</th>
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<tr>
<td>Part Number</td>
<td>TLFC-2162-000/DE0/1</td>
<td>TLFC-2082-000/DE0/1</td>
<td>TLNT-2102-000/DE1</td>
<td>TLNS-2102-000/DE1</td>
</tr>
</tbody>
</table>

**Input Connectors**
- (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) 10GbE
- (2) 10GbE

**Connector Type**
- (2) Optical SFP+ LC (Included)
- (2) Optical SFP+ LC (Included)
- (2) RJ45
- (2) Optical SFP+ LC (Included)

**Warranty**
- 3 year
- 3 year
- 3 year
- 3 year

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

Use Case

Thunderbolt Host

4K DisplayPort Monitor

LTO Tape Drive

32Gb Fibre Channel Switch

Network Attached Storage

Ethernet Fibre Channel SAS/SATA Thunderbolt

12Gb SAS/SATA Storage

32Gb Fibre Channel Storage

16Gb Fibre Channel Storage
Software
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
- macOS® 10.11 and later
- Volume and enterprise licensing available

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

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

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

**ATTO ConfigTool™, vConfigTool™, XstreamVIEW™ and ATTO FastFrame 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 XstreamVIEW™** System Manager user interface for remote management, set up and configuration while providing storage performance metrics, traffic statistics, storage and host LUN mapping and diagnostic tools.

- Performance tuning and event logging
- Email notification for monitoring

**ATTO FastFrame 360** - Ethernet Tuning and Diagnostic Tool unlocks the true potential of ATTO FastFrame™ and ATTO ThunderLink® Ethernet products with ATTO FastFrame 360. 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 NAS and Fabrics, manage driver settings, buffers and CPU affinity
- Diagnose common issues that cause poor performance such as MBUFs, toggle MTU size and turn Flow Control on/off
- Monitor all Ethernet traffic including OS, CPU, NUMA, IRQ, etc.
- Mapping tools like Nmap and Trace Route provide detailed information about the storage network and use as input for diagnosis and tuning
**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 resources.

**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.

**Hardware Accelerated iSCSI**
Engineered into the xCORE acceleration process, improves iSCSI performance by accelerating all iSCSI, TCP and SCSI commands in hardware without the need for context switching.

**intelligent Bridging Architecture™**
Combines powerful hardware with an efficient data engine to create a platform that delivers performance with a rapid I/O ramp and extremely low latency.

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

**MultiPath Director™**
A proprietary technology available on ATTO Fibre Channel host bus adapters and Thunderbolt™ adapters that enables Linux®, macOS® 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 Processor**
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 Offload Processor**
Adds common, open storage and management services, integrates with industry standard APIs, handles reservations, storage routing and host and LUN mapping functions.

**PowerCenter 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 HBAs and Thunderbolt 3 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.

**SpeedWrite™**
Keeps path between host and ATTO XstreamCORE® filled with data to significantly boost tape write performance.
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
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.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.

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