



ATTO's ExpressSAS 12Gb/s SAS HBAs provide high performance direct attach connectivity for server storage, JBOD and RAID arrays.

#### Technical Features

- Up to 1,200 MB/s throughput per port
- Over 1 million sustained IOPS
- Features a high-performance x8 PCIe 3.0 host interface
- Onboard Power Center Pro RAID 0, 1, 1e and 10 included (select models)
- Supports up to 2048 end devices
- Low-profile, MD2 short form factor for versatility and improved airflow
- Exclusive Advanced Data Streaming (ADS™) Technology included
- Copper and optical miniSAS HD high-density connectors with cable management support
- Driver support for the latest Windows®, Linux®, VMware® and FreeBSD operating systems
- Target mode software development kit available
- 3-year standard product warranty

## ATTO ExpressSAS 12Gb SAS HBAs

12Gb/s SAS to PCIe 3.0 Host Bus Adapters

### Industry Proven Technology

ATTO's ExpressSAS 12Gb/s SAS host adapters (HBAs) provide high performance data protection to direct attached SAS and SATA storage. With a wide variety of port configurations and built-in Power Center Pro RAID 0, 1, 1e and 10 for performance and protection, these adapters offer flexibility for every range of application. For over 25 years, ATTO has been at the forefront of the latest innovations in storage connectivity.

### Flexible Connectivity Solutions

The ExpressSAS 12Gb/s SAS HBAs are available with a wide selection of 8, 12 and 16 port options to support a dense and efficient connection to storage from rack-mounted servers and workstations in datacenter, data warehousing, VOD and other high-availability, high-performance applications.

### Performance Engineered

ExpressSAS 12Gb/s host adapters combine 12Gb/s SAS speeds and x8 PCI Express 3.0 with powerful hardware and software elements to manage latency in real-time environments. Additionally, the H1208 and H120F HBAs include Power Center Pro, an integrated software RAID solution that brings the performance and protection of RAID to attached storage devices.

Exclusive Advanced Data Streaming (ADS™) Technology maximizes CPU processes to deliver smooth and reliable data transfers and the highest consistent performance. ATTO pays close attention to detail in board design and signal integrity to minimize transmission errors and data corruption. These differentiating capabilities make ATTO the premier choice for high-performance direct-attached SAS/SATA storage connectivity.

### Advanced Management Tools

ATTO's easy-to-use ConfigTool features an intuitive GUI that simplifies the installation, management and monitoring of the host bus adapter. With advanced troubleshooting and performance tuning capabilities, ExpressSAS HBAs provide users with sophisticated diagnostics and the flexibility to control settings for specific applications.

We offer a broad array of management and diagnostic capabilities. Cables, the most significant point of failure, are often difficult to troubleshoot. ExpressSAS 12Gb/s SAS HBAs are able to help isolate cable and connector failures (and intermittent problems) through independent control of each port, as well as discovery and cable management of data passed through the mini-SAS HD connectors.

# ATTO ExpressSAS 12Gb SAS HBAs

12Gb/s SAS to PCIe 3.0 Host Bus Adapters

## Applications

- The ExpressSAS 12Gb/s SAS/SATA family of host bus adapters offers the fastest available connection to direct-attached SAS or SATA storage. The impressive speed of the 12Gb/s SAS interface, coupled with a x8 PCI Express 3.0 host interface, delivers a dense and efficient connection to all types of storage—from rack-mounted servers and workstations in data center, data warehousing, VOD and other high-availability, high-performance applications.
- Advanced Data Streaming (ADS™)
- Latency-management technology that controls the acceleration of data transfers to move large amounts of data faster and more efficiently

## Key Features

- Automatic link negotiation:
  - 12Gb/s, 6Gb/s and 3Gb/s SAS targets
  - 6Gb/s, 3Gb/s and 1/5Gb/s SATA targets
- Supports up to 2048 (H120F, H12F0, H1248, H1288) or 1024 (H1244, H1208, H1280) targets
- Onboard Power Center Pro RAID 0, 1, 1e and 10 included for performance and data protection (H12F0, H1280 not supported)
- Supports Serial SCSI Protocol (SSP), SATA Tunneling Protocol (STP), SMP, SAT and direct attached SATA protocol
- Supports T10-DIF/PI standards
- 16MB on-board flash memory to store persistent parameters
- Wide-port end device support
- Support for advanced format storage media: 512e, 4Kn
- Supports ATAPI devices
- Dual port SAS support for redundant configurations
- Support for SAS tape devices and transport layer retries (TLR) for error handling
- Target mode driver (TMD) development kit available for storage servers, storage systems and appliances

## User Benefits

- Highest available performance—1,200 MB/s maximum sustained throughput per port; 1M+ IOPS sustained
- Flexible connectivity options for internal and external storage
- Compatible with SAS and SATA technology
- Low power consumption

## Management Tools

- Management APIs via CSMI and IOCTLS
- Scriptable Command Line Interface (CLI) for advanced functionality, including phy and cable management
- ATTO ConfigTool GUI support for management and configuration
- Extensive event and trace logging
- External locate LED on bracket
- Onboard temperature monitoring

## Bus Specifications

- x8 PCI Express 3.0 host interface
- PCIe low profile form factor
- Supports PCI Express Base Spec 3.0
- Supports PCI Express CEM Spec 3.0

## Connectivity

- SFF8644 x4 Mini SAS HD connectors externally
- SFF8643 x4 Mini SAS HD connectors internally
- Full cable management and reporting
- Supports cable lengths up to 1m (SATA), 10m (passive copper) and 100m (active optical)
- Easy-to-install full height and low profile connection brackets included
- Designed to support 12Gb/s SAS signaling

## Boot Support

- UEFI v2.3.1 with HII support

## Reliability

- 4,500,000 Hours MTBF

## Operating System Support

- Windows® / Windows® Server
- SUSE Linux® Enterprise Server (SLES)
- Red Hat Enterprise Linux (RHEL)
- Cent OS
- Fedora Linux
- VMware ESXi Server®
- FreeBSD

## Safety & Environmental Approvals

- UL, CSA, CE and IEC 60950
- EU RoHS Compliant (2011/65/EU)
- EMC Compliance
- FCC Part 15, Subpart B (Class B)
- ICES-003 (Canada)
- EN55022: 2010, CISPR 22 (Class B)
- EN55024: 2010
- VCCI V3/2013.4
- AS/NZS CISPR22:2010

## Operating Temperature

- Hardware Environment
  - Airflow: 200 lf/m (min) recommended (H12F0, H120F, H1288, H1248); 100 lf/m (min) recommended (H1280, H1208, H1244 )
  - Temperature: 0-55° C
  - Humidity: 10 - 90% non-condensing
- Storage Environment
  - Temperature: -40°-70°C
  - Humidity: 5 - 95% non-condensing

## Dimensions

- Length 6.600", Height 2.713"

## Power

- H1208, H1280, H1244: 11W (typical)
- H120F, H12F0, H1248, H1288: 15W (typical)

## Warranty

- 3 Years

ATTO ExpressSAS	H1280	H12F0	H1208	H120F	H1244	H1248	H1288
<b>Ports</b>	8 External	16 External	8 Internal	16 Internal	4 External, 4 Internal	4 External, 8 Internal	8 External, 8 Internal
<b>Bus Characteristics</b>	x8 PCIe 3.0	x8 PCIe 3.0	x8 PCIe 3.0	x8 PCIe 3.0	x8 PCIe 3.0	x8 PCIe 3.0	x8 PCIe 3.0
<b>Form Factor</b>	Low Profile	Low Profile	Low Profile	Low Profile	Low Profile	Low Profile	Low Profile
<b>Connections</b>	2 Mini SAS HD (x4) SFF 8644 External	4 Mini SAS HD (x4) SFF 8644 External	2 Mini SAS HD (x4) SFF 8643 Internal	4 Mini SAS HD (x4) SFF 8643 Internal	1 Mini SAS HD (x4) SFF 8644 External  1 Mini SAS HD (x4) SFF 8643 Internal	1 Mini SAS HD (x4) SFF 8644 External  2 Mini SAS HD (x4) SFF 8643 Internal	2 Mini SAS HD (x4) SFF 8644 External  2 Mini SAS HD (x4) SFF 8643 Internal