**ATTO ExpressSAS® 12Gb SAS HBAs**

**12Gb/s SAS to PCIe 3.0 Host Bus Adapters**

**Industry Proven Technology**

ATTO Technology, Inc. ExpressSAS® 12Gb/s SAS host bus adapters (HBAs) provide high-performance direct attach connectivity for server storage, JBOD and RAID arrays.

**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, video on demand and other high-availability, high-performance applications.

**Performance Engineered**

ExpressSAS 12Gb/s HBAs 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**

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

ATTO offers 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.
**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 PCIe 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 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 (H12F0, 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 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 PCIe Express 3.0 host interface
- PCIe low profile form factor
- Supports PCIe 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
- macOS®
- SUSE Linux® Enterprise Server (SLES)
- Red Hat Enterprise Linux (RHEL)
- CentOS
- Fedora Linux
- VMware ESXi Server®
- FreeBSD

**Safety & Environmental Compliance**
- 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 lfm (min) recommended (H12F0, H12F0, H1288, H1248); 100 lfm (min) recommended (H1280, H1208, H1244)
  - Temperature: -0°C - 55°C
  - Humidity: 10% - 90% non-condensing
- Storage Environment
  - Temperature: -40°C - 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® 12Gb SAS HBAs**

**12Gb/s SAS to PCIe 3.0 Host Bus Adapters**

---

**ATTO ExpressSAS Specifications**

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

---

The Power Behind the Storage +1.716.691.1999 | atto.com

Rev. 4/12/18