



ATTO Technology, Inc.

ATTO ExpressSAS Host Adapter Installation and Operation Manual

**ExpressSAS R348 RAID Adapter
ExpressSAS R380 RAID Adapter**

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4/2007

Document Control Number: PRMA 0389-000

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1 ATTO provides storage solutions

The ATTO Technology ExpressSAS low-profile host adapters provide 3-Gb SAS/SATA II connectivity for both IT and digital video environments. The adapters are compatible with multiple operating systems, applications and drives.

The ATTO ExpressSAS R380 host adapter and the ExpressSAS R348 host adapter provide enhanced reliability and performance thanks to more than 15 years of ATTO experience with SCSI hardware and storage connectivity solutions. Using the latest in PCI Express bus technology, the ATTO ExpressSAS host adapters deliver blazing-fast performance with transfer rates of up to 3-Gb per second per port.

An easy-to-use utility, ATTO Configuration Tool, configures, manages and monitors the ExpressSAS adapters.

ATTO also incorporates its field-proven Advanced Data Streaming (ADS™) technology to meet the most demanding performance requirements of intensive applications. ATTO provides industry standard PCIe to SAS control using Serial SCSI Protocol (SSP), Serial ATA Tunneling Protocol (STP) and Serial Management Protocol (SMP).

The ATTO ExpressSAS R348 is a low-profile SAS host adapter configurable as four external and four internal ports or as eight internal ports.

The ATTO ExpressSAS R380 is a low-profile SAS host adapter with eight external ports.

Primary benefits

- Improved performance over traditional ULTRA320 SCSI with SAS, SATA and SATA II attachment
- Increased bandwidth through x8 PCI Express host interface
- Point-to-point technology delivers full throughput to each connected storage device

- One-click installation
- User-friendly ATTO Configuration Tool provides a simple host-based utility for effortless configuration, a BIOS setup utility provides flexibility for custom applications, and a user-friendly GUI allows for quick and easy RAID setup
- ADS technology: alleviates data transfer bottlenecks and moves data more efficiently while managing latency

Technical highlights

- x8 PCIe host interface: PCIe spec 1.0a
- True low-profile form factor
 - Length: 6.600"
 - Height: 2.713"
 - Low-profile and standard height brackets
- Operating environment
 - Temperature: 0°-55°C (32°-113°F)
 - Humidity: 5%-95% non-condensing
- Storage Environment
 - Temperature: -40°-70°C (-40°-157°F)
 - Humidity: 5%-95% non-condensing
- Protocols:
 - Serial SCSI Protocol (SSP)
 - Serial ATA Tunneling Protocol (STP)
 - Serial Management Protocol (SMP)
- Drivers to support Windows® 2000, Server 2003, XP and Vista (32 bit & 64 bit), Linux Red Hat and SUSE (32 bit & 64 bit kernel 2.6.x) and Mac® OS X (10.4x)
- RoHS compliant

2 Install drivers

ATTO ExpressSAS host adapters require a current device driver and hardware flash for proper operation.

Your adapter was properly flashed before shipment. However, you must add ExpressSAS drivers to your computer before continuing with installation.

If you already have one or more ExpressSAS adapters installed and you have the latest drivers found on the ATTO web site, you do not need to perform any of these procedures.

Windows

Most systems allow you to install the ExpressSAS driver directly from the installation CD.

Windows XP and Server 2003

- 1 Log on to Windows as the system administrator.
- 2 Insert the ExpressSAS installation CD that shipped with your adapter, open the folder containing the latest driver that was downloaded and expanded, or click on an ExpressSAS installation floppy disk (refer to [Create an installation disk from the CD](#) on this page or [Create an installation disk from a file](#) on this page).
- 3 If you are using the Installation CD, the installation program starts automatically when the computer powers on or you insert the CD. Follow the on-screen instructions.
If you are using a folder or an installation floppy disk
 - a. Navigate to the folder or floppy disk.
 - b. Run the self-extracting zip file to uncompress the the windows driver to a folder.
 - c. Click on the **setup.exe** file in the folder where you extracted the driver.
 - d. Follow the instructions to complete the installation.
- 4 Reboot the host computer after the installation process completes.
- 5 Continue to [Install hardware](#) on page 5.

Windows Vista

- 1 Log on to Windows as the system administrator.
- 2 Insert the ExpressSAS installation CD that shipped with your adapter, open the folder containing the latest driver that was downloaded and expanded, or click on an ExpressSAS installation floppy disk (refer to

[Create an installation disk from the CD](#) on this page or [Create an installation disk from a file](#) on this page).

- 3 If you have **User Account Control enabled**, you are prompted to grant the installer permission to continue.

If you do not have administrator privileges, you must enter an administrator user name and password.

- 4 Click the **Continue** button
- 5 The driver installer launches. Click **Install**.
- 6 A Windows security panel asks you to confirm that you want to install the driver. Click **Install**.



Note

*If you also select **Always trust software from ATTO Technology Inc.**, you will not receive this prompt again.*

- 7 Continue to [Install hardware](#) on page 5

Create an installation disk from the CD

- 1 Insert the Installation CD into a CD or DVD drive. The installation starts automatically. If it does not, navigate to the root of the CD and run *autorun.bat*
- 2 Select **Windows Drivers** from the items on the left side of the screen.
- 3 Select the appropriate CPU-based operating system from operating system choices.
- 4 Select **Create Scsiport Driver Diskette** or **Create Storport Driver Diskette**.
- 5 Follow the instructions to complete the installation.

Create an installation disk from a file

- 1 Download the latest driver software from the ATTO Technology web site.
- 2 Run the self-extracting executable file, selecting a folder to place the expanded software package.

- 3 Navigate to the expanded software package folder.
- 4 The ExpressSAS Windows driver is located in the base directory. The x86 package also

includes a Storport directory. Navigate to the folder with the desired ExpressSAS driver.

- 5 Run **makedisk.exe**.
- 6 Follow the instructions to complete the installation.

Mac OS X drivers

The ATTO ExpressSAS adapter supports Macintosh operating systems: Mac OS X 10.4 or later

- 1 Power on your system.
- 2 Double click the supplied **gzip file**.
- 3 A **dmg** is installed on the desktop. Mount the **dmg file**.

- 4 Open the contents of the mounted file.
- 5 Double-click on the installer.
- 6 Follow the on-screen instructions
- 7 Reboot.
- 8 Continue to [Install hardware](#) on page 5

Linux

The ATTO ExpressSAS adaptor supports Linux operating systems RedHat ES 3, 4; Suse Linux 9, 9.1, 9.2, 9.3, 10, 10.1 and the following architectures: i386 (with or without CONFIG_REGPARM); x86_64 (AMD64, Intel EM64T).



Note

The ExpressSAS RAID adapters are not supported under Linux 2.4.

- 1 Power on your system.
- 2 Unzip and untar the driver files: **\$ tar xzf filename.tgz**
- 3 Change to the extracted directory: **\$ cd extracted_directory_name**
Make sure there are no spaces in the path in which you extract the archive. The Linux kernel **Makefile** will fail if the path name contains a space character.
Kernel header files must be installed to build this driver. If the files are in a non-standard location, modify the **KDIR** variable in the **Makefile**.
- 4 As root, make and install the modules: **\$ make install**
- 5 The modules are ready to use. If drivers load automatically, continue to [Install hardware](#) on page 5. Otherwise, refer to [Loading drivers](#) on this page.

Loading drivers

- To load a driver manually, type **\$ modprobe esasraid**
You may receive a warning that the module will taint the kernel.

- Red Hat Hardware Discovery Utility may ask you to **Configure the Device, Ignore, or Do Nothing** after loading the driver for the first time. Select **Configure** and follow the utility's configuration prompts.
- To load a driver at boot if your system does not do so automatically:
 - Red Hat 4. Add the following line to **/etc/modprobe.conf** after installing the driver: **alias scsi_hostadapterX esasraid** where **X** is the next available number.
 - Red Hat 3. Add the following line to **/etc/rc.modules** after installing the driver **modprobe esasraid**
You may need to create **/etc/rc.modules** and make it executable with **'chmod +x /etc/rc.modules'**
 - SUSE 9
- 1 Run the **yast** utility by selecting it the GUI under **System** in the application menu or running it from a command line.
- 2 Select **Hardware**
- 3 Select **Disk Controller**
- 4 Under **Disk Controller Configuration**, select the ATTO device.
- 5 Under the **Module to Use** heading, select the **esasraid** module
- 6 In the box next to **Load Module in initrd**, put an **X**
- 7 Select **Finish** to complete the configuration.
- SUSE 10. Add the following line to **/etc/init.d/boot.local** after installing the driver: **modprobe esasraid**

3 Install hardware

After installing drivers, install the ATTO ExpressSAS adapter into a PCI Express expansion slot on your computer.



CAUTION

Back up your system data before changing or installing any hardware.

System requirements

The ATTO ExpressSAS host adapter package contains the host adapter, the ATTO Utilities CD and a warranty and registration card. If any of these items are missing, contact your ATTO authorized sales representative.

To install and use the ATTO ExpressSAS host adapter you need

- A computer with an available PCI Express expansion slot.
- The complete ATTO ExpressSAS host adapter package.

SAS address

Each ATTO ExpressSAS adapter has a unique SAS address designated by the Institute of Electrical and Electronic Engineers which allows the system to recognize the ATTO ExpressSAS host adapter as a unique part of your configuration.

The address is clearly marked on the back of the board for easy identification. Please keep a reference copy of the number in a safe place.

Installation



WARNING

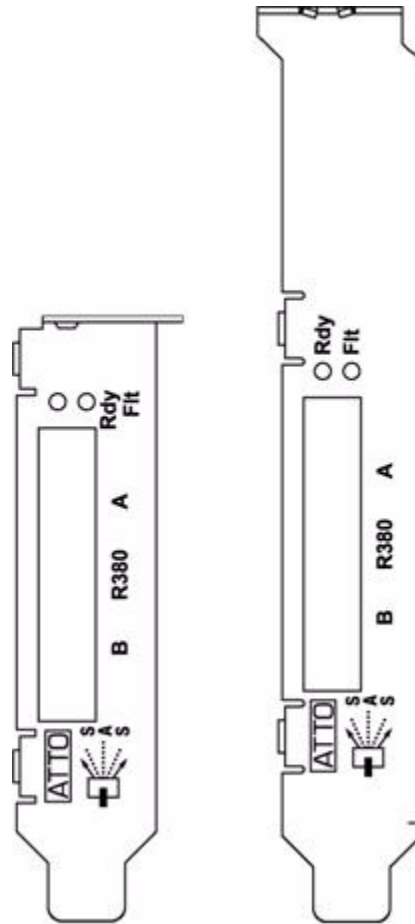
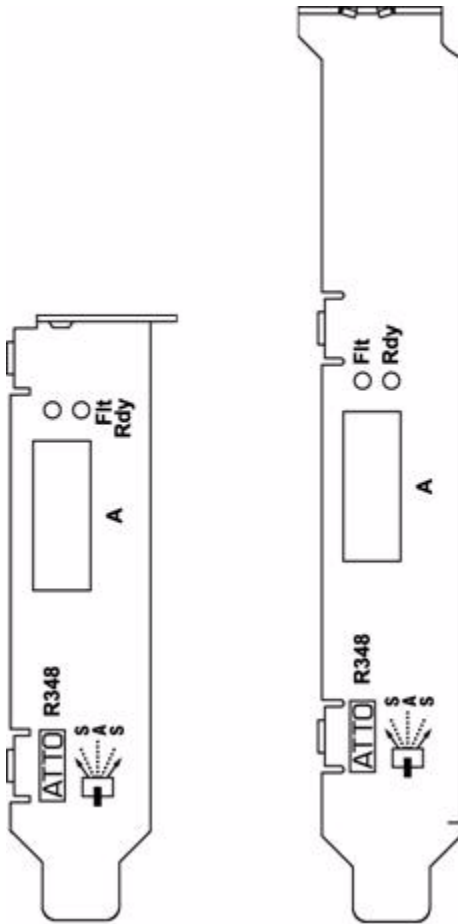
ATTO ExpressSAS host adapters contain components that are sensitive to electrostatic discharge (ESD). ESD can cause damage to the ATTO ExpressSAS host adapter. Please follow standard methods to avoid ESD.

- 1 Install system drivers before you begin hardware installation. Refer to [Install drivers](#) on page 3.
- 2 Power down the computer and unplug the computer from all power sources.
- 3 Open the case.
- 4 Insert the ATTO ExpressSAS host adapter into any open PCI Express expansion slot. If you have questions about how to install an expansion card in your system, consult your computer's documentation.
- 5 Close the case on the computer and power it up.
- 6 Installed drivers are loaded.
For Windows XP and Server 2003
 - Windows detects your ExpressSAS Adapter and the **Found New Hardware** wizard appears. Proceed through the wizard with the default settings for each adapter channel. Insert the ExpressSAS installation disk when prompted.
 - Windows XP only: After adapter installation is complete, the **Found New Hardware** wizard shows an **ATTO Phantom Device** for each channel. Proceed through the wizard with default settings to complete the installation.For Windows Vista
 - Windows Vista detects your adapter and automatically installs the required drivers.If drivers do not load, refer to [Install drivers](#) on page 3 and [Troubleshooting](#) on page 11.
- 7 Connect SAS devices: insert SAS cable from each device to a connector on the ATTO ExpressSAS host adapter until you hear a click.
Use the ATTO Configuration Tool to configure RAID groups. Refer to the ATTO Utilities Installation and Operation Manual for complete information.

Bracket details

Exhibit 3-1 The ExpressSAS R348 Adapter brackets

Exhibit 3-2 The ExpressSAS R380 Adapter brackets



Adapter board details

Exhibit 3-3 The ExpressSAS R348 Adapter board

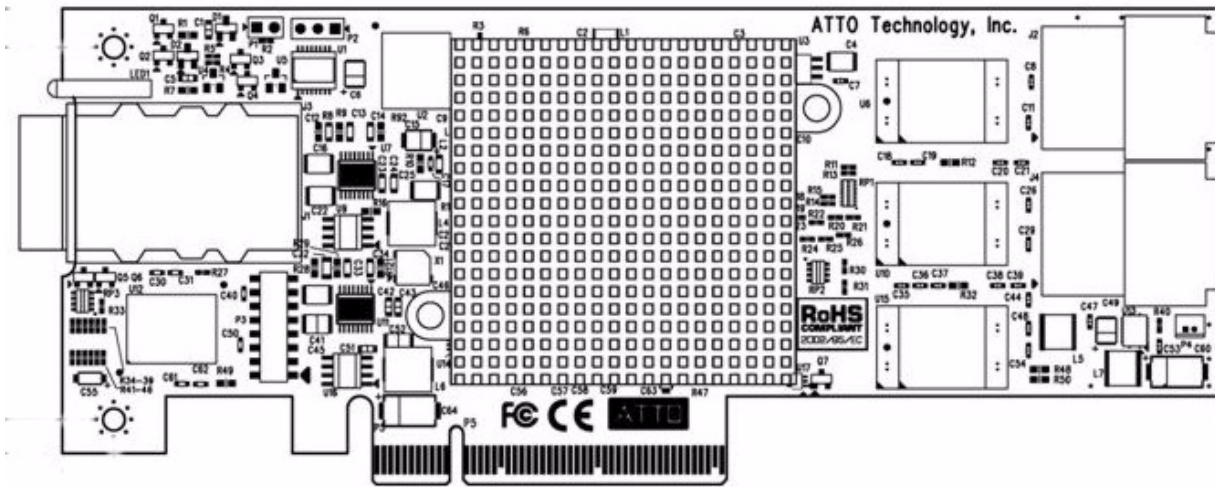
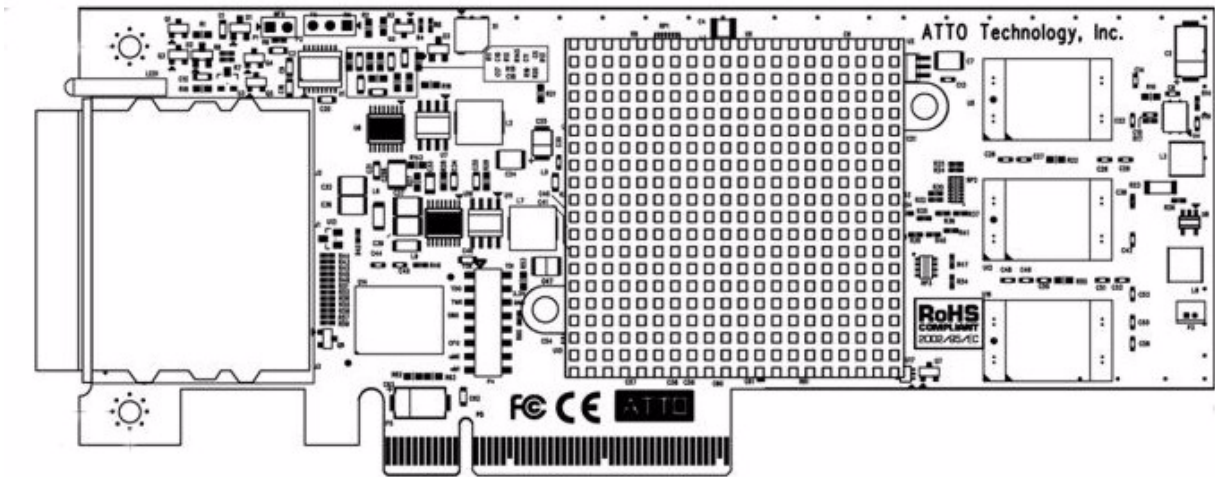


Exhibit 3-4 The ExpressSAS R380 Adapter board



4 Updating drivers and adapter configurations

ATTO ExpressSAS host adapters require a current device driver and hardware flash for proper operation.

Your adapter was properly flashed before shipment but the flash memory or device drivers may need to be updated as new versions become available or if the factory-installed version becomes corrupt. For best performance, use the most recent device driver from the ATTO web site, www.attotech.com.

If an ATTO support technician tells you to update your hardware flash, refer to the ATTO Utilities Manual. The ATTO Utilities Manual provides detailed information on using the ATTO Technology configuration utilities found on the ATTO Utilities CD or downloaded from the ATTO web site.

To verify the version of an installed driver, use the ATTO Configuration Tool from the ATTO Utilities CD, or download the Configuration Tool from the ATTO web site, or use the operating system-specific methods below:

Windows: Use a combination of the adapter boot string during system boot and the **Device Manager**.

Mac OS X: Use the **Apple System Profiler**.

Linux: Examine `/proc/scsi/ATTO ExpressSAS/X` where **X** is the adapter's host number.

Upgrade ExpressSAS drivers in Windows

Windows XP and Server 2003

- 1 Log on to Windows as the system administrator.
- 2 Download the latest driver from the ATTO web site.
- 3 Navigate to the folder where you downloaded the driver.
- 4 Run the self-extracting zip file to uncompress the the windows driver to a folder.
- 5 Click on the **setup.exe** file.
- 6 Follow the instructions to complete the installation.
- 7 Reboot the host computer after the installation process completes.

Windows Vista

- 1 Log on to Windows as the system administrator.
- 2 Download and expand the latest driver from the ATTO web site.
- 3 Navigate to the folder or floppy disk.
- 4 Run **Setup.exe**.



Note

If you have User Account Control enabled, you are asked to grant the installer permission to continue. If you do not have administrator privileges, you are asked for an administrator username and password.

- 5 Click the **Continue** button. The driver installer launches.
- 6 Click **Install** to install the ExpressSAS driver and complete the installation. A Windows security prompt ask you to confirm that you want to install the driver.
- 7 Click **Install**. If you also select **Always trust software from ATTO Technology, Inc.** you will not receive this prompt again.

Install a fresh copy of Windows

- 1 Start Windows text mode setup according to the instructions provided with Windows.
- 2 Press F6 when the first blue window, Windows Setup, appears. Setup will continue to load files after you press F6
- 3 A new window gives instructions to specify additional mass storage devices. Press S
- 4 Insert the ExpressSAS installation diskette in drive A: and press Enter. You should then be presented with a screen from which you would normally select a driver, but only a list of ExpressSAS adapters should appear.
- 5 Select your adapter and Press Enter.
- 6 Windows Setup will load the files from the floppy and then display screen described in step 2. The 'ATTO ExpressSAS' device should now be listed as detected.
- 7 Repeat steps 2 - 4 for any other vendor-supplied driver installation disks. After all other drivers have been processed, press Enter and

proceed with the rest of the Windows Installation procedure.



Note

When Windows begins copying files to your hard disk, you will again be prompted to insert the ExpressSAS installation disk

Install a fresh copy of Windows Vista

- 1 Start Windows setup using the instructions provided with Windows.
- 2 Select **custom installation**
- 3 In the **Where do you want to install Windows?** window, click **Load Driver**.
- 4 Insert media containing the ExpressSAS driver package.
- 5 Click **OK**.
- 6 Windows Setup searches for drivers matching devices in your system. If the ExpressSAS adapter is not listed in the **Select the driver to be installed** list, click **Browse** to locate the

driver. Select the ExpressSAS adapter from the list and click **Next** to install the driver.

- 7 Your SAS/SATA devices are listed in the next window. Remove the ExpressSAS installation media.
- 8 Select and configure a partition for installing Windows.
- 9 Click **Next**.
- 10 Finish Windows installation using the instructions provided with Windows.



Note

When Windows begins copying files to your hard disk, you are asked to insert the ExpressSAS installation disk (and any other vendor-supplied disks you used during custom installation). This is normal. The first time you inserted the disks, Windows loaded the drivers into memory; the second time Windows copied the driver to your hard disk

Mac OS X driver update

- 1 Extract the latest version of the device driver file to your desktop.
- 2 Double click the installer icon and follow the on screen prompts.
- 3 Reboot your system for the changes to take effect.

Linux driver update



Note

You must have kernel header files for the appropriate kernel installed.

You must be logged in as **root**.

- 1 At the command prompt type **rmmod esasraid**
- 2 Download the appropriate version of the device driver from the ATTO website.
- 3 At the command prompt, extract the file using the command **tar -xzf <filename.tgz>**
- 4 Enter the directory created in the above step and type **make install** to overwrite any previously-installed driver.
- 5 Start the driver by typing **modprobe esasraid**

5 Troubleshooting

This chapter contains solutions for the most common problems you might encounter. If you need additional assistance, please refer to the ATTO Technology web site (www.attotech.com) or contact an ATTO Technology authorized representative.

General suggestions

- Check each cable connection on every device.
- Verify all cables are in proper working condition. Loose or broken cables are often the cause of errors or problems.
- Check that devices are plugged into an AC outlet and are turned on before you add power to your computer.
- Ensure you have the latest driver for your operating system and that the driver is installed (refer to [Install drivers](#) on page 3).
- Ensure the ExpressSAS adapter is installed properly in the computer (refer to [Install hardware](#) on page 5).

If the RAID adapter is not accessible

- 1 Open the ATTO **Configuration Tool** from the ATTO Utilities CD or download from the ATTO web site. Refer to the *ATTO Utilities Installation and Operation Manual* for additional information.
- 2 If the adapter does not appear in the **Device Listing**, make sure it is properly seated in the PCI slot.
 - a. Remove power from the PC.
 - b. Remove the case.
 - c. Check the PCI slot.

- d. Replace the case.
- e. Apply power.



Note

If it is properly seated and devices are still not accessible, contact an ATTO Technology authorized representative.

- 3 Verify the driver is loaded.
 - a. Click on the adapter name in the **Device Listing** to view the **Basic Info** screen.
 - b. If the **Driver Information** section indicates **Unknown: driver not loaded**, reinstall the driver. Refer to [Install drivers](#) on page 3.
 - c. If reinstalling the driver does not fix the problem, contact an ATTO authorized representative.
- 4 Reset the NVRAM for all channels to defaults and reboot. If the problem persists, contact an ATTO authorized representative.



Note

When calling ATTO Technical Support, please have a printout of the IOreg listing and output from the Apple System Profiler available.

Appendix A Standards and compliances

The equipment described in this manual generates and uses radio frequency energy. The Technical Specification sheet for a particular ATTO ExpressSAS RAID adapter list certifications for that model.



FCC standards: radio and television interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help



Canadian standards

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.



European standards

Declaration of Conformity

This following statement applies to the ATTO ExpressSAS RAID adapter.

This device has been tested in the basic operating configuration and found to be compliant with the following European Union standards: Application of Council Directive: 89/336/EEC

Standard(s) to which conformity is declared: EN55024:2002; EN55022:2002 CLASS B

This Declaration will only be valid when this product is used in conjunction with other CE approved devices and when the entire system is tested to the applicable CE standards and found to be compliant.



ATTO ExpressSAS cards comply with Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS). Contact your ATTO representative regarding RoHS compliant products

Appendix B **Contact ATTO Technology, Inc.**

Customer service, sales information and technical support are available by phone Monday through Friday, Eastern Standard Time 8:00 a.m. to 8:00 p.m., or by e-mail and web site 24-hours a day.

ATTO Technology, Inc.
155 CrossPoint Parkway
Amherst, New York 14068
(716) 691-1999 • voice
(716) 691-9353 • fax
<http://www.attotech.com>

ATTO Technology can also be reached via e-mail at the following addresses:

<i>Sales Support:</i>	<code>sls@attotech.com</code>
<i>Technical Support:</i>	<code>techsupp@attotech.com</code>

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