ATTO ExpressSAS Troubleshooting Guide for Windows

This document describes troubleshooting techniques that can be used to identify and resolve issues associated with the ATTO ExpressSAS Raid Controller. Some of these techniques may seem simplistic or overly obvious, but these are the ones that are commonly overlooked and can take several hours of frustration to find. It is important to only try one technique at a time. While changing multiple variables may seem to be a time saver, it usually complicates the troubleshooting process.

A.) Windows Operating Systems

→ **The computer will not boot past its Power On Self Test when the controller is installed.**
- The controller may be improperly seated. Power down the computer and reseat the controller.
- Try putting the controller in a different PCI slot.
- Disconnect any SAS/SATA devices from the controller and reboot the computer. If this resolves the issue, investigate the SAS/SATA cables or SAS/SATA target devices as described in the section below.
- If the computer still does not boot, try installing the controller in a different computer. If the controller works in the new computer, report this as a possible interoperability issue between the controller and the computer. If the problem follows the controller, replace it with a new adapter.
- Verify that the latest version of the computer BIOS is installed. Use caution when updating the computer's BIOS. A mistake could leave the system in an unusable state.

→ **The ExpressSAS RAID controller is installed in the computer but it does not appear during the system BIOS scan.**
> **Note:** *The ATTO Technology banner should appear shortly after booting the computer.*

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*****************************************************
*     ATTO ExpressSAS™    Version 1.00      *
*  Copyright © 2007    ATTO Technology, Inc. *
*****************************************************

        *** Press [Ctrl] [Z] for Setup Utility ****

   Channel 1 ExpressSAS R380            FW Version 1.00
```

- The controller may be improperly seated. Power down the computer and reseat the controller.
- Try putting the controller in a different PCI slot.

- Verify that the latest version of the computer BIOS is installed. Use caution when updating the computer's BIOS. A mistake could leave the system in an unusable state.
- Remove any non-vital PCI controllers from the system to determine if there is a PCI bus conflict.
- Disconnect any SAS/SATA devices from the controller and reboot the computer. If this resolves the issue, investigate the SAS/SATA cable or SAS/SATA target devices as described in the section below.
- If the computer still does not boot, try installing the controller in a different computer. If the controller works in the new computer, try updating the flash on the controller as described in the "Installation and Operations" manual. Then try it again in the original computer.
    - If it still fails, report this as a possible interoperability issue between the controller and the computer.
    - If the problem follows the controller, replace it with a new adapter.

→ **The computer freezes when the ATTO Banner is displayed during the system BIOS scan.**

- Disconnect all devices from the SAS controller and reboot the system.

If the system still freezes:

- Remove any non-vital PCI controllers from the system to determine if there is a PCI bus conflict.
- Remove the SAS controller and test it in a different computer (not the same model). If the controller works properly, enter the ATTO ExpressSAS Utility during the system BIOS scan by hitting Control-Z when prompted. Enter the controller configuration menu and disable the BIOS. There may be a BIOS conflict between the ATTO controller and the original computer. Place the controller back into the original machine and reboot.
    - If this resolves the issue, report this is as a BIOS conflict. Note that you can continue to operate. Disabling the BIOS will only prevent the computer from booting from an external drive connected to the controller.
    - If the computer still hangs, replace the controller with a new one.

If the system no longer freezes after disconnecting the SAS/SATA devices:

- Check the SAS/SATA devices. Check for fault lights on the drives.
- Check cable integrity. Check the cables for solid connections. Make sure they are snapped in. Inspect cable ends for bent pins or faulty gold fingers.
- Try attaching SAS/SATA devices one at a time with different cables, adding drives and cables until the problem occurs. This will help pinpoint the device or cable causing the problem.
- Watch the LED indicators on the SAS/SATA devices before, during, and after startup. Drive lights should also flash at startup as the SAS/SATA bus is scanned. This may give a clue as to the root cause of the issue.

→ The system's BIOS scan recognizes the ExpressSAS RAID controller, but states that no virtual disks are found.

- This will occur when no RAID groups have been created but disks are recognized.

→ The system's BIOS scan recognizes the ExpressSAS RAID controller and the RAID group but states that no virtual disks are found.

- This will occur when a RAID group has been created but the group has not been mapped properly to the controller. Mapping can be done via the CTRL-Z function or ATTO Configuration Tool.

→ The system's BIOS scan recognizes the ExpressSAS RAID controller, but it does not detect <u>any</u> of the connected SAS devices.
> *Note: The ATTO Technology banner should appear shortly after rebooting the computer. If the controller's BIOS is set to "enabled" or "scan only", the connected devices, group name, status and RAID level will also be displayed.*

- The SAS controller BIOS may have been set to disabled (factory default: BIOS enabled). Set it back to Enabled (if you need to boot from an external device connected to the controller) or Scan Only.
- Verify the SAS/SATA devices are powered on.
- Verify the drives are mapped to the controller correctly. You may need to execute the 'automap' command to remap the drives. This can be done in the ATTO Configuration Tool or the controller utilities (CTRL-Z).
- Check cable integrity. Check the cables for solid connections. Make sure they are snapped in. Inspect cable ends for bent pins.
- Try attaching SAS/SATA devices one at a time with different cables, adding drives and cables until the problem occurs. This will help pinpoint the device or cable causing the problem.
- Watch the LED indicators on the SAS/SATA devices before, during, and after startup. Drive lights should also flash at startup as the SAS/SATA bus is scanned. This may give a clue as to the root cause of the issue.
- Try putting the controller in a different PCI slot.
- Try updating the firmware on the controller as described in the "Installation and Operations" manual.
- If there is an Expander in the Array verify the following:
  - ➢ **Zoning**: Verify the Expander(s) are zoned properly so that the ExpressSAS Raid card and the SAS/SATA drives have access to one another. If there are pre-existing zones setup, be sure to add the ExpressSAS Raid to the zone.
  - ➢ **Port Visibility**: Verify the Expander can see the ExpressSAS Raid card on the port(s) in question. Refer to the Expanders manufacturer's guide for more detail on this step.
  - ➢ **Speed Auto negotiation**: Verify the Expander is set to "Auto" negotiate transfer speed.
- If all else fails, replace the SAS controller.

→ The computer's BIOS scan recognizes the ExpressSAS RAID controller, but <u>only</u> <u>detects</u> connected SAS/SATA devices on <u>one</u> of the connectors. The other bus reports no devices.

Note: I you are using a R348 SAS Controller be sure the controller is configured to use the appropriate ports you need. This card can be configured to use all internal connectors or one internal and one external.

- Swap the devices and cables from the SAS/SATA bus that appears to be working with the one having issues. If the issue follows the bus and there is an expander in the Array, move on to next step. If there is no expander, replace the card.
- If there is an Expander in the Array verify the following:

    - ➢ **Zoning**: Verify the Expander(s) are zoned properly so that the ExpressSAS Raid card and the SAS/SATA drives have access to one another. If there are pre-existing zones setup, be sure to add the ExpressSAS Raid to the zone.

If the issue follows the attached SAS/SATA devices, troubleshoot the attached devices:
- Verify the SAS/SATA devices are powered on.
- Verify the drives are mapped to the controller correctly. You may need to execute the 'automap' command to remap the drives. This can be done in the ATTO Configuration Tool or the controller utilities (CTRL-Z).
- Check cable integrity. Check the cables for solid connections. Make sure they are snapped in. Inspect cable ends for bent pins.
- Try attaching SAS/SATA devices one at a time with different cables, adding drives and cables until the problem occurs. This will help pinpoint the device or cable causing the problem.
- Watch the LED indicators on the SAS/SATA devices before, during, and after startup. Drive lights should also flash at startup as the SAS/SATA bus is scanned. This may give a clue as to the root cause of the issue.

→ The ExpressSAS RAID controller is detected during the system's BIOS scan but it is not detected by the operating system.
        Note: *When working properly, the ExpressSAS RAID controller will show up in the device manager.*
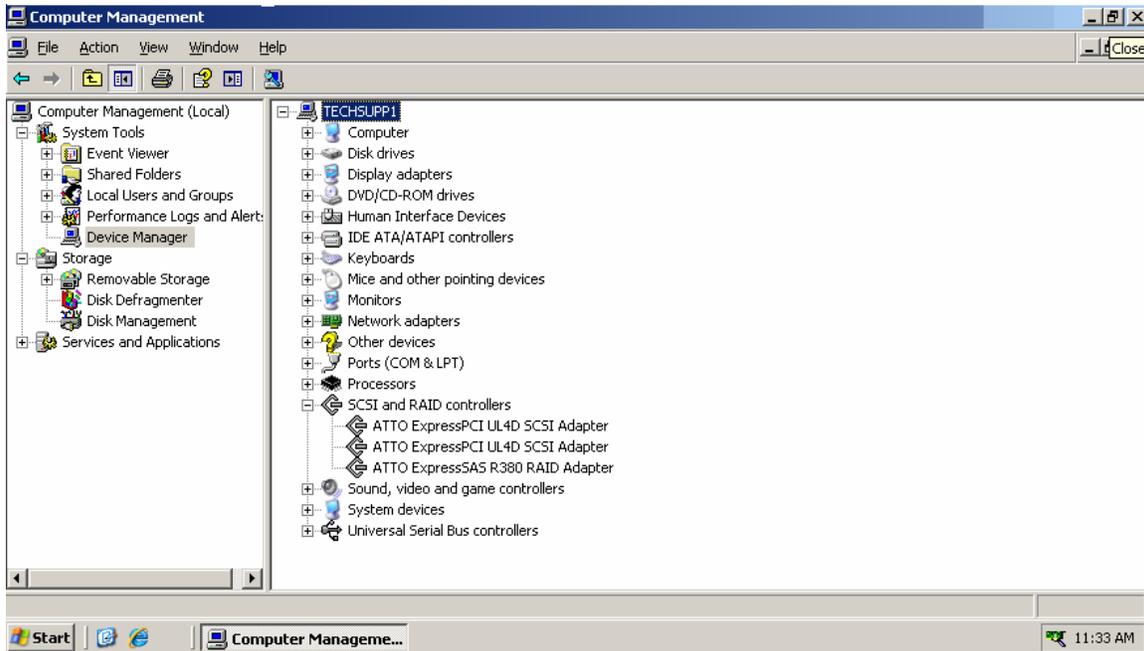
- The controller driver may not be properly installed. Please refer to the controller Installation and Operations manual for instructions on installing your OS driver.
- The firmware and driver may not be at compatible revision levels. The drivers are updated more frequently than the firmware, therefore the revision levels are seldom the same. There may be an occasion where the latest driver also requires a firmware update. Verify from the web site that the latest firmware and driver version are being used. The firmware version can be viewed when the controller is detected during the computer's BIOS scan. The driver version can be verified from within the Device Manager.

➔ **The ExpressSAS RAID controller is detected by the operating system, it <u>detects some</u> of the connected devices, but <u>does not detect all</u> of the connected devices.**

- Verify the SAS/SATA devices are powered on.
- Verify the drives are mapped to the controller correctly. You may need to execute the 'automap' command to remap the drives. This can be done in the ATTO Configuration Tool or the controller utilities (CTRL-Z).
- Check cable integrity. Check the cables for solid connections. Make sure they are snapped in. Inspect cable ends for bent pins.
- Try attaching SAS/SATA devices one at a time with different cables, adding drives and cables until the problem occurs. This will help pinpoint the device or cable causing the problem.
- Watch the LED indicators on the SAS/SATA devices before, during, and after startup. Drive lights should also flash at startup as the SAS/SATA bus is scanned. This may give a clue as to the root cause of the issue.
- If there is an Expander in the Array verify the following:
  - ➢ **Zoning**: Verify the Expander(s) are zoned properly so that the ExpressSAS Raid card and the SAS/SATA drives have access to one

another. If there are pre-existing zones setup, be sure to add the ExpressSAS Raid to the zone.

- ➤ **Port Visibility**: Verify the Expander can see the ExpressSAS Raid card on the port(s) in question. Refer to the Expanders manufacturer's guide for more detail on this step.
- ➤ **Speed Auto negotiation**: Verify the Expander is set to "Auto" negotiate transfer speed.

➔ **Errors are reported while trying to flash new firmware onto the SAS controller.**
  - The ATTO Configuration Tool performs validations on the structure of the file. If it does not pass these validations, the file is rejected. The image file may be corrupted. Try downloading the image file from the support section of the website again.
  - If this still does not work, check to see if there is a newer version ATTO Configuration Tool and driver. If so, make these updates first then try flashing the controller.

➔ **The SAS controller fails its Power On Self Test.**
  - The BIOS driver will perform several checks to verify that the controller is functioning. If the BIOS driver determines that the adapter has non-functioning hardware it will not complete the initialization of the OS driver. If the BIOS driver determines that the firmware on the adapter is not functioning, then it will complete the initialization in degraded mode. Under Windows, degraded mode will not perform I/O but it will allow the end user to flash the adapter with working firmware. The POST failure will be recorded in the Windows Event Log. Try to re-flash the firmware using the Configuration Tool in Windows. If the problem persists, replace the controller.

➔ **The software application being used to communicate with the attached SAS/SATA devices reports Parity or communication errors.**
  - Check your cables. There could be slight damage to one conductor causing intermittent failures.
  - Check drive status in the ATTO Configuration Tool to make sure no drives have faulted.
  - Check for new drivers and firmware. There may be an incompatibility between the Intel chip and certain hardware. There are fixes with each new driver and firmware release.
  - If the issue is not resolved, enable the Event logs as described below and contact ATTO Technical Support.

➔ **Errors are reported while using the ATTO Configuration Tool.**

Note: Sometimes when using the ATTO Configuration Tool, an error message describing an unexpected event or incorrect information discovered by the application will be displayed.

▪ Use the help text presented with the error message to correct the issue.

The following conditions cause a warning or error message to be posted in the "Status" area of the configuration utility. These messages will be shown in red.

➢ ***An error occurred loading NVRAM data*** - The first time a controller channel is highlighted, the application makes an attempt to read NVRAM from the controller. If the size of the NVRAM buffer does not match the expected size, or if the NVRAM buffer couldn't be retrieved at all, this message is displayed.

➢ ***Warning: NVRAM could not be read***, *defaults returned* - This message occurs as a result of corrupt NVRAM. When the driver accesses the NVRAM, a continuity check is performed on the NVRAM to ensure the returned data is valid. If this check fails, the driver has no other alternative than to return a known NVRAM data buffer that represents controller defaults. When this situation occurs the defaults are presented via the graphical user interface and the user is informed that the values shown are defaults. These defaults must be committed in order to correct the state of the NVRAM.

➢ ***An error occurred updating the NVRAM*** - This message occurs during a committal of NVRAM to the controller. If the driver is unable to put the new settings on the controller, this message is displayed to the user and no changes are made to the controller.

➢ ***This is not a flash file, or it is corrupt*** – Checks are performed to assure the proper file has been selected for flashing to the specific model of controller.

B.) Error Log Capabilities

The ATTO ExpressSAS Raid driver logs all failure related information to an event log. The user can control the classification of events that are recorded via a registry setting for Windows.

The driver records events broken into the following classifications.
• FATAL Records various fatal situations within the driver and controller.
• SAS   Records SAS errors as reported by the controller.

- ISP   Records errors as reported by the FW of the controller.
- LOOP   Records event notifications as reported by the FW.
- INFO   Records events related to the starting and restarting of the driver.

We recommend Event Logging only be active for troubleshooting purposes as performance will be affected. Also, when in this mode of operation, all flags be enabled.

To enable the advanced event logging features of the ATTO ExpressSAS Raid controller in a *Windows* environment, please do the following:

- Click **"Start"** and **"Run"**.
- Type **"regedit"** to start the registry editor.
- Follow the tree structure to : **\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\\esasraid\Parameters\ATTO**
- Right-click the right hand pane and select "**New**" to create a new registry key.
- Select "**DWORD Value".**
- Type "**EventLogMask**".
- Double-click "**EventLogMask"** and enter the value of "**FFFFFFFF**" (8 F's).
- Reboot your computer.

Advanced event logging is now enabled. To retrieve the log to provide to support personnel please do the following:

- Go to "**Computer Management**".
- Select "**Event Viewer**"
- Select "**System**"
- Save the file by clicking "**Action**" and "**Save Log File as**" [filename].
- This "[**Filename**]" is what you need to provide to support personnel.

Once you have provided the log and your issue is resolved you may delete the registry key by doing the following:
- Click **"Start"** and **"Run"**.
- Type **"regedit"** to start the registry editor.
- Follow the tree structure to : **\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\\esasraid\Parameters\ATTO**
- Highlight "**EventLogMask**", right-click and select "**delete**".

NOTE: be careful to only select this key as deleting other keys could harm your computer.

C.) Escalating issues to Tech Support.

When an error is encountered, please insure you have an answer to each of the following questions when reporting it as an issue:

QUESTION	ANSWERED
1. Computer Model:	
2. Operating System:	
3. OS Patch Level:	
4. PCI slot # and type:	
5. ATTO driver version:	
6. ATTO firmware revision:	
7. List all of the devices attached to the ATTO HBA. Include the manufacturer and model number for each device:	
8. Did it ever work? Is this a new error that just started happening, or is this an error that has been around since the first use.	
9. Does it happen when you try it with a second controller (if possible)? For example, swap out one controller for another and see if error still occurs.	
10. Is the latest firmware and driver being used?	
11. Is the device in default mode? Are there settings that have been adjusted that may be causing the problem? Do settings need to be adjusted to allow the device to function properly?	
12. How duplicable is the error? Does the error occur sporadically/randomly, or can it be reproduced each and every time?	
13. If the system was working previously, what changed about the configuration?	