ATTO

ATTO Technology, Inc.

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ATTO ThunderLink FC
Thunderbolt™ to Fibre Channel
Troubleshooting Guide

OVERVIEW

This document describes troubleshooting techniques that can be used to identify and resolve issues associated with the ATTO ThunderLink FC.

Before continuing with this guide, verify that the latest host adapter driver and flash bundle are installed for your operating system. If you are experiencing an interoperability or protocol issue, chances are that other users have already reported the same thing. ATTO releases driver and flash bundle updates numerous times a year and there is a good chance your issue has already been resolved. The latest drivers can be obtained from the "Driver Download" section of the ATTO web site.

Also verify that you are using the latest versions of third party applications and storage devices. In addition to the steps listed below, we highly recommend you explore the following additional technical resources:

- Read the information posted in the support section of the ATTO web site [www.attotech.com/support]. The known issues and workarounds are listed.

- The known issues section of the Product Release Notes document may also be helpful in identifying a potential issue. Product Release Notes can be obtained in the "Driver Download" section of the ATTO web site.

- The "Installation and Operations Manual" explains proper techniques and tips used for installation, operation, and configuration of the ThunderLink FC. The "Utilities Manual" explains how to configure and tune your ThunderLink FC for optimal performance in given configurations. It also explains how the ATTO "ConfigTool" management GUI can be used to monitor operation of the ThunderLink FC and the connections to your storage targets. Both of these manuals can be found in the support section of the ATTO web site.

ATTO spends a great deal of time testing third party applications and products. This testing ensures that each supported configuration performs as indicated and operates successfully. Interoperability matrices are available in the support section of the ATTO web site. While these are not all inclusive, the listed products are a good baseline for assuring that they have been tested and should work in your system. Storage and system providers' web sites are the best sources for detailed configuration information including hardware and firmware/drivers/software for each component supported.

The ATTO ConfigTool is a great utility that can be used to monitor the connections between your ThunderLink FC and your storage. It will list and provide details on each connected device

the host adapter sees. It will also allow you to configure the ThunderLink FC for specific modes of operation. However, changing these settings can have adverse effects. ATTO recommends you leave the settings at their default values unless instructed to change them by an ATTO Technical Support representative or you have advanced knowledge of the Thunderbolt™ and Fibre Channel protocols.

TROUBLESHOOTING TECHNIQUES

There are a few categories that failures can be placed in:

- Hardware: A component completely or intermittently fails.

- Interoperability: One or more devices in the system interpret the protocol specification different than the others resulting in undesirable behavior.

- Design: There is an error in the implementation of the software or firmware that prevents or limits functionality.

- User Error: The system is unable to achieve expected behavior due to improper installation or configuration or the desired behavior is simply not achievable due to unrealistic expectations.

Troubleshooting steps need to be taken to isolate hardware failures and user errors, which can easily be remedied by replacing a piece of hardware or changing something, from interoperability or design errors which could require code changes and take considerable time to resolve.

The some of the most common problems that most installations are:

1) My operating system hangs, does not boot, crashes, or does not see the ATTO ThunderLink FC.
2) My ATTO ThunderLink FC cannot find the FC Storage volumes.

Unfortunately, these common problems can be caused by myriad of common installation mistakes/problems or combination of several problems.

Some of the following techniques may seem simplistic or overly obvious, but these are the ones that are commonly overlooked and can take several hours of frustration to locate. It is important to try only one technique at a time. While changing multiple variables may seem to be a time saver, it usually complicates the troubleshooting process. The goal is to observe the issue and systematically isolate it to identify the least common factors that cause it to occur. If the problem goes away, there is no sure way of knowing what actually resolved it. If the

problem does re-occur, you may have actually fixed it with one change, but another change may have caused a similar symptom.
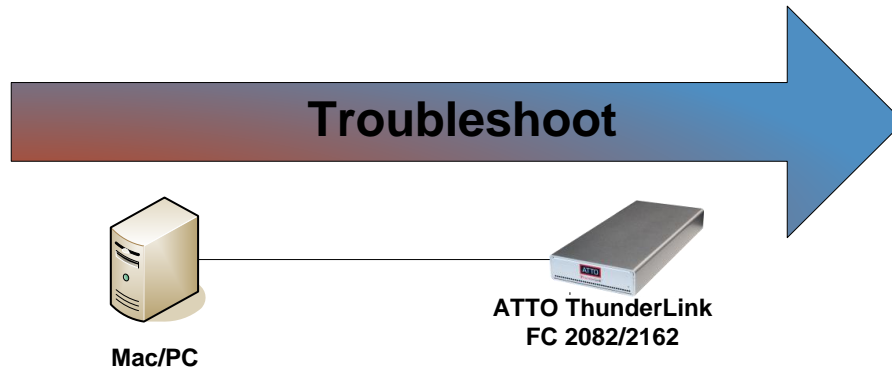
OBSERVATIONS

Take a step back and think about what is being observed. Ask the following questions:

- Has the configuration been working and all of a sudden now fails? If you can absolutely assure that nothing has changed, the issue is most likely due to a hardware failure. However, there are some very subtle changes that could have been made (maybe by a colleague) that could affect overall system behavior. What has changed? Has the switch or storage firmware been upgraded? Has something been added or taken away? Even something as seemingly innocuous as an upgrade to disk drive firmware in a RAID storage system can have unexpected effects.

- What is the observed behavior compared to the expected behavior? When reporting an issue to ATTO, try to observe and report the overall "high level" problem as well as the details. For example, an overall problem may be that drives disappear during heavy I/O. The details would include if the ThunderLink FC reported or logged an error when this occurred. Providing enough detail is important towards achieving a quick resolution.

- Is the problem repeatable? If yes, can it be repeated on a non-production test system? Collecting information such as system error logs is often needed. Since production systems are not generally set up to collect this information in normal operation, it is important to be able to configure the system to collect data and recreate the problem on a non-production test system.

- What do the status LEDs indicate? Check the ThunderLink FC LEDs to determine the status. Refer to the appropriate product manuals to gain an understanding of what the LEDs indicate, but they are usually a good source of information towards identifying root cause.

PROBLEM ISOLATION

Once the problem is observed, attempt to determine where the problem originates. Begin by eliminating problem sources at a high level. Is it the computer, network or the storage? If the network and storage can be eliminated, only the computer and its components need to be examined.

Problem #1: My operating system hangs, does not boot, crashes, or does not see the ATTO ThunderLink FC

Host:

1) Try reseating the Thunderbolt™ cable to the host. The ThunderLink FC can take up to 30 seconds to become ready. On some earlier iMacs with Thunderbolt™ connections, you can accidentally plug the cable upside down. Verify that you plug the cable in correctly.
2) Try plugging the Thunderbolt™ cable into another Thunderbolt™ port on host if available.
3) Try using a different Thunderbolt™ cable.
4) Verify that your host has the latest system updates (BIOS, EFI, firmware, OS, etc).
5) Remove any other Thunderbolt™ devices from the system and see if the ThunderLink FC is found.
    a. If this works, you could have a bad cable.
    b. Alternatively, if the ThunderLink FC was not the first in the chain, the device ahead of it may be the cause of the issue.
6) Make sure you have the latest driver for the ThunderLink FC installed.
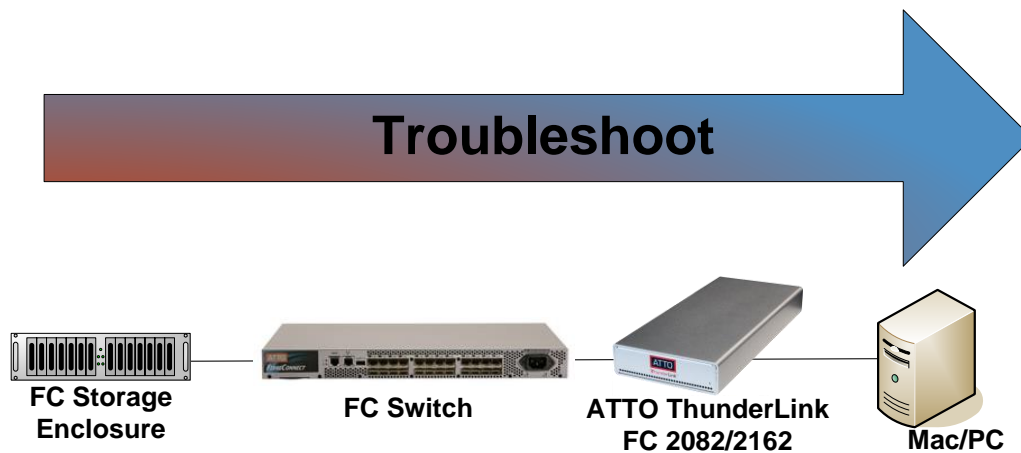
ATTO ThunderLink FC:

1) Try reseating the Thunderbolt™ cable to the ThunderLink FC. The ThunderLink FC can take up to 30 seconds to become ready.
2) Try plugging the Thunderbolt™ cable into the other Thunderbolt™ port on the ThunderLink FC.
3) Try using a different Thunderbolt™ cable.
4) Verify that the ThunderLink FC power supply is plugged into the unit properly. Verify the power LED is illuminated.
5) Try disconnecting all Fibre Channel devices from the ThunderLink FC and see it will boot.
    a. If the host now sees the ATTO ThunderLink FC or no longer freezes, try replacing the Fibre Channel cables.

b. If the host still does not see the ATTO ThunderLink FC, verify that the ThunderLink FC is using the latest firmware and driver.

6) Windows users only: Some older ATTO ThunderLink FC units may lack a certain bit set that tells the Windows host that the device is certified for Windows. Some PC manufacturers choose to ignore this bit and some do not. Check with your PC manufacturer for a possible work-around for this problem.

If you are still experiencing problems, see Appendix A to collect some logs and then contact Tech Support.

Problem #2: My ATTO ThunderLink FC cannot find the Fibre Channel Storage volumes.

When troubleshooting this kind of problem, the best approach is to troubleshoot the inside-out method.

You begin with the device(s) connected to the ThunderLink FC first and work your way out:

Hint: Take notice as to which drive or drives are not detected.
- Is it one drive?
- Is it a few drives, but they all seem to be associated with a specific cable, ThunderLink port, or part of the drive enclosure?

Fibre Channel Storage Enclosure:
1) **Check cable integrity**: Cables are the number one cause of problem in any Fibre Channel system. Cables that work with one device may not necessarily work with all devices. Check the cables for solid connections.
2) **Check SFPs:** Intermittent SFPs can be the cause of numerous issues from not always detecting connected devices to inconsistent performance. Verify the SFP is rated for the

speed of the devices.

3) **Power**: Make sure that the enclosure has the necessary power cabling and connections. Also a cause for drives not appearing can be insufficient or dirty power conditions. If the enclosure is connected to a UPS, try connecting it directly to an outlet instead. Also if the enclosure is sharing the circuit with many other devices, try placing the enclosure on its own circuit.

4) **External Fibre Channel Connectors:** Make sure the Fibre Channel Ports on the enclosure are in good condition.

5) **Fibre Channel Connector LEDs:** Many enclosures will have an LED on the Fibre Channel Ports to indicate if the links are up or not. If the LED does not light up, this may indicate a bad Fibre Channel cable.

6) **Enclosure Services:** Many enclosures will report fan speed, enclosure temperature, power levels, etc using an SES processor. Please refer to your Storage vendor's documentation to check these parameters.

7) **Host Mapping**: Verify that the specified Storage Volumes are created and are available. Many Storage arrays require the Storage volume mapped to a specific Host, usually using the ThunderLink FC World Wide Node Name and/or World Wide Port Name. Check with Storage vendor for further details.

Fibre Channel Switch

1) First see if the FC ports are up and running. You can check the LEDs on the switch port for link up. If the link is down, check the following:

    a. Date Rate Mismatch: Verify the Fibre Channel data rate of the switch port the ThunderLink FC is plugged into is set to Auto. This should provide a link at the fastest possible speed. If the switch and the ThunderLink are both set to auto and the link is still not working, try forcing both to same data rate (ex 16Gbps). If this fails, try a lower data rate for both the ThunderLink and switch port.

    b. Connection topology: Verify that the ThunderLink switch port is configured as an N-Port or an F-Port.

    c. SFP: Verify that the SFP in the switch and the SFP in the ThunderLink is attached to are using SFPs that are rated for the desired speed.

2) Verify if the switch has Zoning enable. If it is, verify that the ThunderLink FC and the appropriate Fibre Channel storage devices are in the same zone. Please refer to Fibre Channel switch vendor's zoning documentation for further details.

ATTO ThunderLink FC:

1) First see if the Fibre Channel ports are up and running. You can check the LEDs on the ThunderLink FC for link up. If the link is down, check the following:

a. Date Rate Mismatch: Verify the Fibre Channel data rate of the target or switch port the ThunderLink FC is plugged into is set to Auto. This should provide a link at the fastest possible speed. If the switch and the ThunderLink are both set to auto and the link is still not working, try forcing both to same data rate (ex 16Gbps). If this fails, try a lower data rate for both the ThunderLink and switch port.

b. Connection topology: Verify that the target or switch port is configured as an N-Port or an F-Port.

c. SFP: Verify that the SFP in the switch or target and the SFP in the ThunderLink FC are rated for the desired speed.

3) Trying reseating cables into the ATTO ThunderLink FC.

4) If you have a dual channel ATTO ThunderLink FC, try swapping the cables around and see if the problem moves to the new connection. If it does, then the problem is most likely a cable problem. If it does not, you could have a bad Fibre Channel port or SFP on the ThunderLink FC.

5) Replace the cable.

6) Replace the SFP.

Host:

1) Try reseating the Thunderbolt™ cable to the host. The ThunderLink FC can take up to 30 seconds to become ready. On some earlier iMacs with Thunderbolt™ connections, you can accidentally plug the cable upside down. Verify that you plug the cable in correctly.

2) Try plugging the Thunderbolt™ cable into another Thunderbolt™ port on host if available.

3) Try using a different Thunderbolt™ cable.

4) Verify that your host has the latest system updates (BIOS, EFI, firmware, OS, etc).

5) Remove any other Thunderbolt™ devices from the system and see if the ThunderLink FC is found.

a. If this works, you could have a bad cable.

b. Alternatively, if the ThunderLink FC was not the first in the chain, the device ahead of it may be the cause of the issue.

6) Make sure you have the latest driver for the ThunderLink FC installed.

If you are still experiencing problems, see Appendix A to collect some logs and then contact Tech Support.

APPENDIX A CONTACTING SUPPORT:

When you run into a situation where you cannot resolve the issue, please collect the following information, as if possible, before contacting Tech Support.

How to Gather Diagnostic Logs Used For Troubleshooting

These diagnostic logs can be useful when troubleshooting issues and will often be requested by ATTO Technical Support. There are two methods to collect the logs. The easiest is to use the ATTO ConfigTool to gathers events and other useful informational messages to a single archive. The logs can be collected with the one-button diagnostics menu item. It is recommended to install the ATTO ConfigTool service during the initial installation of the ATTO product to ensure that ATTO event logging is running and captures critical data at the time a failure occurs.

For headless systems, a script can be used instead of the ConfigTool to gather the logs.

1.0 - ATTO ConfigTool Download
The ATTO ConfigTool is a free utility available via the ATTO website. This application supports a variety of operating systems. Please visit the ATTO website for specific operating system support information and downloads.

2.0 - Using the ATTO ConfigTool with Both GUI and ConfigTool Service (Windows, macOS, and Linux)
Install the ConfigTool - Follow these installation instructions to install the full version of the ATTO ConfigTool to include the GUI and service
1. Launch the ATTO ConfigTool Installer
   - Windows - Run the ConfigTool_4xx.exe
   - Mac OS X – Mount the osx_app_configtool_4xx.dmg image and run the ConfigTool_4xx file
   - Linux – Extract the lnx_app_configtool_4xx.tgz package and run the ConfigTool_4xx.bin
2. Select FULL installation
3. Follow the on-screen instructions

   Note: Oracle® Java version 1.5 or later is required to use the ATTO ConfigTool. Visit http://java.com for the latest Java updates for Linux and Windows. The latest Java runtime for Mac OS X can be obtained through Software Update.

Gather the logs with the ConfigTool GUI - *After the installation process simply open the ConfigTool and select **Help, Run Diagnostics.** Then choose a place to save the file output. It may take several minutes to gather the logs. See Figure 3 below.*
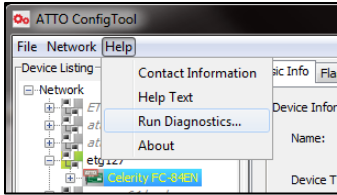
Figure 3 - Run Diagnostics generates an extensive log to aid in troubleshooting.

If troubleshooting a problem where host is freezing, crashing, or the ThunderLink FC is not seen, try and get the system back to a known good state. This may require you removing the ATTO ThunderLink. Once back to a known good state, run steps 1 to 5 above to collect the logs.

CONTACT INFORMATION

You may receive customer service, sales information, and technical support by phone Monday through Friday, 8:00 am to 6:00 pm Eastern Standard Time, or by email and web site contact form.

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