

# Application Note

January 2016

## Install and Configure ATTO ThunderLink Bridge on Mac OS X for NEO Libraries



## Summary

This application note describes how to install the ATTO ThunderLink (SAS&FC) Bridge driver and ATTO ConfigTool on Mac (10.10.3). To discover NEO devices on Mac with a Thunderbolt connection, the ATTO ThunderLink device drivers must be installed.

## About This Document

Use the following information as a reference when implementing NEO tape libraries with ATTO ThunderLink Bridges on Mac OS X systems. This document describes in detail what Thunderbolt and ATTO ThunderLink Bridges are as well as how to install the ATTO supporting drivers and utilities. The driver installation is similar on the ATTO bridge product regardless of the interface type. The steps to install the driver for the ATTO ThunderLink FC Bridge FC2082 are the same as the SAS SH2068, only the filenames differ. The product references used in this document are the NEOs StorageLoader and the ATTO ThunderLink FC2082 Bridge; however, there are references to both products throughout this document. Refer to the [Troubleshooting](#) section of this document for resolutions to different issues you may encounter.

## About Thunderbolt Interface

On Mac systems, Thunderbolt provides two channels on the same connector that is capable of 10Gb/s throughput both directions. This is 40 times faster than USB2, twice the speed of USB 3 and 25 times faster than FireWire. Thunderbolt is used for high-end or high-performance Storage Subsystem, which is ideal with the NEO tape library products.




**NOTE:** Thunderbolt connectivity to a NEO tape library using an ATTO ThunderLink Bridge is limited to the type of Apple Mac configuration. Some older Mac systems have an interface that will look like a Thunderbolt but in reality, it is a Mini Display Port, which is the same type of connector but passive. The difference is that a true Thunderbolt interface can provide power to a Thunderbolt device, which is active instead of passive.

Additional information under the topic *Which Macs have Thunderbolt Ports* section can be found here:

<https://support.apple.com/en-us/HT204154>

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 **CAUTION:** Connecting a NEO tape library to an unsupported Mac configuration can result in an inability to discover any of the tape library devices on the Mac system.

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## About ATTO ThunderLink SH 2068

This bridge acts as an external Thunderbolt to SAS/SATA adapter, connecting all-in-one systems and laptops to a 6 Gb/s SAS/SATA storage devices. The SH 2068 provides Mac OS systems the capability to use the Thunderbolt interface and attach to as a SAS alternative interface to any Overland Storage NEO tape library products.



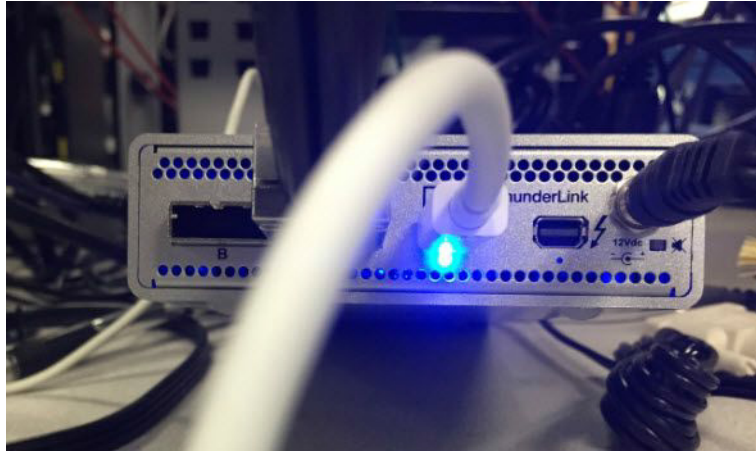
Additional information on the ThunderLink SH2068 can be found here.

<https://www.attotech.com/products/thunderbolt-desklink-devices/ThunderLink/thunderbolt-2-to-6gb-sas-sata/TLSH-2068-D00>

### SAS Specifications

- Up to 1375 MB/s maximum throughput
- Dual 20 Gb Thunderbolt with Display Port and device daisy-chain support
- Thunderbolt line speed performance
- SAS 2.0, SAS, SATA and SATA II support
- Supports up to 128 drives
- Thunderbolt certified for Mac and PC
- Support for Linux® operating systems when Thunderbolt-enabled systems become available)
- Exclusive Advanced Data Streaming (ADS™) Technology
- ATTO Config Tool, a Graphical User Interface, for customized performance settings
- Proven interoperability with support for leading storage hardware & software vendors
- 3-year standard product warranty
- RoHS Compliant

The following image shows the cable connection of a Thunderbolt cable and SAS cable to an ATTO ThunderLink SH2068.



### About ATTO ThunderLink FC 2082

This bridge acts as an external **Thunderbolt 2 to Fibre Channel adapter**, connecting all-in-one systems and laptops to 8Gb/s Fibre Channel storage devices. With dual channel configurations, the 8Gb/s Fibre Channel Desklink Device is an ideal solution for users looking to achieve the highest I/O and data throughput for advanced video and access to IT applications. ThunderLink 8Gb/s Desklink Devices offer driver support for Mac OS X 10.9 or later when Thunderbolt-enabled systems become available), providing a single connectivity solution for customers with heterogeneous operating system environments.



Additional information on the ThunderLink FC2082 can be found here:

<https://www.attotech.com/products/thunderbolt-desklink-devices/ThunderLink/thunderbolt-2-to-8gb-fibre-channel/TLFC-2082-D00>

#### Fibre Channel Specifications:

- Up to 1600MB/s maximum throughput
- Dual 20Gb Thunderbolt 2 with Display Port and device daisy-chain support
- Exclusive Advanced Data Streaming (ADS™) Technology
- Auto Negotiation to 8Gb and 4Gb devices
- Pluggable optical SFP+ LC modules included
- ATTO Config Tool, a Graphical User Interface, for customized performance settings
- 3-year standard product warranty
- RoHS compliant

The following image shows the cable connection of a Thunderbolt cable and SAS cable to an ATTO ThunderLink FC2082.



## Required Information, Tools and Files

Before you begin these procedures, the following information, tools and files are required.

### Prerequisites

- This document assumes the installer is familiar with Mac OS X.
- This document assumes the NEO tape library is connected and powered on. Additional information on setup can be found in the NEO Quick Installation or User Guide.
- This document assumes that the Mac system meets the bare minimum requirement to support the ATTO ThunderLink Bridge products.
- This document assumes the installer has read all ATTO ThunderLink Bridge documentation and is familiar with the products and processes required for the implementation.
- All ATTO software, which includes ATTO ThunderLink Drivers and Utilities, are found on ATTO's website.  
<https://www.attotech.com/register/?FROM=http://www.attotech.com/downloads.php>
- Java is a required in order to install the ATTO ConfigTool.

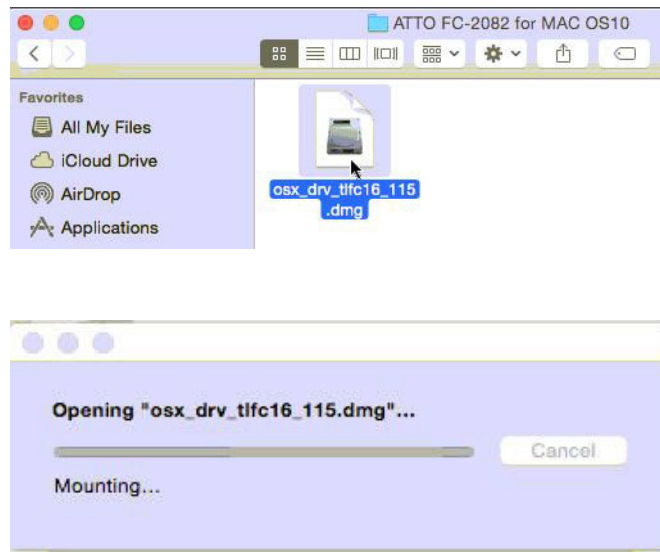
## Versions

The test environment uses the following versions:

- NEOs StorageLoader firmware v5.00 / 2.50n
- NEOxl 60, NEOxl 80 firmware v2.00
- NEOs T24, NEOs T48 firmware v5.00 / 3.20
- IBM ULTRIUM–HH6 FC firmware vD8E5
- IBM ULTRIUM–HH6 SAS firmware vE6R3
- ATTO ThunderLink SH 2068 driver version 1.2.0
- ATTO ThunderLink FC 2082 driver version 1.1.5
- ATTO ConfigTool version 4.20
- Mac Version 10.10.3

## Download and Extract ATTO ThunderLink Drivers

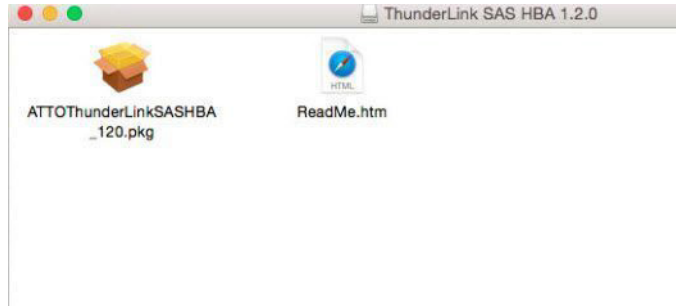
1. Download ATTO ThunderLink drivers from the Attotech Web Portal.  
<https://www.attotech.com/register/?FROM=http://www.attotech.com/downloads.php>
2. Double-click and extract the **dmg** package file.



This example shows a Fibre Channel ThunderLink FC2082 driver.



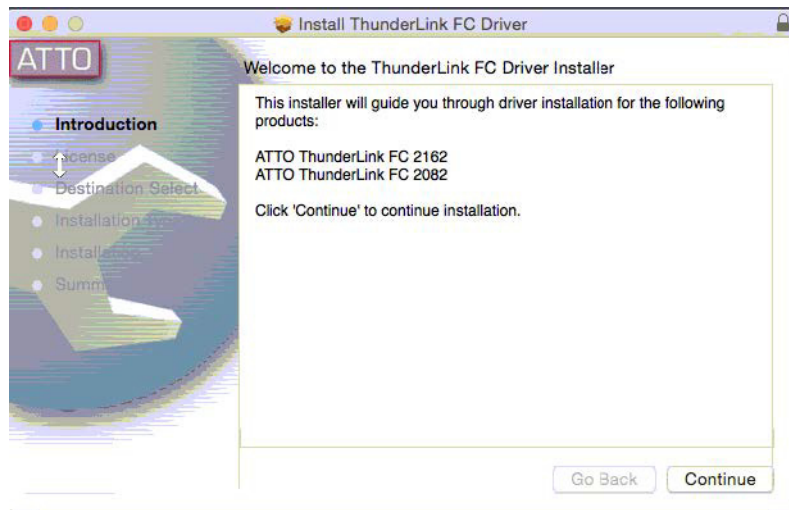
This example shows a SAS ThunderLink SH2068 driver.



## ATTO ThunderLink Driver Installation Procedure

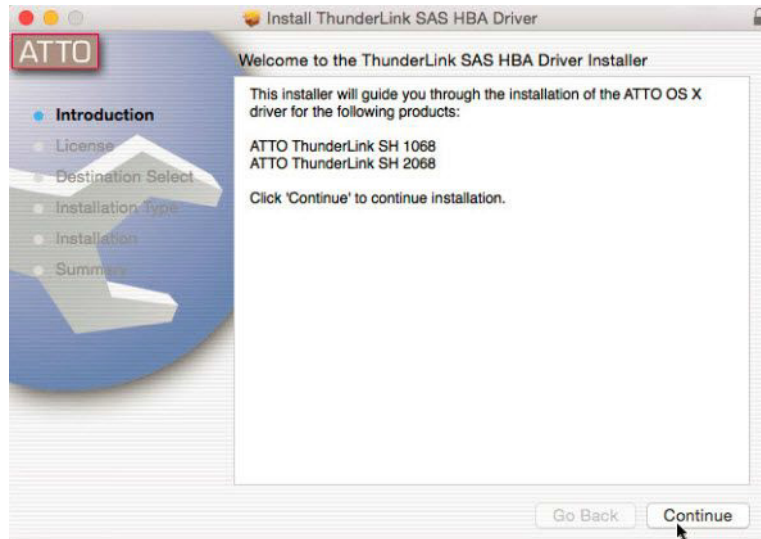
1. Double-click the package to start the install wizard.
2. Click **Continue**.

This example shows a Fibre Channel ThunderLink FC2082 driver wizard.

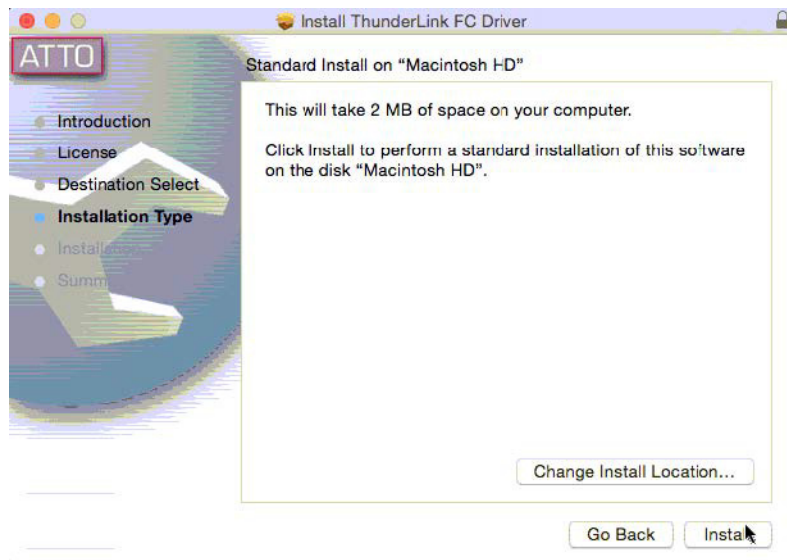




This example shows a SAS ThunderLink SH2068 driver wizard.

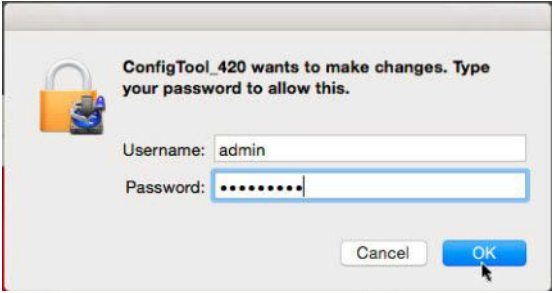


3. When the Software License Agreement appears, select **Continue**.
4. Click **Agree** to continue the installation.
5. Click **Install** to start the installation.



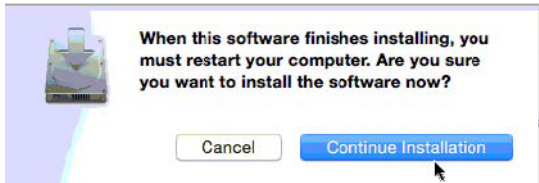


6. Provide the admin password and click **Install Software**.

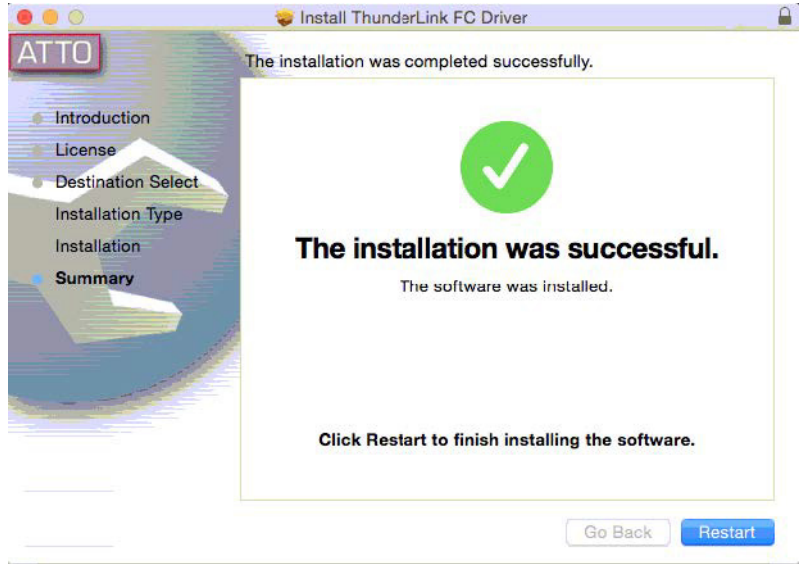


7. Click **Continue Installation**.

**NOTE:** You will be prompted to restart the computer after finishing the software installation.

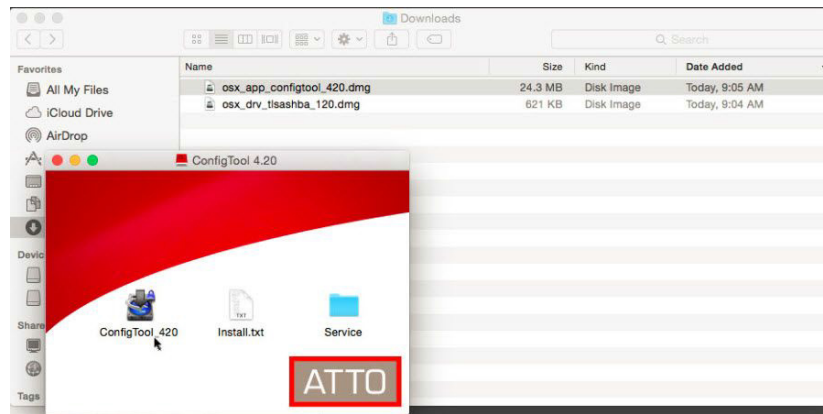


8. Click **Restart** after completion of the installation.



# ATTO ConfigTool Installation Procedure

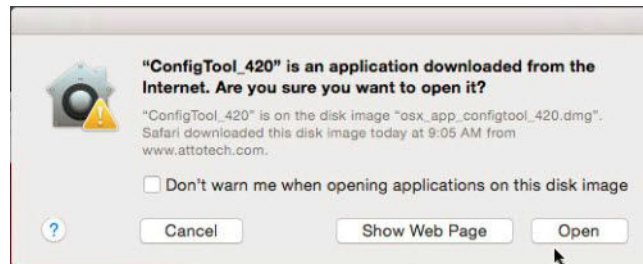
1. Double-click the ATTO ConfigTool **dmg** file.



2. When the following Java SE dialog window appears, click **More Info**. Java is required to install ATTO ConfigTool.

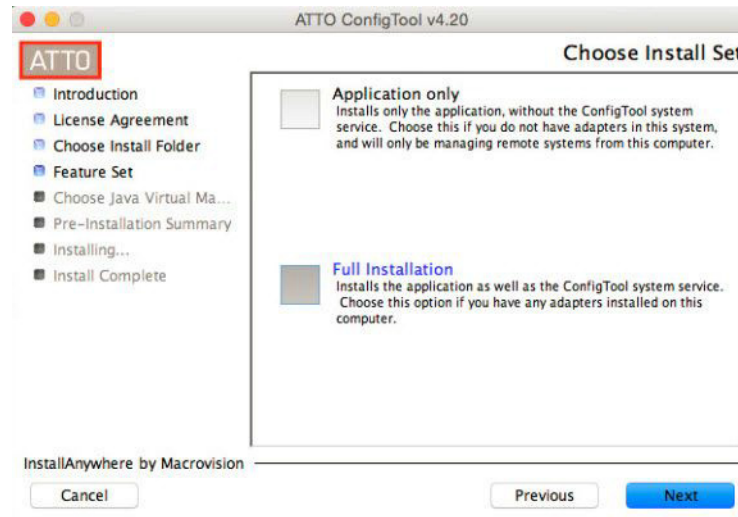


3. Repeat previous [Step 1](#) after Java has been installed. When the following dialog window appears, click **Open**.

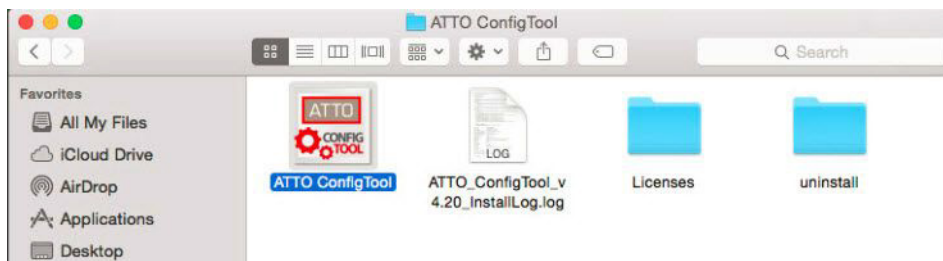


4. Enter the credentials when asked and click **OK**.
5. Review the introduction and click **Next**.
6. Review the license agreement and click **Next**.
7. Choose the installation folder and click **Next**.

8. Select either **Full Installation** or **Application Only** and click **Next**. The example shows the default of **Full Installation**.



9. When the installation summary appears, click **Next**.
10. When the Install Complete appears, click **Done**.
11. To access the ATTO ConfigTool, select **Go Applications > ATTO ConfigTool**.

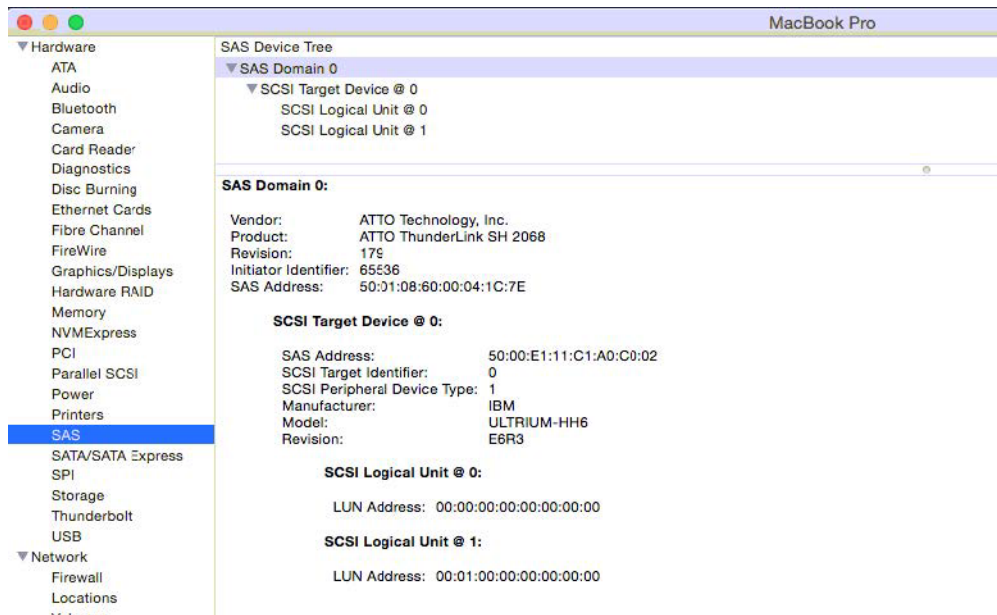


## Verifying the NEO Tape Library on Mac

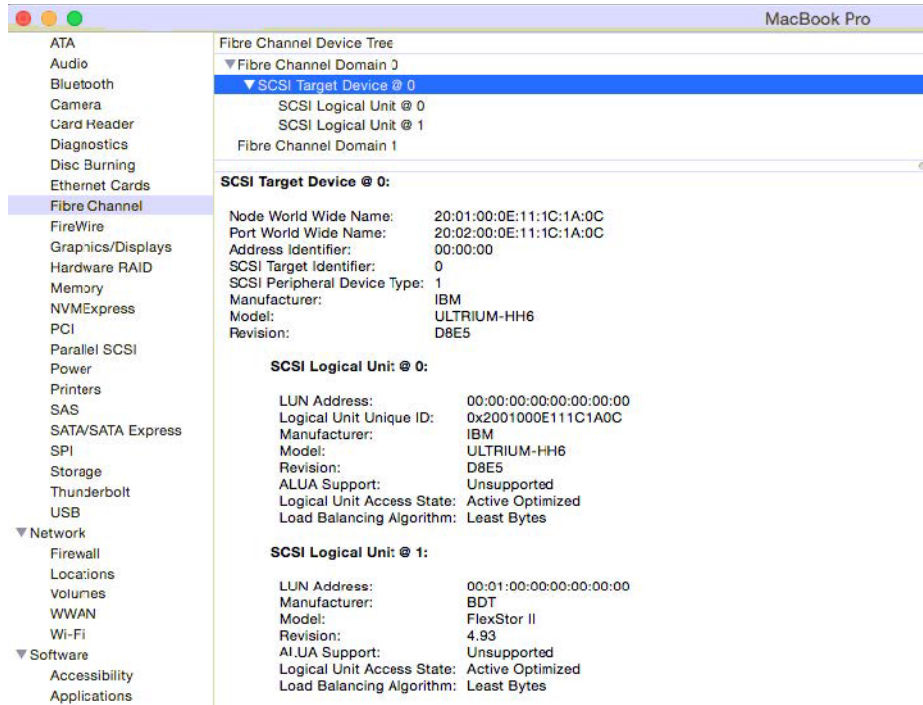
There are several ways to verify the NEO tape library on Mac OS natively or using ATTO utility such as ConfigTool. Native Mac OS tools are **System Profiler | Hardware** or use of the **ioreg** command line interface.

### Verifying NEO devices with System Profiler | Hardware

1. Navigate to System Profiler. Verify the devices from the SAS Hardware as shown below. The following image shows a NEO with one IBM LTO-6 SAS tape drive connected to ATTO SH2068 SAS Bridge.

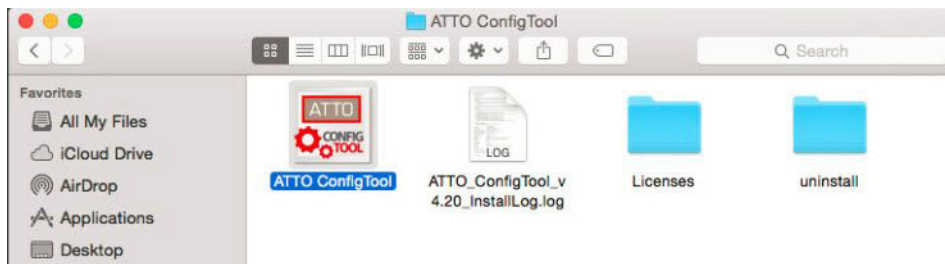


- Verify the devices from the FC Hardware as shown below. The following image shows a NEO with an IBM LTO-6 FC tape drive attached to an ATTO FC2082.

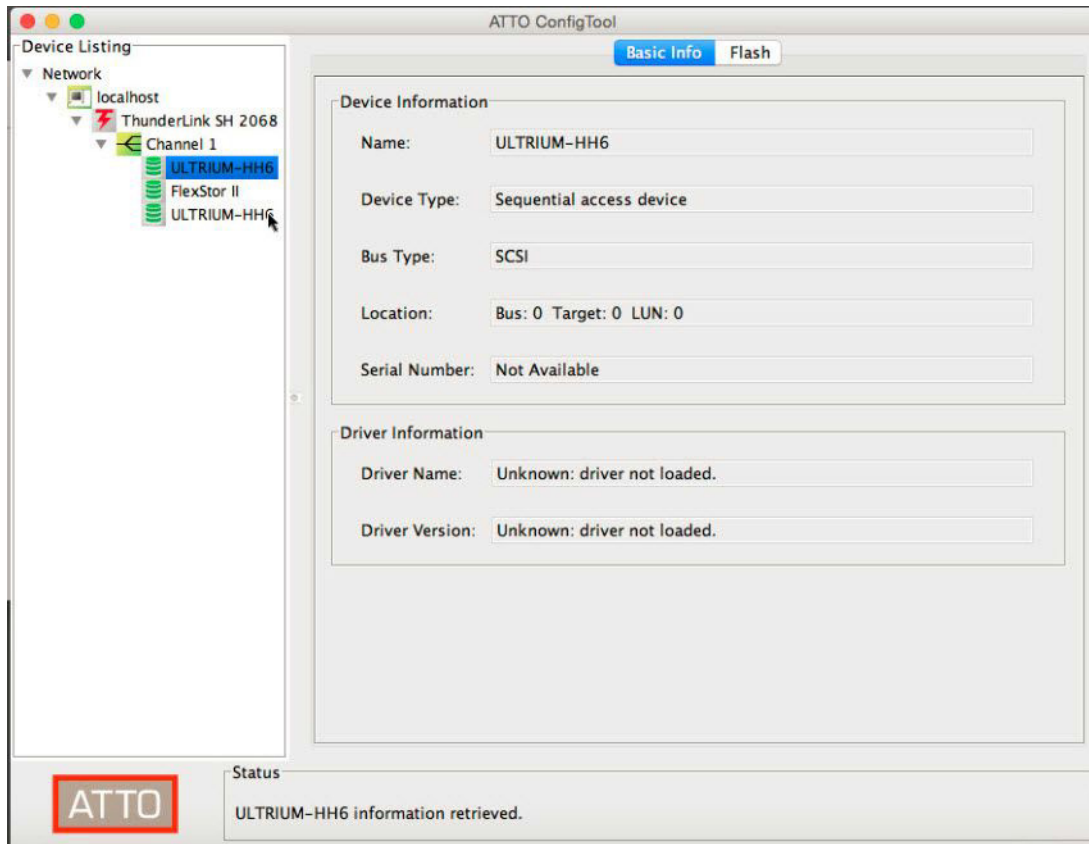


## Verifying NEO devices with ATTO ConfigTool

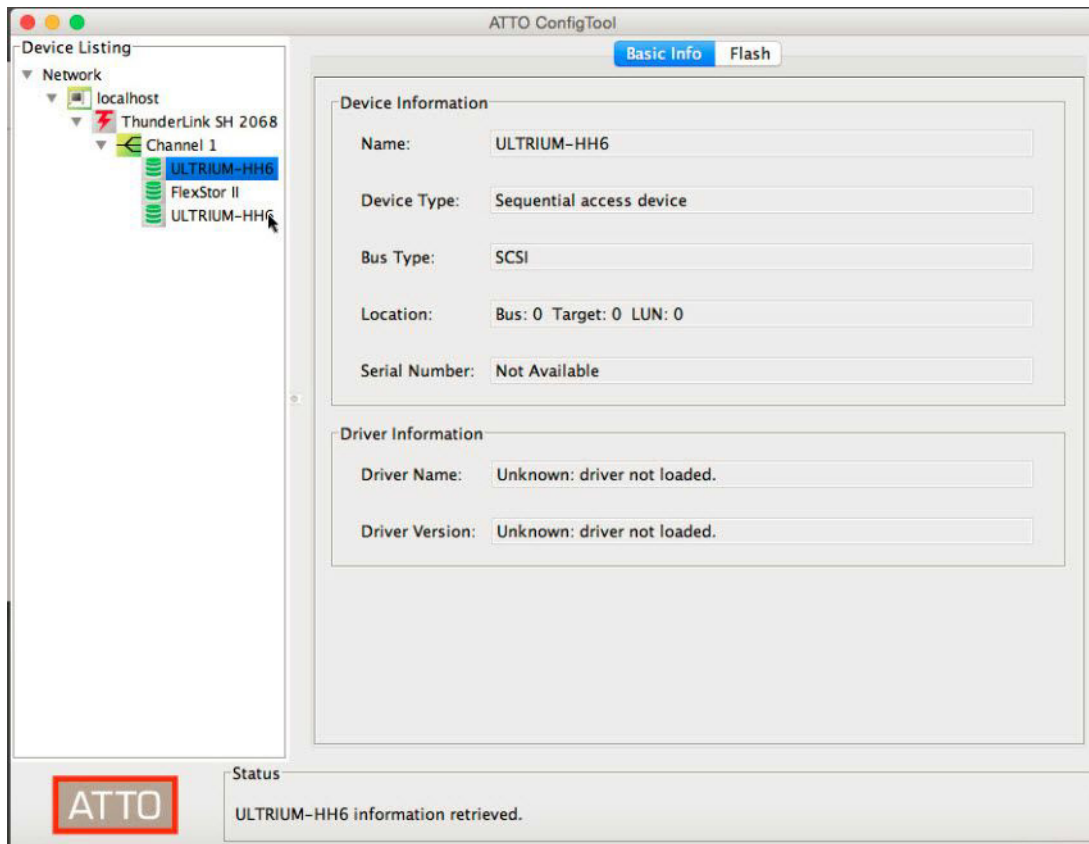
- Navigate to **Go > Applications** and select **ATTO ConfigTool**.



2. Browse the **localhost** and navigate down to the ThunderLink device. The following shows the SAS SH2068 with a NEOs tape library and drive attached. There are additional options when the Channel and NVRAM is open. The default configuration is the recommendation.

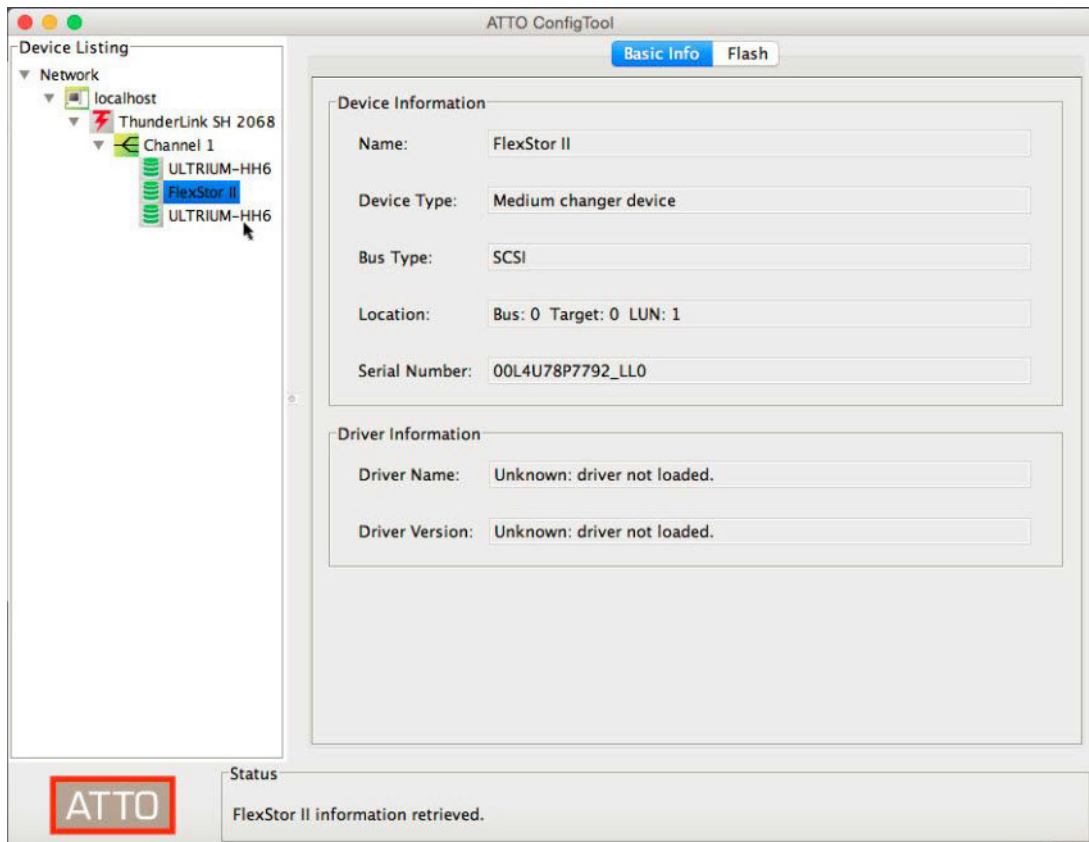


This example shows a two drive NEOs with the details of the tape drive selected.

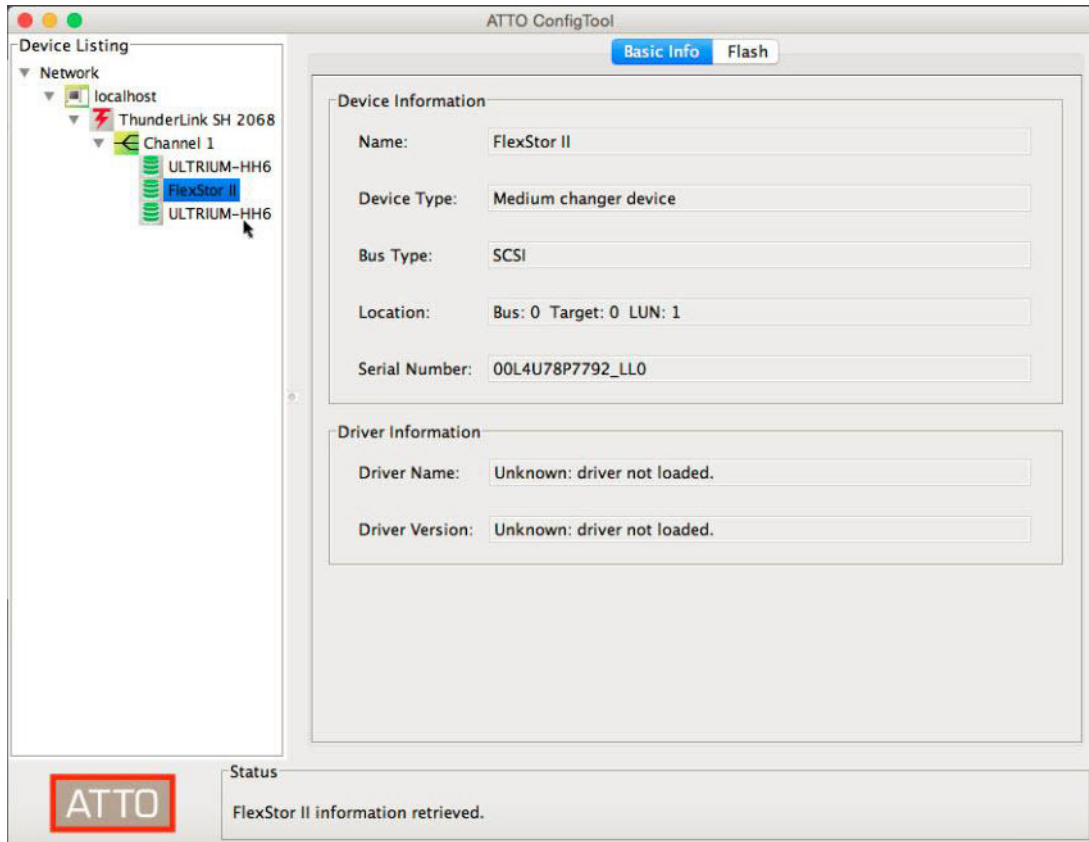




This example shows a two drive NEOs with the details of the library selected.



This example shows a NEOs library attached to an ATTO ThunderLink FC2082.





The following `ioreg` output depicts a IBM LTO-6 ULTRIUM-HH6 Tape Drive in the NEOs StorageLoader.

```

| | | | | IIOCSITargetDevice <class IOCSITargetDevice, id 0x100002f5, registered, matched, active, busy 0 (1 ms), retain 13>
| | | | | {
| | | | |   "Product Revisor Level" = "E6R3"
| | | | |   "Peripheral Device Type" = 1
| | | | |   "Vendor Identification" = "IBM"
| | | | |   "INQUIRY Device Identification" = ({Identifier Type=1, Code Set=2, Identifier="IBM ULTRIUM-HH6 11C1A400B5", As
| | | | |   Identifier="5000e11148c6001", Association=0}, {Identifier Type=4, Code Set=1, Identifier="00000001", Association=1}, {Identif
| | | | |   0002, Association=1}, {Identifier Type=3, Code Set=1, Identifier="5000e11148c6001", Association=2})
| | | | |   "Product Identification" = "ULTRIUM-HH6"
| | | | |   "INQUIRY Unit Serial Number" = "11C1A400B5"
| | | | |   "Protocol Characteristics" = {Write Time Out Duration=30000, Read Time Out Duration=30000, Physical Interconnect="SAS"
| | | | |   Location="External", Multiple Initiators="True", SAS Address="5000e11148c6002", SCSI Domain Identifier=0, Unique SCSI Port Id

```

## Troubleshooting

Use the following section to help troubleshoot any device discovery related common issues.

### I am unable to discover NEO devices using ioreg.

1. For Mac OS 10.10 or higher, use the following `ioreg` command with certain key words and parameters:

```

ioreg -l | grep FlexStor
ioreg -l | grep ULTRIUM
ioreg -l | grep ULT3580

```

2. For Mac OS 10.5.x and lower, export out to a text file and then complete searches. Use the following command:

```

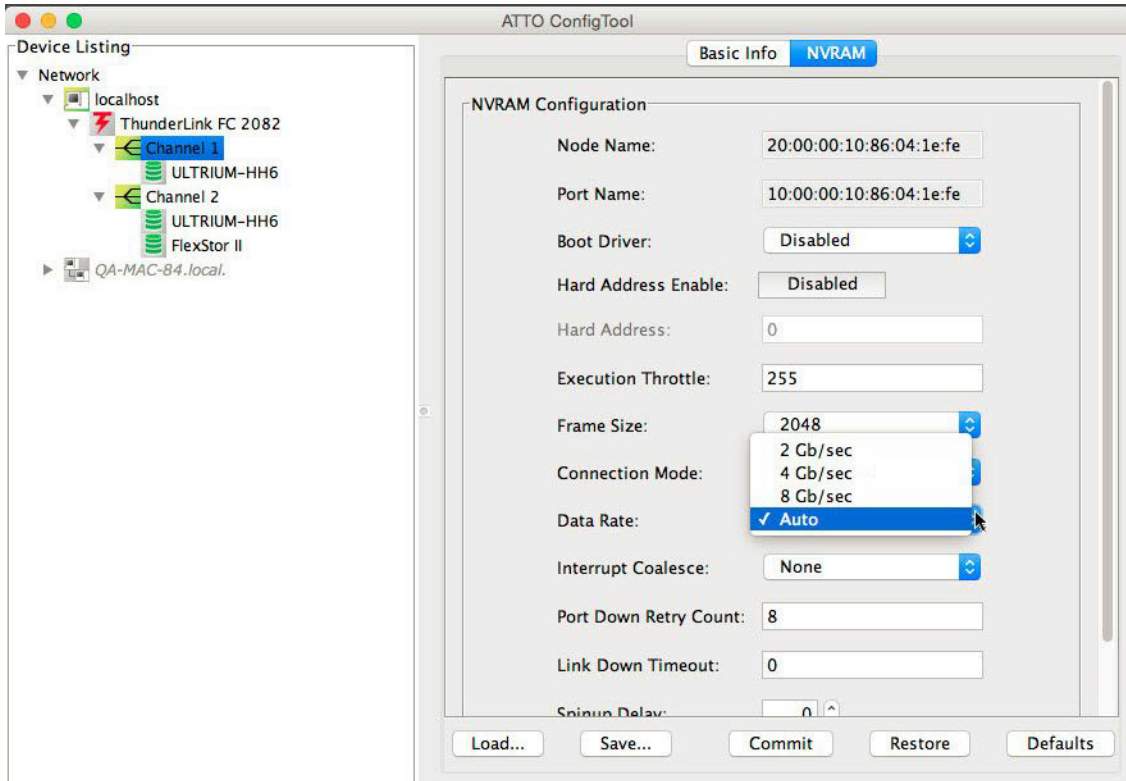
ioreg > ioreg.txt

```

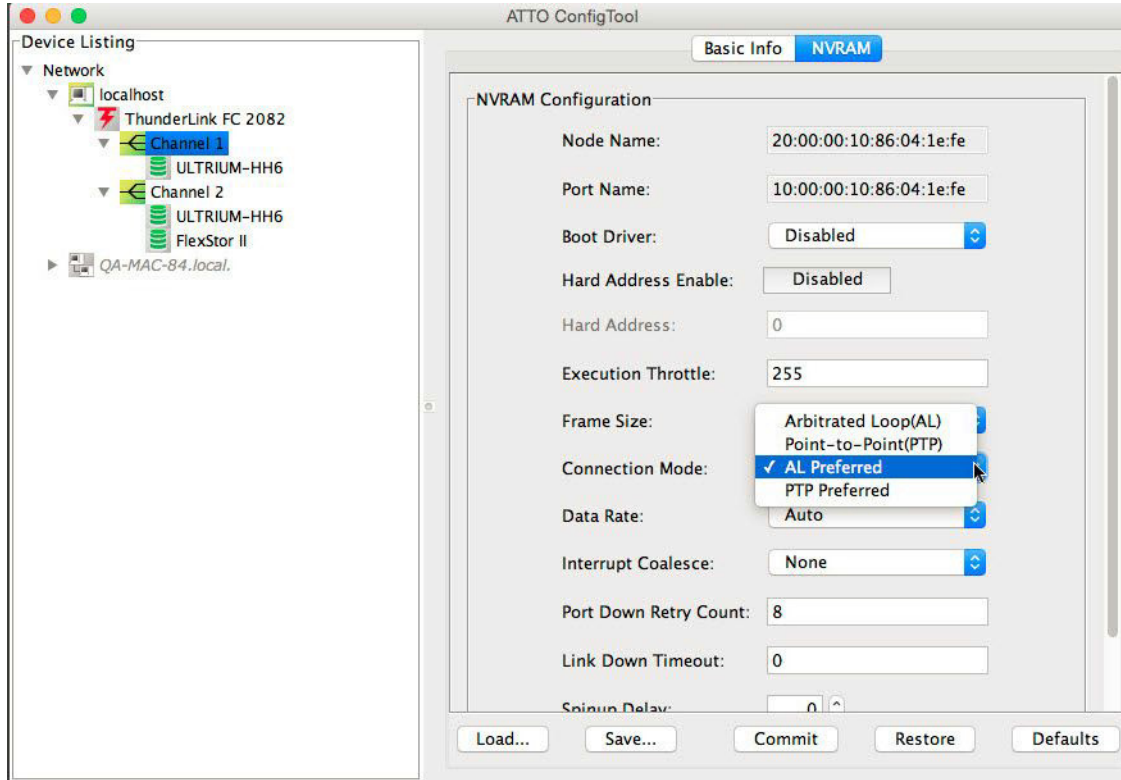
**I am unable to discover NEO devices attached to ATTO Fibre FC2082.**

Default configurations work without modifications for the FC2082 and NEO library. However, the Data Rate and Connection Mode may need to be set if devices are not found.

1. In ATTO ConfigTool, click the **Channel** and **NVRAM**. The following shows **Auto** as the default for data rate.
2. Click the far right to select the appropriate setting, then select **Commit**.



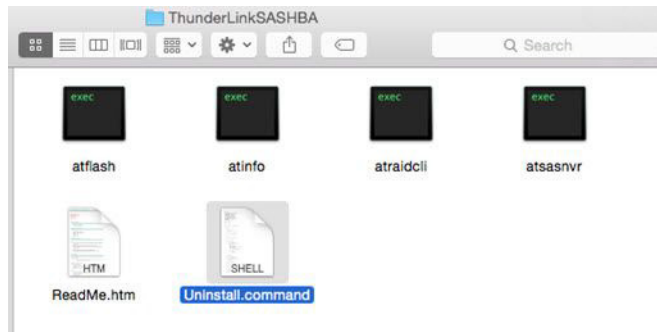
3. The Connection Mode Topology can also be configured.



**I am unable to discover the NEO library (FlexStor II) with neither ioreg nor ATTO ConfigTool.**

The following steps may be required to resolve any issues if a Tape Drive has been replaced.

1. Uninstall the ATTO ThunderLink SAS Driver. Navigate to **Go > Applications > ATTO > ThunderLink SASHBA** directory.
2. Click the `Uninstall.command` file. When the option **Reboot** appears, make sure to reboot the Mac.



3. Uninstall the utility ATTO ConfigTool. Navigate to **Go > Applications > ATTO ConfigTool > Uninstall** directory.

