

# ATTO 360™ Tuning, Monitoring, and Analytics Software Installation and Operation Manual

## **FastFrame N322**

10/25GbE Dual Port PCIe 3.0 Network Interface Card

## **FastFrame N351**

10/25/40/50GbE Single Port PCIe 3.0 Network Interface Card

## **FastFrame N352**

10/25/40/50GbE Dual Port PCIe 3.0 Network Interface Card

## **FastFrame N311**

10/25/40/50/100GbE Single Port PCIe 3.0 Network Interface Card

## **FastFrame N312**

10/25/40/50/100GbE Dual Port PCIe 3.0 Network Interface Card

## **Thunderlink TLN3-3102**

Thunderbolt 3 to 10Gb Ethernet Device

## **Thunderlink TLNS-3252**

Thunderbolt 3 to 25Gb Ethernet Device



The Power Behind the Storage

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# ATTO 360™ Features and Overview

## Overview

The following document provides a tutorial on how to use ATTO 360™ software for tune for network performance, monitor, and identify potential network issues when using ATTO FastFrame and Thunderlink Ethernet controllers on macOS, Windows, and Linux.

## Getting Started

In general, to install the ATTO 360 application, you must:

1. Ensure you have the equipment and software you need for the installation:
  - FastFrame NIC or Thunderlink controller with Ethernet interface
  - A computer running macOS, windows, or Linux

## Software Installation

### Windows

1. Power on your system and log in as the administrator or a user with proper administrative privileges.
2. Go to <https://www.atto.com>
3. Click on downloads
4. Register or log in if previously registered.
5. Click on software in the left dialog.
6. Navigate to ATTO 360 in the right dialog and click on it.
7. Scroll down to and click the windows download.
8. A download window appears. Choose Save File.
9. Double-click the downloaded file to extract and launch the driver setup program.
10. Follow the on-screen instructions to complete the software installation.

**NOTE: A graphics driver that provides OpenGL 2.1 or higher is required for ATTO 360™ to properly function in the Windows operating system. For more information, see the following:**

<https://doc.qt.io/qt-5/windows-requirements.html>  
<https://support.esri.com/en/technical-article/000011375>

### Linux

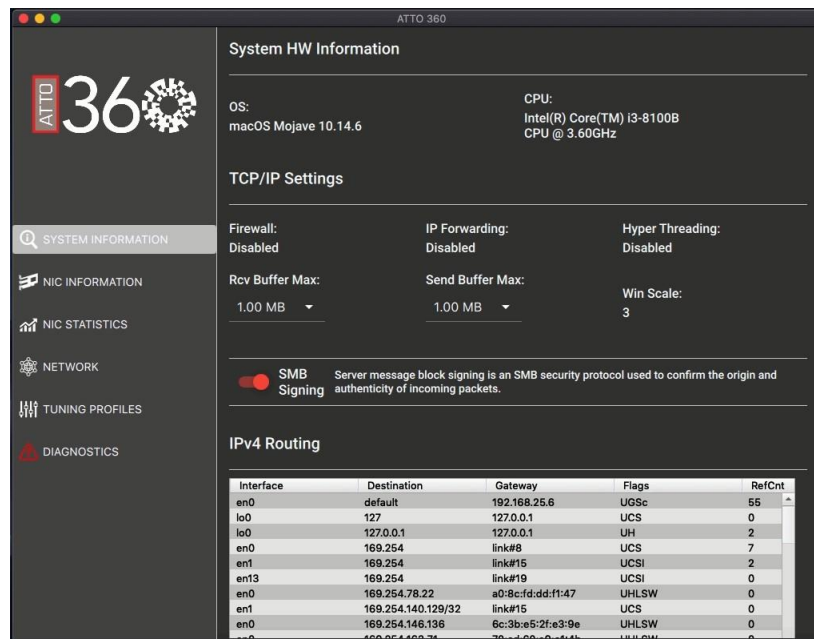
1. Power on your system and log in as the administrator or a user with proper administrative privileges.
2. Go to <https://www.atto.com/>
3. Click on downloads
4. Register or log in if previously registered.
5. Click on software in the left dialog.
6. Navigate to ATTO 360 in the right dialog and click on it.
7. Scroll down to and click the Linux version of ATTO 360
8. A download window appears. Choose Save File.
9. After the download has completed, open the ATTO 360 volume on the desktop.

10. Open the Linux folder.
12. Copy the .tgz file to a temporary folder.
13. Open a terminal window and change the location of the copied tgz.
14. Extract the file using the command `tar -xzf <filename.tgz>`.
15. Change to the directory created above then run the installer script `./install.sh`.

## macOS

1. Power on your system and log in as the administrator or a user with proper administrative privileges
2. Go to <https://www.atto.com/>
3. Click on downloads.
4. Register or log in if previously registered.
5. Click on software in the left dialog.
6. Navigate to your ATTO 360 in the right dialog and click on it.
7. Scroll down to and click the macOS download version
8. A download window appears. Choose Save File.
9. Launch the installer package.
10. Follow the on-screen instructions.

## System Information

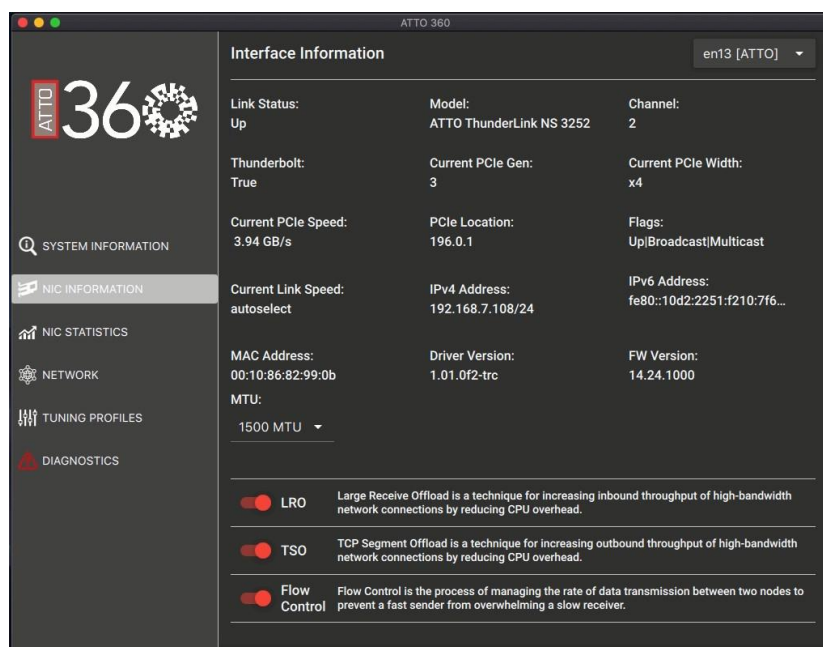


System information is the first screen that loads when you launch ATTO 360™

Here you can access relevant information about your system in one convenient area. You can identify items like Operating System, CPU and see TCP/IP settings like Receive/Transmit Buffers, TCP Window Scale, firewall, IP forwarding, and hyperthreading

**SMB signing** – Server message block signing is an SMB protocol used to confirm the origin and authenticity of incoming packets

# NIC Information



Right under System Information in the left hand menu area you can select NIC information as the second option.

Select the network interface you would like to display information for in the top drop down box. You will see several interfaces each representing a single Ethernet port. Ports connected to ATTO adapters or Thunderlink devices will be highlighted in red with [ATTO] next to their number identifier.

When you select a corresponding ATTO interface you will be given access to several points of data about your NIC including, Link status/speed, Model, channel, current PCIe slot, PCI location, flags, Mac address, MTU size/selection, driver version and firmware version.

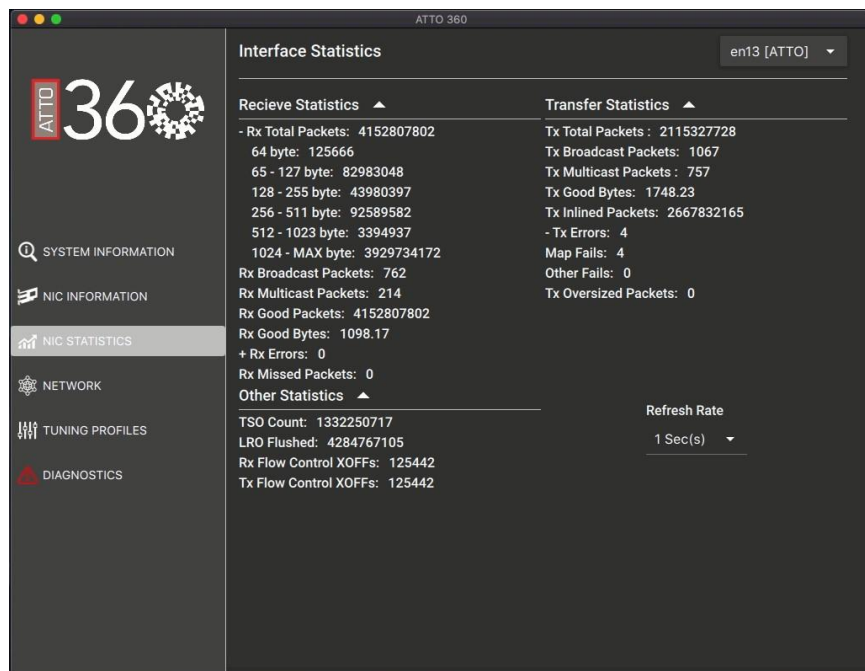
You can also adjust 3 key areas that are helpful when fine tuning the performance of your NIC and can affect throughput positively or negatively.

**LRO – Large Receive Offload** is a technique for increasing inbound throughput of high-bandwidth network conditions by reducing CPU overhead

**TSO – TCP segmentation Offload** is a technique for increasing outbound throughput of high-bandwidth network communications by reducing CPU overhead.

**Flow control** – Flow control is the process of managing the rate of data transmission between two nodes to prevent a fast sender from overwhelming a slow receiver

# NIC Statistics



The network statistics menu area was created to monitor Layer 2 Frame statistics and offer a view into Layer 1 to assist with troubleshooting specific issues and to offer insight into performance tuning opportunities.

| Term                 | Definition  |
|----------------------|---|
| Rx Total Packets     | Total number of all packets received (unicast, broadcast, multicast), regardless of length, errors, or L2 filtering, but excluding flow control packets.        |
| Rx Broadcast Packets | Number of good (non-erred) broadcast packets received while the broadcast address filter is configured to allow reception of broadcast packets.                 |
| Rx Multicast Packets | Number of good (non-erred) multicast packets received that pass L2 filtering, excluding broadcast packets and flow control packets.                             |
| Rx Good Packets      | Number of good (non-erred) packets received that pass L2 filtering and have a legal length. Counts of good packets received are also displayed by packet size.  |
| Rx Good Bytes        | Total number of all bytes received in good (non-erred) packets from the field through the field, inclusively.   |
| Rx Errors            | Total number of errors in packets received. When errors are displayed, check SFP, cable, MTU as well as local or remote interfaces.                             |
| CRC Errors           | Number of packets received with CRC errors, not including packets whose length is less than 64 bytes (Fragments) or greater than the max packet size (Jabbers). |
| Illegal Bytes        | Number of packets received with illegal byte errors, such as an illegal symbol in the packet.   |

|                       |  |
|-----------------------|--|
| Length Errors         | Number of packets received whose packet length field in the MAC header doesn't match the actual packet length.   |
| Undersize Packets     | Receive undersize errors: Received frames that are shorter than the minimum size (64 bytes) and have a valid CRC.  |
| Oversize Packets      | Receive oversize errors: Received frames that are longer than the configured maximum packet size and have a valid CRC.   |
| Fragments             | Receive fragment errors: Received frames that are shorter than the minimum size (64 bytes) and have an invalid CRC   |
| Checksum Errors       | Number of packets received that contain IPv4, TCP, UDP or SCTP checksum errors. Checksum errors are not counted when a packet has any MAC error (CRC, length, undersize, oversize, byte error or symbol error).  |
| Allocation Fails      | Number of packets that were dropped because of a memory allocation failure.  |
| Rx Missed Packets     | Number of packets received that were dropped because no buffer was available to receive the data. Check MBUF structures with netstat -m. Counts the total number of packets missed on all Traffic Classes (TC).  |
| Tx Total Packets      | Total number of all packets transmitted, including standard, secure, FC, and manageability packets.  |
| Tx Broadcast Packets  | Number of broadcast packets transmitted.   |
| Tx Multicast Packets  | Number of multicast packets transmitted.   |
| Tx Good Bytes         | Number of successfully transmitted bytes, including bytes from the field.  |
| Tx Inlined Packets    | Number of Inlined packets transmitted.   |
| Tx Errors             | Total number of errors in packets transmitted  |
| Map Fails             | Number of packets that were dropped because of an error mapping the packet memory.   |
| Other Fails           | Number of packets that were dropped due to a general failure.  |
| Tx Oversized Packets  | Oversize errors: Frames that are longer than the configured maximum packet size and have a valid CRC   |
| TSO Count             | Number of Transmit Segmentation Offload operations attempted (including attempts that may have failed)   |
| LRO Flushed           | Number of Large Receive Offloads operations flushed.   |
| Rx Flow Control XOFFs | Counts of Ethernet Pause Frames (Flow Control). Flow control is a Link layer attempt to relieve the pressure on queues to avoid congestion. When an Ethernet device gets congested or over loaded, flow control allows it to send PAUSE requests to the transmitter until the over loaded condition dissipates. If flow control is not enabled and |

an over loaded condition occurs, the device will drop packets. Dropping packets will impact performance.

Tx Flow Control XOFFs

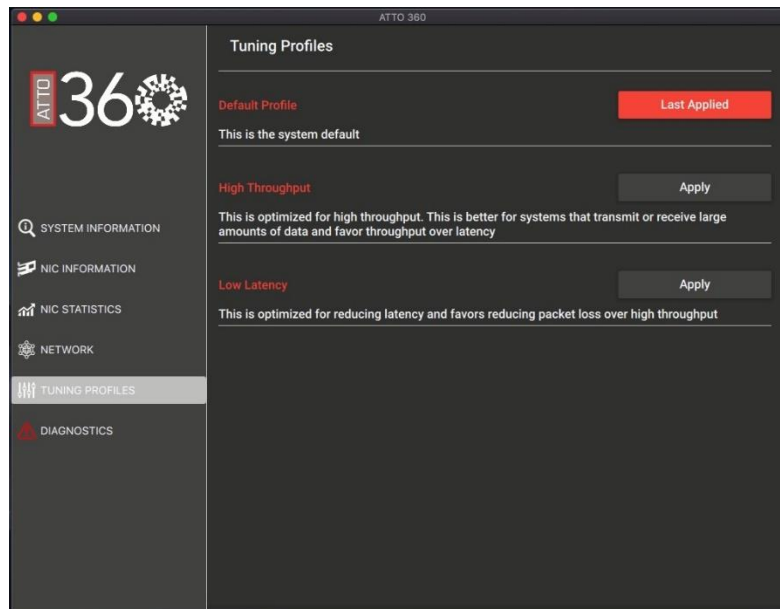
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## Network Tab

| Protocol | Process ID | Process Name     | Stream                    | Rx Bytes |
|----------|------------|------------------|---------------------------|----------|
| TCP      | 92958      | AnyDesk          | LISTEN: 7070              | 0        |
| TCP      | 92958      | AnyDesk          | LISTEN: 51589             | 0        |
| UDP      | 92958      | AnyDesk          | LISTEN: 50001             | 0        |
| TCP      | 92958      | AnyDesk          | 192.168.25.26 53718 -...  | 107339   |
| TCP      | 92958      | AnyDesk          | 192.168.25.26 53715 -...  | 27017    |
| TCP      | 92958      | AnyDesk          | 192.168.25.26 51589 -...  | 14171    |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53741 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53740 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53739 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53738 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53737 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53736 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53733 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53732 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53731 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53730 -...  | 0        |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53728 -...  | 5072     |
| TCP      | 13161      | com.apple.WebKit | 192.168.25.26 53727 -...  | 4460     |
| TCP      | 13159      | Safari           | 192.168.25.26 53743 -...  | 0        |
| TCP      | 13159      | Safari           | 192.168.25.26 53726 -...  | 1257     |
| TCP      | 13159      | Safari           | 192.168.25.26 53723 -...  | 7706     |
| TCP      | 10284      | SubmitDiagInfo   | fe80::aede:48ff:fe00:1... | 183      |
| TCP      | 10284      | SubmitDiagInfo   | fe80::aede:48ff:fe00:1... | 11822    |
| TCP      | 493        | mobileactivation | fe80::aede:48ff:fe00:1... | 5534     |
| UDP      | 417        | JavaApplauncher  | LISTEN: 7374              | 0        |
| TCP      | 382        | findmydevice     | fe80::aede:48ff:fe00:1... | 289      |
| TCP      | 326        | parsecd          | 192.168.25.26 53725 -...  | 4288     |
| UDP      | 275        | netbiosd         | LISTEN: 138               | 0        |
| UDP      | 275        | netbiosd         | LISTEN: 137               | 0        |
| TCP      | 221        | bosUpdateProxy   | fe80::aede:48ff:fe00:1... | 313      |
| UDP      | 200        | mDNSResponder    | LISTEN: 65011             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 65011             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 64713             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 64713             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 63808             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 63808             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 60398             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 60398             | 0        |
| UDP      | 200        | mDNSResponder    | LISTEN: 60398             | 0        |

The Network tab gives you a look at each socket open on your network. Each row displayed is an open stream and ATTO 360™ displays data on each stream like Protocol, Process ID, etc. The view will be unique across operating systems and depending on which version you are using their could be more or less data displayed depending on that operating system's network stack.

# Tuning Profiles



The Tuning Profiles area contains 1-click settings to change pre-designated NIC and system parameters that are design to work with specific workflows and storage use cases. These profiles were designed by ATTO engineers to work best in certain environments.

## Glossary

| Term             | Definition   |
|------------------|--|
| OS               | Indicates which Operating System is installed on the system running 360. An operating system (OS) is system software that manages computer hardware, software resources, and provides common services for computer programs.   |
| CPU              | Indicates CPU model is installed on system running 360. A central processing unit (CPU) is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logic, controlling, and input/output (I/O) operations specified by the instructions. |
| Performance Mode | Indicates whether CPU is running in high performance mode rather than power saving or sleep modes that would cause performance problems  |
| Firewall         | Indicates whether or not firewall is established. A firewall is a network security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules.[]  |
| IP Forwarding    | Indicates whether IP forwarding is enabled/disabled.   |



|                 |  |
|-----------------|--|
| Hyper Threading | Indicates whether Hyper Threading is enabled/disabled. Hyper Threading is a high-performance computing architecture that simulates some degree of overlap in executing two or more independent sets of instructions. |
| Receive Buffer  | Displays size of receive buffer window. The buffer size of system memory that can be used by the adapter for receiving packets   |
| Transmit Buffer | Displays size of transmit buffer window. The buffer size of system memory that can be used by the adapter for sending packets  |
| Window Scale    | Displays TCP Window Scale option. The TCP window scale option is an option to increase the receive window size allowed in Transmission Control Protocol above its former maximum value of 65,535 bytes.              |
| Link Status     | Displays whether Link Status is up or down. Indicating whether or not you are able to communicate.   |
| Model           | Indicates the ATTO Model number of the FastFrame NIC or Thunderlink device   |
| Channel         | Indicates which Ethernet interface is being displayed  |
| Thunderbolt     | Thunderbolt is the brand name of a hardware interface developed by Intel (in collaboration with Apple) that allows the connection of external peripherals to a computer.   |
| PCIe Generation | Displays PCI Express generation NIC is running PCIe 1.0, 2.0, 3.0, 4.0, or 5.0   |
| PCIe Width      | Displays PCIe width determining the number of lanes that can be used in parallel by the device for communication (i.e. x4, x8, x16)  |
| PCIe Speed      | Displays current speed of PCIe connection in GB/s  |
| PCIe Location   | Displays the hard IP address for PCIe card   |
| Interface Flags | Displays Ifconfig values (i.e.) Up/Broadcast/Multicast   |
| Link Speed      | Displays the maximum speed in bits per second that your device can communicate with the device that it is linked to.   |
| IPv4 Address    | Displays IPv4 address. The IPv4 address is a 32-bit number that uniquely identifies a network interface on a machine.  |

|                |   |
|----------------|---|
| IPv6 Address   | Displays IPv6 address. An IPv6 address is a 128-bit alphanumeric string that identifies an endpoint device in the Internet Protocol Version 6 (IPv6) addressing scheme.           |
| MAC Address    | Displays MAC address. A media access control address of a device is a unique identifier assigned to a network interface controller.   |
| MTU            | Here you can change MTU size. Maximum Transmission Unit (MTU) is the size of the largest protocol data unit (PDU) that can be communicated in a single network layer transaction. |
| Driver Version | Displays what driver version is installed   |
| FW Version     | Displays what Firmware version is installed   |