

Introduction

In EtherCAT Communications it is often necessary to create a log of all data passing over the network for debugging purposes. This document will demonstrate how to create a Wireshark log of all the EtherCAT messages.

Hardware Requirements

Qty	Description
3	RJ-45 Ethernet cables (Cat6 12" preferred)
1	StarTech USB 3.0 to Dual Port Gigabit Ethernet Adapter https://www.startech.com/Networking-IO/usb-network-adapters/USB-3-to-Dual-Port-Gigabit-Ethernet-Adapter-NIC-with-USB-Port~USB32000SPT
1	Great Scott Gadgets LAN Throwing Star https://greatscottgadgets.com/throwingstar/

StarTech Adapter



Great Scott Gadgets Throwing Star



Software Requirements

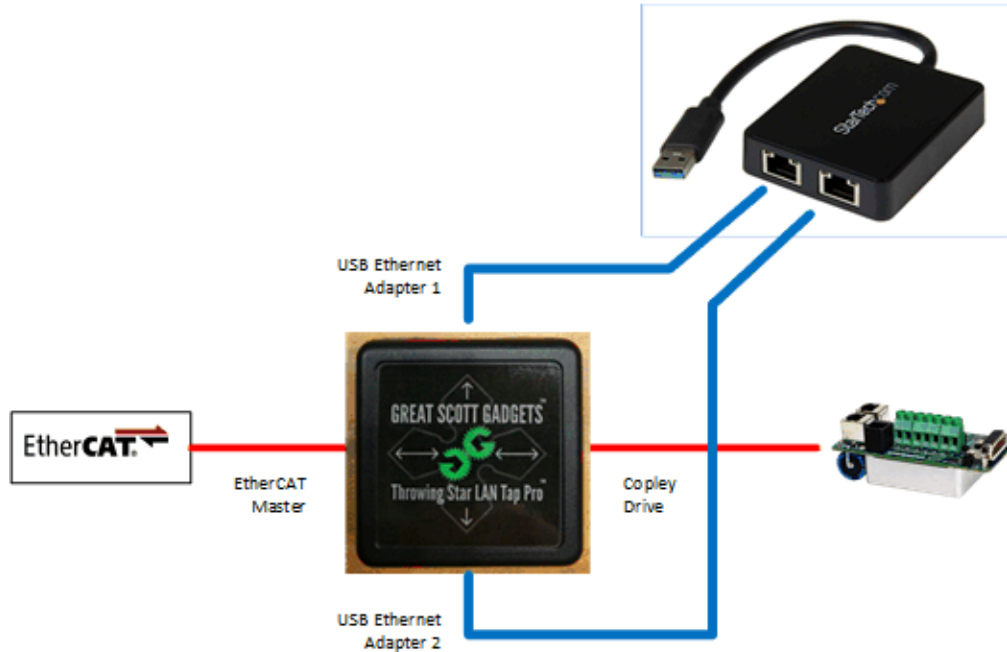
Wireshark can be downloaded using the following link:

<https://www.wireshark.org/download.html>

The recommended version of Wireshark for this application is the Old Stable Release (2.6.11).

Setting Up

Turn off the EtherCAT Master. Important messages are sent on startup from the Master to downstream devices and will be missed if the log has not been started before the Master was powered on. After acquiring a dual port ethernet adapter (or two single port usb-ethernet adapters) and the LAN throwing star, connect the hardware components together.

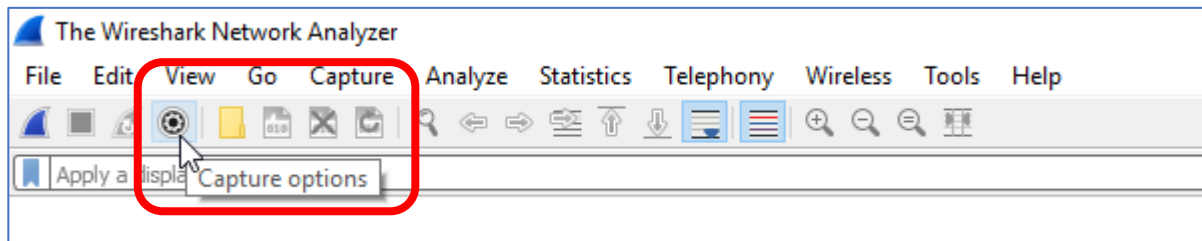


Connect the hardware in accordance with the graphic above. The existing ethernet cable will connect from the Master to the LAN Tap. One of the 12" Ethernet cables will connect from the LAN Tap to the drive, and the other two 12" cables will connect from the LAN Tap to the Dual Port USB-Ethernet Adapter. Connect the USB-Ethernet Adapter to the PC.

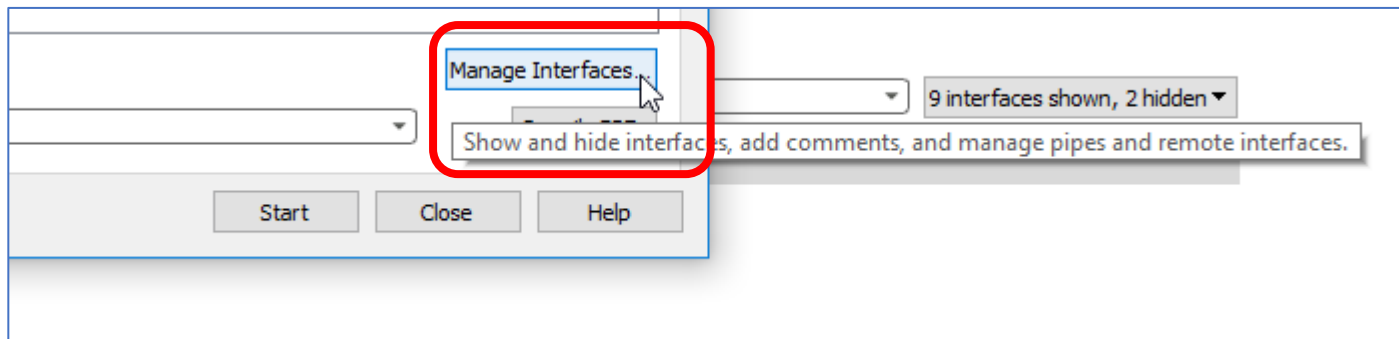
Now install the drivers for the adapter. For Windows Machines, navigate to the Device Manager. Right-click on the adapter in the list under "Network adapters" and select "Update Driver". Perform this step twice (once for each adapter).

The next step is to start the Wireshark Software.

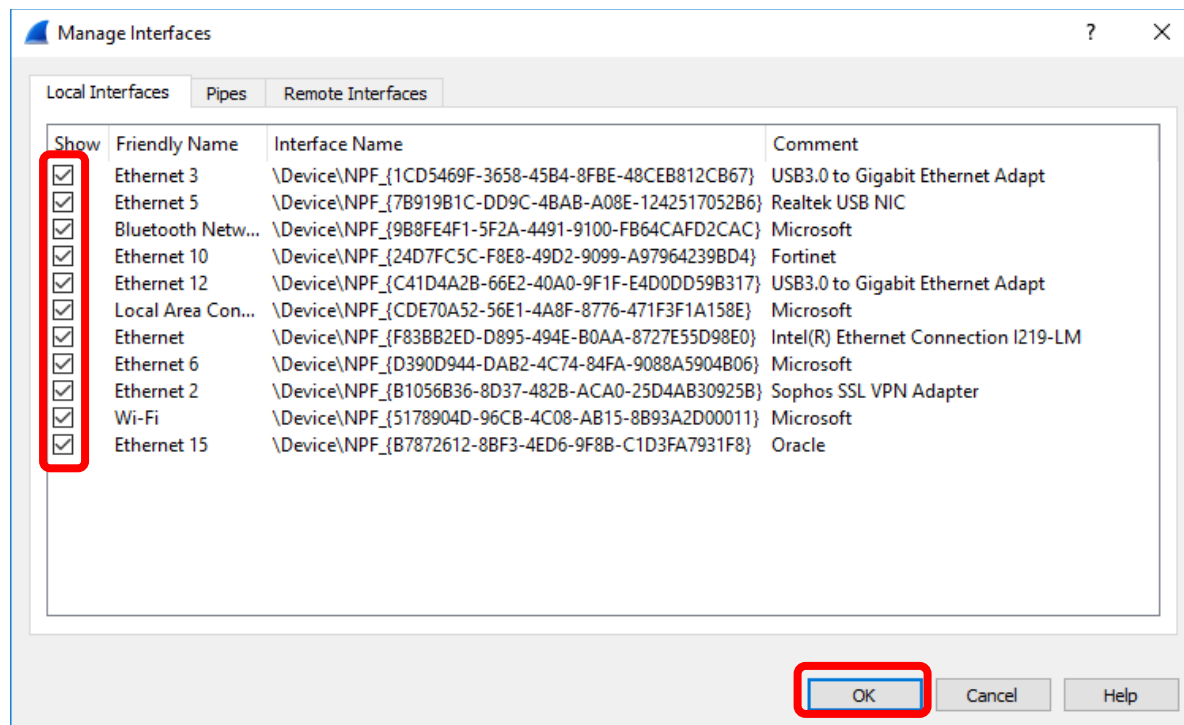
After opening Wireshark, click on the **Capture Options Button** in the toolbar (top left).



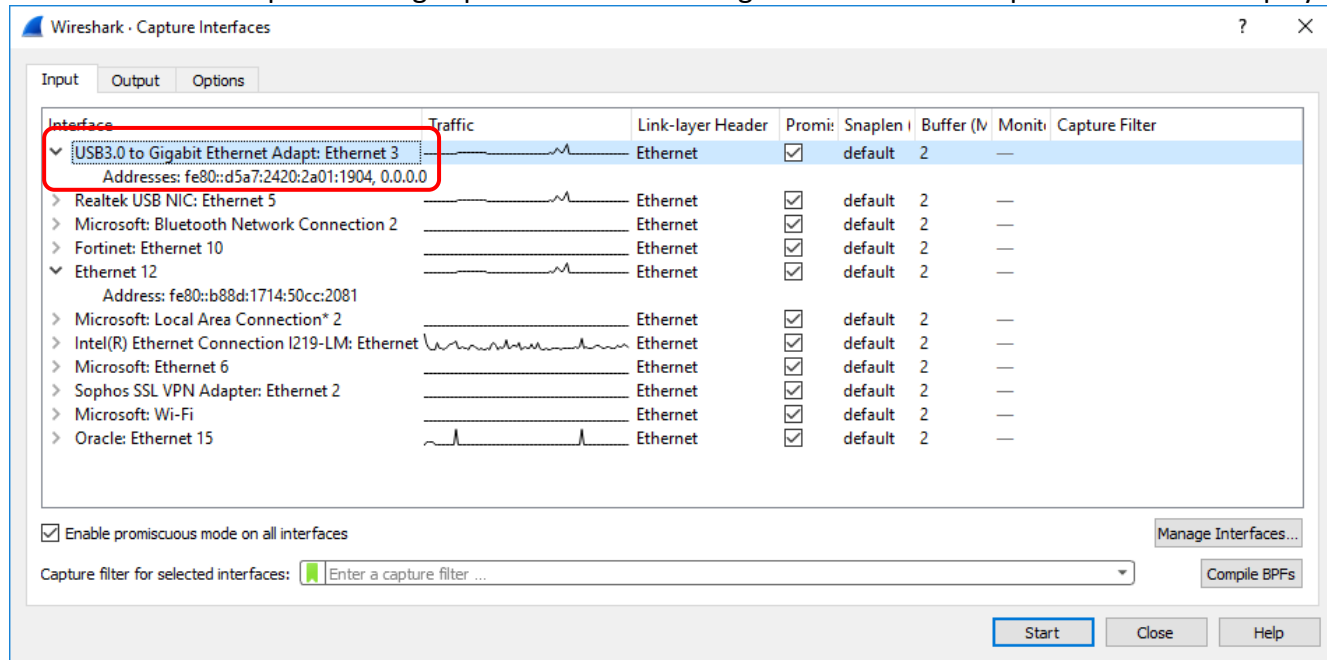
Click the **Manage Interfaces Button**.



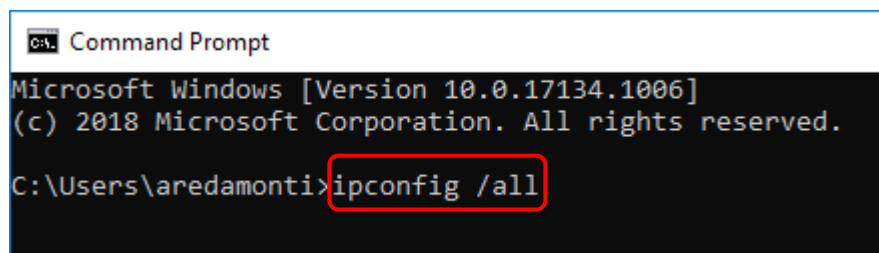
Check all the Show Checkboxes to see all the local interfaces connected to the network then select "OK".



All the local interfaces are now shown in the Capture Interfaces Display. Hover over the adapter or click the down arrow to see its address. This address must match the address in the Command Line to verify that the correct adapter is being captured when selecting interfaces in the Capture Interfaces Display.



To see all the addresses of the network adapters connected to the PC, open the **Windows Command Line**.



Type: **“ipconfig /all”** shown above. There is a space between “ipconfig” and “/all”.

Hit the Enter Key on the keyboard.

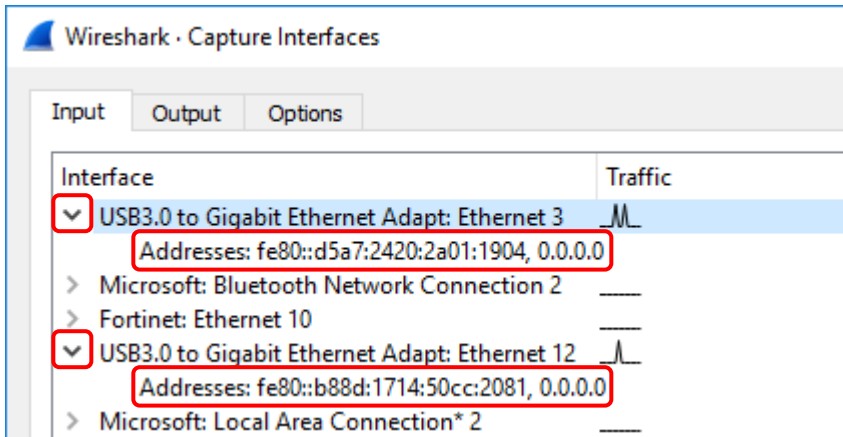
A list will print in the command line of all the network adapters connected to your PC along with information pertaining to each adapter.

Find the adapters with the description “ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter” and take note of each of their **Link-local IPv6 Addresses**. Match those with the addresses found in Wireshark’s **Capture Interfaces Screen**.

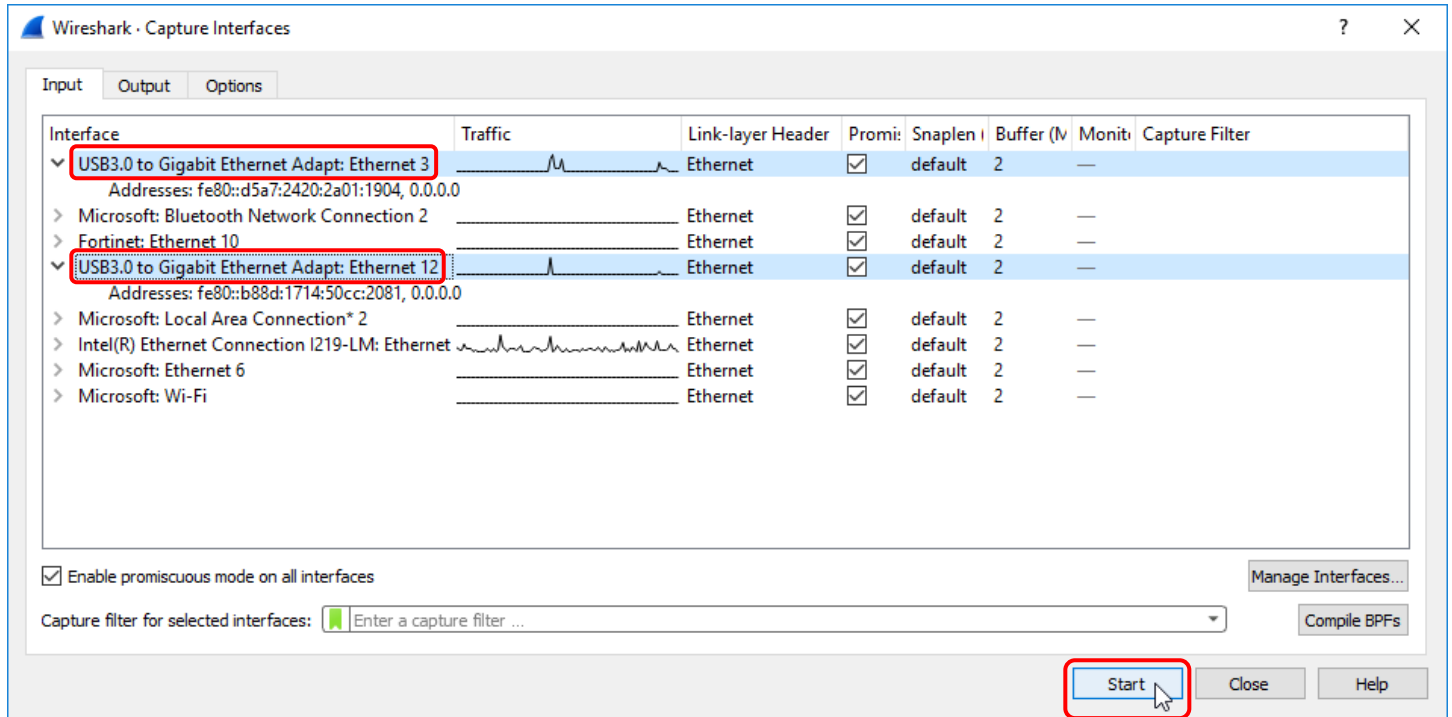
If the correct addresses in the Command Line are not found in the list of addresses in the Capture Interfaces Screen, then the dual port USB-Ethernet Adapter is probably connected to the PC through a docking station. Please connect the dual port adapter directly to a USB port on the PC.

```
Ethernet adapter Ethernet 3:
Connection-specific DNS Suffix . :
Description . . . . . : ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter
Physical Address. . . . . : 00-0A-CD-34-55-B7
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::d5a7:2420:2a01:1904%5(Preferred) ←
Autoconfiguration IPv4 Address. . : 169.254.25.4(Preferred)
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 805309133
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-A7-27-6D-54-E1-AD-B9-B7-2C
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                          fec0:0:0:ffff::2%1
                          fec0:0:0:ffff::3%1
NetBIOS over Tcpi. . . . . : Enabled
```

```
Ethernet adapter Ethernet 12:
Connection-specific DNS Suffix . :
Description . . . . . : ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter #4
Physical Address. . . . . : 00-0A-CD-34-55-B6
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::b88d:1714:50cc:2081%26(Preferred) ←
Autoconfiguration IPv4 Address. . : 169.254.32.129(Preferred)
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 1543506637
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-A7-27-6D-54-E1-AD-B9-B7-2C
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                          fec0:0:0:ffff::2%1
                          fec0:0:0:ffff::3%1
NetBIOS over Tcpi. . . . . : Enabled
```

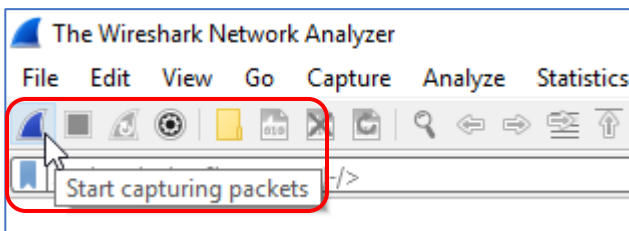


Now that the adapters are known to be correct, they can be selected for capture.



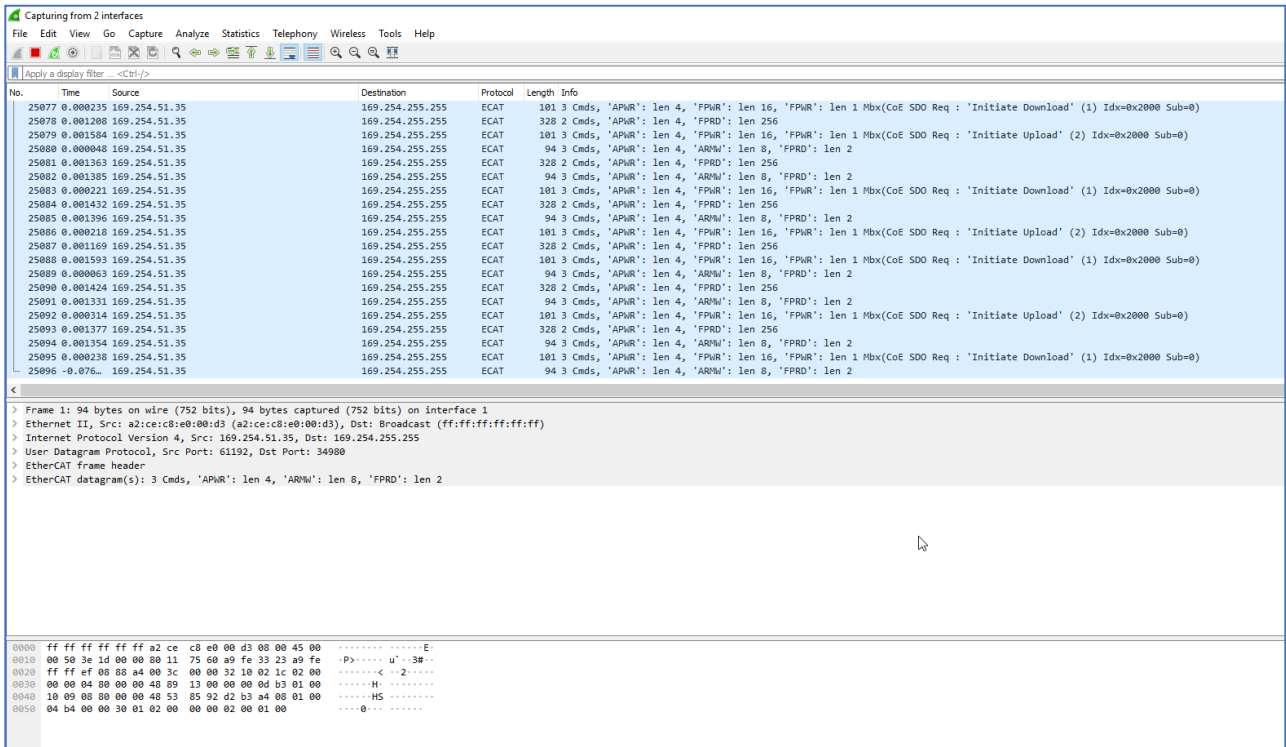
Both adapters **MUST** be selected before clicking the Start Button. To do this, simply click on the name of one adapter and then **while holding down the Ctrl Button on the keyboard**, click on the name of the second adapter. Before clicking the Start Button, the Capture Interfaces Display should look like the above image. Click the Start Button shown above.

Alternatively, if the Capture Options Menu was not accessed when Wireshark was first started and the name of the known Ethernet Adapters appears in the Capture Display, the **Start Capturing Packets Button** can be pressed (after selecting both adapters in the interface tree) to begin logging. The button has a shark fin icon shown below.

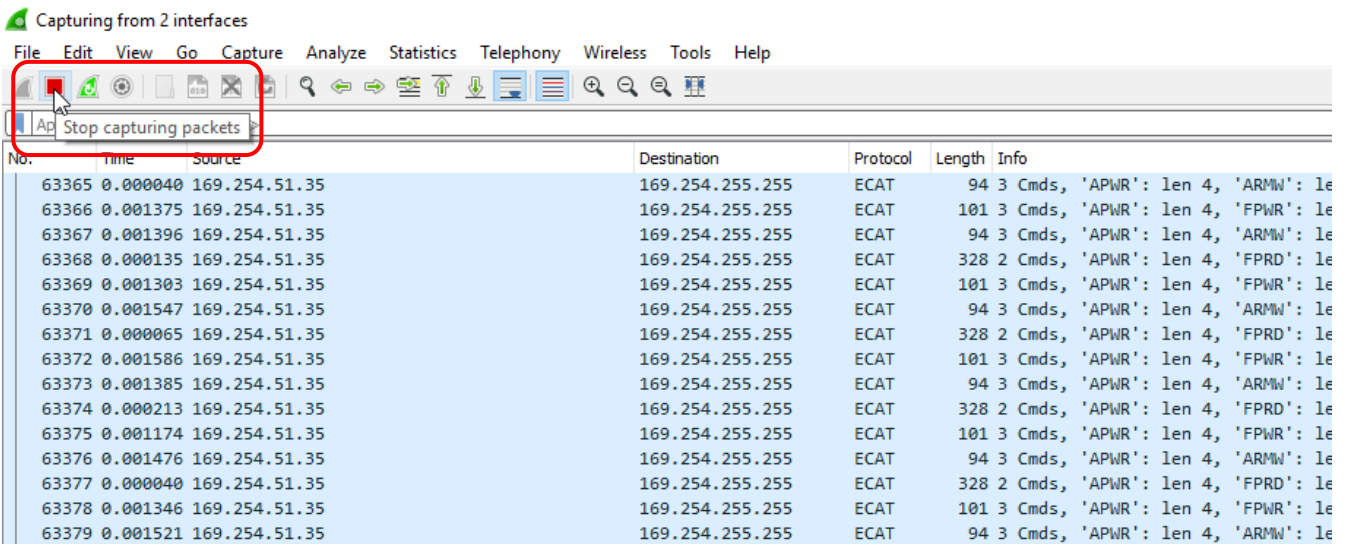


Wireshark is now logging all the messages to and from the drive and master.



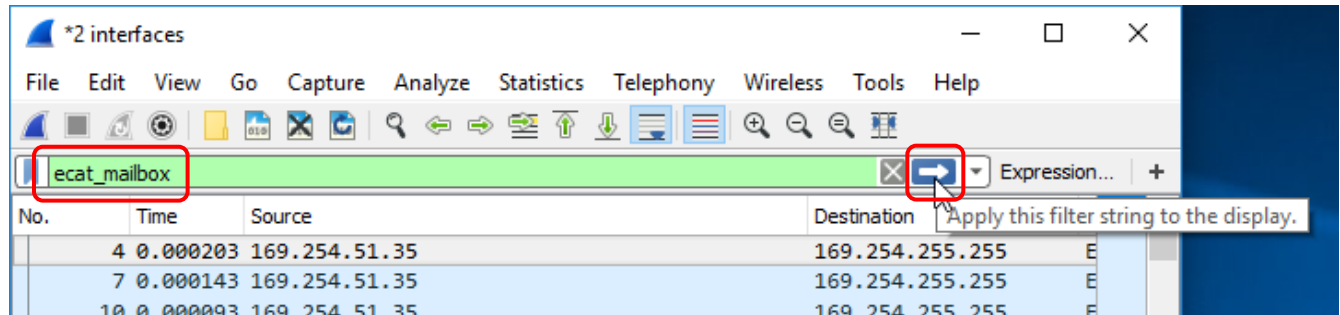


Turn on the EtherCAT Master and run the application. When the application is complete, press the Stop Button shown below to stop logging messages.



Finally, select File > Save As and save the log.

To see all the EtherCAT mailbox access in the log, apply a filter by typing “ecat_mailbox” in the Display Filter Textfield and clicking the Apply Filter Button shown below.



Revision History

Date	Version	Revision
9/27/2019	1.0	Initial release