

Voyager M310C™ Protocol Analyzer/Exerciser Quick Start

1 Introduction

The Teledyne LeCroy Voyager M310C™ Protocol Analyzer/Exerciser is a multifunction verification system for USB development and testing. It supports USB 3.1 SuperSpeed (5Gbps) and SuperSpeed Plus (10Gbps), as well as USB 2.0, Power Delivery (PD) 2.0 and 3.0 and USB Type-C(TM) event data over the "C" connector cables. The Power Delivery can capture Provider, Consumer, SOP, SOP' and SOP" traffic. The M310C is built to support the latest PD exerciser capability, with the ability to sink or source up to 100 Watts. The M310C can sink or source voltages from 5 to 20 VDC and currents from 0 to 20 Amps (within the limit of 100 W). It can also verify and display the channel configuration (CC) data coming from either the power Provider or the power Consumer. The Voyager M310C is designed to record USB traffic and graphically present the logical transactions and events. It can also be configured to generate USB 3.1 10 Gbps (SS+), as well as USB 5 Gbps (SS) and USB 2.0. traffic. The Voyager M310C is connected to a laptop or desktop host machine via its Super Speed USB or Gigabit Ethernet port. Please see the Readme file on the installation DVD for the

Before Starting

Use this document for quick installation and setup. If you experience problems or need more information, see the **USB Protocol Suite User Manual** on the Installation DVD or at the Teledyne LeCroy web site. For details about the latest software version, see the **USBProtocolSuite_Readme.html** file on the Installation DVD.

latest information on the host machine requirements and supported operating systems. The system can monitor traffic between USB 2.0 links using standard high-speed compliant cables.

If configured for USB 3.1 testing, the system supports monitoring between SuperSpeed/SuperSpeed+ links using USB 3.1 cables.

Note: You must install the software before connecting the Analyzer to the host machine for the first time.



USB 3.1 or 2.0

The Voyager M310C models available are:

Voyager Feature Comparison	Voyager M310C USB 3.1 Analyzer	Voyager M310C USB 3.1 Analyzer & Exerciser	Voyager M310C USB 3.1 SS+ Analyzer	Voyager M310C USB 3.1 SS+ Analyzer & Exerciser
Part number	USB-T0A3-V06-X	USB-TZA3-V06-X	USB-T0P3-V06-X	USB-TZP3-V06-X
USB 3.1 5 Gbps SuperSpeed/ 2.0 / USB 1.1 Recording	✓	✓	✓	✓
USB 3.1 10 Gbps SuperSpeed Plus Recording	✓	✓	✓	✓
Simultaneous Recording with USB 2.0	✓	✓	✓	✓
USB 5 Gbps / 2.0 Traffic Gen (Host and Device)	(\$)	✓	(\$)	✓
USB 10Gbps / 5Gbps / 2.0 Traffic Gen (Host and Device)	(\$)	✓	(\$)	✓
USB Compliance Suite option	(\$)	(\$)	(\$)	(\$)
Standard Recording Memory	8GB	8GB	16GB	16GB
Power Delivery over CC Recording	✓	✓	✓	✓
Spool to Disk Recording	✓	✓	✓	✓
USB 3.1 SS/ 2.0 Hardware Triggering	✓	✓	✓	✓
USB 3.1 SS+ Hardware Triggering	✓	✓	✓	✓
Verification Script Engine (VSE)	✓	✓	✓	✓
Bus Utilization Graphs	✓	✓	✓	✓
LTSSM and State Timing View	✓	✓	✓	✓
Real-Time Statistics monitor (RTS)	✓	✓	✓	✓
Multi Protocol Analysis (Sync w / PCIe & SATA analyzers)	✓	✓	✓	✓
Power Tracker™ Option	(\$)	(\$)	(\$)	(\$)

2 Components

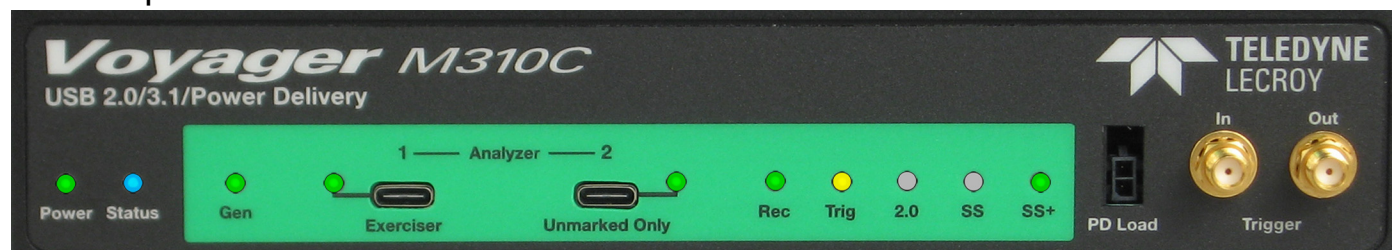
The Voyager M310C basic components are:

- Voyager M310C Protocol Analyzer/Exerciser System
- 160 Watt AC Power Adapter and Cord
- USB cables
 - 3.1: C-C (x2), C-B, C-A, C-A Receptacle, A-B
 - 2.0: C-B, C-uB
- Installation DVD-ROM, including documentation
- Quick Start Guide

- Please see the *USB Protocol Suite User Manual* on the installation DVD for component specifications.



3 Description



The Analyzer has the following indicators and connectors in the front:

Power LED (Green if plugged in and powered on)

Status LED (Blue if system successfully initializes)
(Red if hardware failure)
(Green while initializing)

Analyzer Connector 1 / Exerciser Connector

Connect DUT 1 to this connector

Analyzer Connector 2

Connect DUT 2 to this connector.

(Do not use an electrically marked cable in this connector)

Connector LEDs

(Red: You need to flip the plug)
(Green: Plug is oriented correctly)

Warning: Do not open the Voyager M310C enclosure. No operator serviceable parts are inside. Refer servicing to Teledyne LeCroy customer care.

Analyzer LEDs

Gen - Generator Status

(Green if enabled)

Rec - Recording

(Green if recording enabled)

Trig - Triggered

(Yellow if triggered)

2.0 - USB 2.0

(Yellow for Low and Full Speed)

SS - 3.1 SuperSpeed

(5 Gbps)

(Green for Hi Speed)

(Green if link is up)

SS+ - 3.1 SuperSpeed Plus

(10Gbps)

(Yellow if only LFPS traffic)

(Green if link is up)

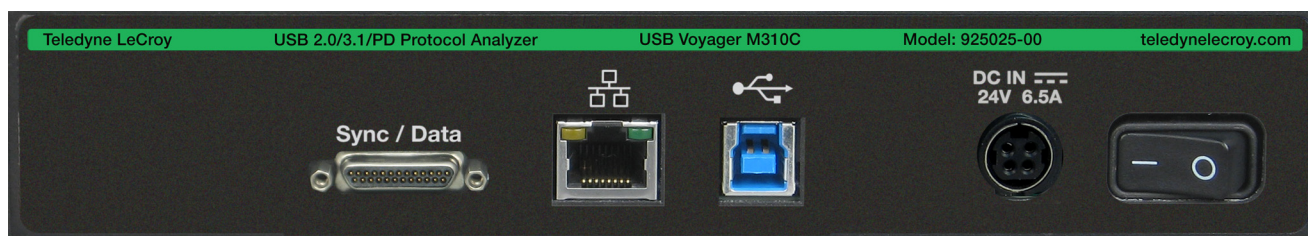
(Yellow if LFPS traffic)

PD Load -Programmable Load for Power Deliver attaches here.

Trigger

In - SMA external trigger input.

Out - SMA external trigger output.



The Analyzer has the following connectors in the rear:

Sync / Data - Used for Daisy Chaining and Cross Sync with Cable (P/N AC031XXA-X), as well as 8-bit Data Capture and external Trig In/Out (P/N AC050XXA-X) (Cables sold separately)

ETHERNET - Gigabit Ethernet for connection to host machine

USB - USB 3.1 Super Speed Standard B Connector to host machine

DC IN - 24V, 6.67A power supply connector.

Power Switch (0/1)

4 Installing the Software

Note: You must install the software before connecting the Analyzer to the host machine for the first time. This installation procedure is for Windows 8.1.

To install the software, follow the steps below:

[Refer to the System Requirements in the readme file for information about the exact Windows operating systems supported.](#)

1. Insert the installation disc into the host machine's DVD drive.
2. Typically, the installation process will automatically start. If it doesn't, browse to the 'Autorun' folder on the installation disc, then double-click the 'autorun.exe' file.
3. Follow the on-screen instructions to complete the installation.

Note: If you get an error message during installation of the drivers, consult your system administrator.

5 Setting Up the Analyzer

To set up the Analyzer:

1. Connect the provided Power Adapter to the rear of the Analyzer and to a 100-volt to 240-volt, 50-Hz to 60-Hz, 200-W power outlet.
2. Connect the USB port on the rear of the Voyager M310C to a USB port on the host machine using the 1 m USB 3.1 cable USB A-B cable.
3. Turn on the power switch.

At power on, the Voyager M310C initializes itself and performs self-diagnostics for approximately 50 seconds before it is ready. This is indicated by the Blue color of the Status LED.

6 Starting the Application

To start the application, launch the Teledyne LeCroy USB Protocol Suite program from the Start Menu:

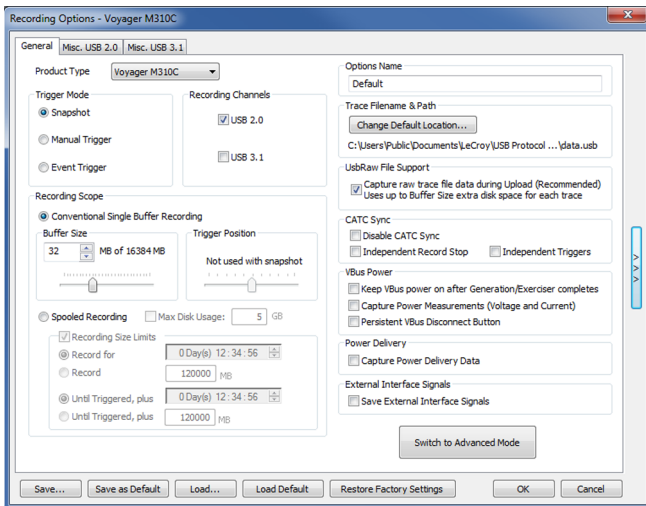
Start > All Programs > LeCroy > USB Protocol Suite > USB Protocol Suite to open the main window.

You can use the software with or without the system connected to the host machine. Without the Analyzer, the program functions as a trace viewer to view, analyze, and print trace files. The first time you open the USB Protocol Suite application, confirm proper installation by selecting **About** from the Help menu to view the Software Version, Firmware Version, BusEngine™ Version, and Unit Serial Number.

7 First USB Recording

After installing and launching the software, you can test the system by performing the following steps:

1. Connect a USB Device Under Test with its cable to Connector 1 (on the left), and a USB Host Under Test with its cable to Connector 2 (on the right).
2. Select **Recording Options** under **Setup** on the Menu Bar.
3. Select the **General** tab to display the following dialog box showing factory default settings such as Snapshot and 16 MB buffer size. For the first recording, you can leave these settings unchanged



4. Click **OK** to activate the recording options you selected.
 5. Turn on the USB devices that are to be tested and cause them to generate USB traffic.
 6. Click **Record** on the Tool Bar.
- The system starts to record the USB traffic immediately. After 16 MB of traffic are recorded, the Analyzer uploads the data and displays the packets in the trace window.

7. To terminate recording before the snapshot automatically

completes, click  on the Tool Bar.

When the recording session is finished, the traffic is uploaded from the Analyzer to the hard drive on your host machine as a file named **data.usb** or the name you assigned as the default filename. While the file is being uploaded, you should see a brown progress bar at the bottom of the screen. When the bar disappears, it indicates that the data has been uploaded to disk.

8. To save a current recording for future reference, select **Save As** under **File** on the Menu Bar
OR



Click  on the Tool Bar to display the standard **Save As** screen.

Give the recording a unique name and save it to the appropriate directory.

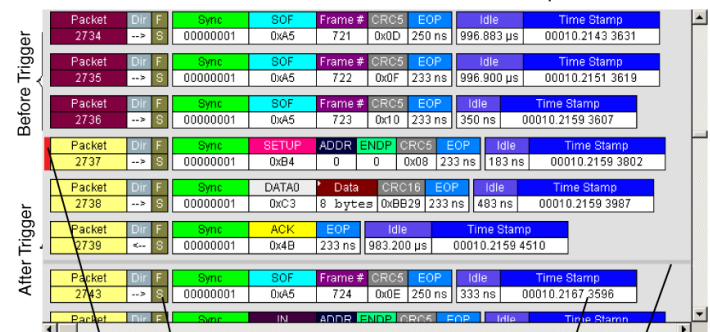
Trace View Features

After a moment, the recording terminates and the results display.

- The packet view display makes extensive use of color and graphics to fully document the captured traffic.
- Packets are shown on separate rows, with their individual fields both labeled and color coded.
- Packets are numbered (sequentially, as recorded), time-stamped (with a resolution of 1 ns on 3.1 10Gbps signaling), and highlighted to show the transmitted speed (low-speed, full-speed, high-speed, or superspeed).
- Display formats can be named and saved for later use.
- Data fields can be collapsed to occupy minimal space in the display.

The display software can operate independently of the hardware and so can function as a stand-alone Trace Viewer that may be freely distributed

Each row numerates, labels, and color-codes a USB packet



Time-stamp appended to each packet

Filtered Traffic is displayed as a gray line

Specifies speed packet transmitted

Indicates a marked comment is set

8 Recording Traffic Generation with Analyzer

Recording Options

After installation, the system defaults to Snapshot recording. To change the default settings, refer to the “Recording Options” chapter of the *USB Protocol Suite User Manual*.

Traffic Generation

Systems configured with the Voyager exerciser option can generate USB traffic and record the real response from the DUT. Traffic Generation can also transmit known bad packets, providing an opportunity for engineers to observe how a device handles specific adverse conditions.

To use Traffic Generation, refer to the “Traffic Generation” chapter of the *USB Protocol Suite User Manual*.

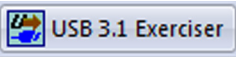
Start Recording

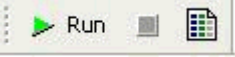
Click the **Start Recording** button  on the Toolbar or select the **Record > Start** command.

Start Generation

Select **Host Emulation** or **Device Emulation** in the Recording/Generating section of the Misc. USB 3.1 tab of the Recording Options

dialog to cause the USB 3.1 Exerciser to continuously attempt to bring up a USB 3.1 link. Click **Record**  on the toolbar and connect the appropriate DUT. After 16 MB of traffic has been recorded, the trace automatically uploads from the analyzer to the host machine, and the software displays the captured packets.

Optionally, you can select the **USB 3.1 Exerciser** icon  from the toolbar and open a sample generation file.

Click the **Run** button  on the Toolbar or select the **Generation > Run Scenario** command.

Stop Recording

You may also choose to stop the recording by pressing the **Stop** button  on the Tool bar or selecting the **Record > Stop** command. The trace automatically uploads from the analyzer to the host machine.

Interrupting the Upload Process: During upload, you can interrupt the upload process by pressing the **Stop** button to display the Abort or Continue Uploading dialog box with the following options: Stop upload but keep the data that has been uploaded already, Stop upload and discard (Flush) any data that has been uploaded, Continue upload, or Re-upload part (Partial) of the recorded buffer.

Save the Trace

After upload finishes, the software saves the recorded traffic data in the **LeCroy\USB Protocol Suite** directory in a file named **data.usb**. You can change the default directory and file name by clicking the **Change Default Location** button in the Trace Filename & Path section of the General tab.

Power Delivery Trace

A typical power delivery trace is shown below:

PD	Packet	SRC	SOP	PD Msg	Msg Type	Rsvd 1	Spec Rev	PR	Msg ID	Obj Cnt	Rsvd 2	Fixed	Max Cur	Voltage	Dual Role
	212				Source Cap	0x0	Rev. 1	SRC	0	4	0x0		1.50 A	5.00 V	0
				Fixed	Max Cur	Voltage	Dual Role	Fixed	Max Cur	Voltage	Dual Role	Fixed	Max Cur	Voltage	Dual Role
					3.00 A	5.00 V	0		3.00 A	12.00 V	0		3.00 A	18.00 V	0
															CRC32
															0xCB6672D8

Teledyne LeCroy Customer Support

Online Download

Periodically check the Teledyne LeCroy Protocol Solutions Group web site for software updates and other support related to this product. Software updates are available to users with a current Maintenance Agreement.

Web: teledynelecroy.com/tm/software/PSG

E-mail: psgsupport@teledyne.com

Support: teledynelecroy.com/support/contact

Trademarks and Servicemarks

Teledyne LeCroy, Voyager, USB Protocol Suite, CATC Trace, and BusEngine are trademarks of Teledyne LeCroy Inc. Microsoft and Windows are registered trademarks of Microsoft Inc. All other trademarks are property of their respective companies.

Changes

Product specifications are subject to change without notice.

Teledyne LeCroy reserves the right to revise the information in this document without notice or penalty.