

Voyager M3x™

Protocol Analyzer/Exerciser

Quick Start

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** at the Teledyne LeCroy web site <https://teledynelecroy.com/sw/usb/>

1 Introduction

The Teledyne LeCroy Voyager M3x™ Protocol Analyzer/Exerciser is a multifunction verification system for USB development and testing. It supports both USB 2.0 and USB 3.0. The Voyager M3x is designed to record USB traffic and graphically present the logical transactions and events. It can also be configured to generate USB traffic. The Voyager M3x is connected to a laptop or desktop host machine via its Super Speed USB or Gigabit Ethernet port.

The system can monitor traffic between USB 2.0 links using standard high-speed compliant cables.

If configured for USB 3.0 testing, the system supports monitoring between SuperSpeed links using USB 3.0 cables.

Note: You must install the software before connecting the

The Voyager M3x models available are:

Feature	Standard USB 2.0 Analyzer	Advanced USB 2.0 Analyzer	Advanced USB 2.0 Analyzer with Exerciser	Standard USB 3.0 Analyzer	Pro USB 3.0 Analyzer	Pro USB 3.0 Compliance	Pro USB 3.0 Analyzer with Exerciser
Part number	USB-T0S2-V03-X	USB-T0A2-V03-X	USB-TZA2-V03-X	USB-T0S3-V03-X	USB-TOP3-V03-X	USB-TCP3-V03-X	USB-TZP3-V03-X
USB 2.0 / USB 1.1 Recording	✓	✓	✓	✓	✓	✓	✓
USB 3.0 / SuperSpeed Recording				✓	✓	✓	✓
Spool to Disk Recording	✓	✓	✓	✓	✓	✓	✓
Standard Recording Memory	1GB	1GB	1GB	1GB	4GB	4GB	4GB
GbE Connection to host		✓	✓		✓	✓	✓
Simultaneous USB 2.0 & 3.0 Recording					✓	✓	✓
Sequential Triggering		✓	✓		✓	✓	✓
Verification Script Engine (VSE)		✓	✓		✓	✓	✓
Bus Utilization Graphs		✓	✓		✓	✓	✓
USB 3.0 LTSSM View		✓	✓		✓	✓	✓
Real-Time Statistics monitor (RTS)		✓	✓		✓	✓	✓
Bus Utilization Graphs		✓	✓		✓	✓	✓
Power Tracker™ Option		(\$)	(\$)		(\$)	(\$)	(\$)
Compliance and Support						(\$)	(\$)

2 Components

The Voyager M3x basic components are:

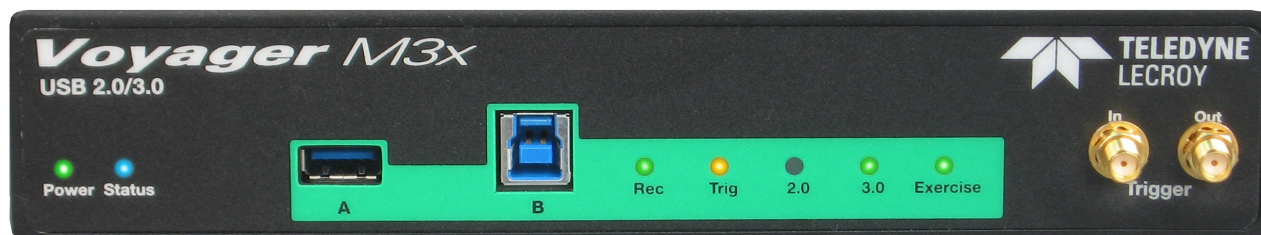
- Voyager M3x Protocol Analyzer/Exerciser System
- AC power cable
- USB cables (7 USB 2.0, 3 USB 3.0)
- Micro to Standard USB adapter
- Mini to Standard USB adapter
- Quick Start Guide

Please see the **USB Protocol Suite User Manual** at the website: <https://teledynelecroy.com/sw/usb/> for component specifications.

Analyzer to the host machine for the first time.



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/Exerciser Ports A (downstream) and B (upstream)

Analyzer LEDs

Rec - Recording (green if recording enabled)

Trig - Triggered (yellow if triggered)

2.0 - USB 2.0 (yellow for Low and Full Speed)
(green for Hi Speed)

3.0 - USB 3.0 (green if link is up)
(yellow if only LFPS traffic)

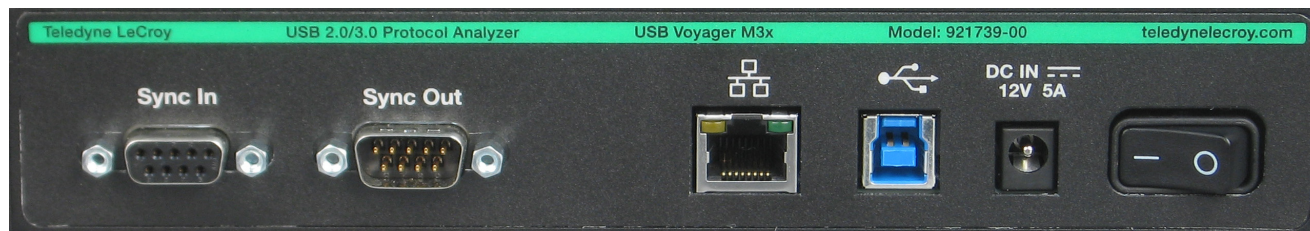
Exercise - (green if a scenario is executing)

Trigger

In - SMA external trigger input.

Out - SMA external trigger output.

Warning: Do not open the Voyager M3x enclosure. No operator serviceable parts are inside. Refer servicing to Teledyne LeCroy customer care.



The Analyzer has the following connectors in the rear:

Sync In - For use in Daisy chaining and Crosssync scenarios.

Sync Out - For use in Daisy chaining and Crosssync scenarios.

ETHERNET - Gigabit Ethernet for connection to host machine

USB - USB 3.0 Super Speed Standard B Connector to host machine.

DC IN - 12V, 5A power supply connector.

Power Switch (0/1)

4 Installing the Software

Note: This installation procedure is for Windows 7.

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

Refer to the System Requirements in the readme file for information about the exact Windows operating systems supported.

1. Download the latest software from the website <https://teledynelecroy.com/sw/usb/>.
2. 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, 100-W power outlet.
2. Connect the USB port on the rear of the Voyager M3x to a USB port on the host machine using the LONG (6-foot/2-meter) USB cable.
3. Turn on the power switch.

At power on, the voyager M3x 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.

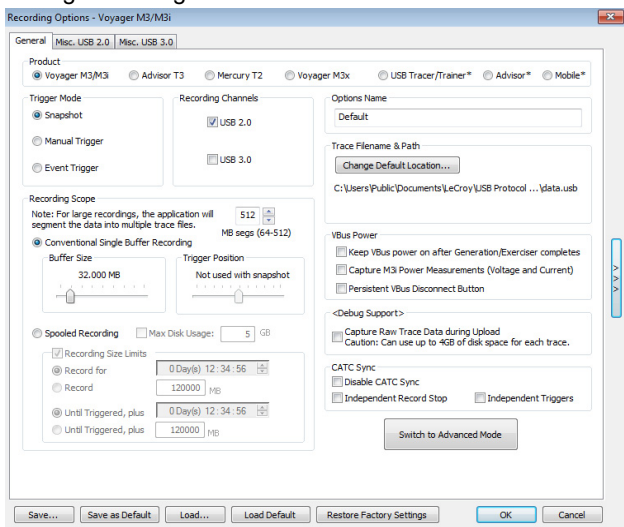
You can use the software with or without the system connected to the host machine. Without the Analyzer, the program functions as a trace viewer to view, analyze, and print trace files.

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 cable to each of the two front panel ports on the Analyzer module, then connect the other ends to the USB Device Under Test and USB Host Under Test.
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 is recorded, the Analyzer uploads the data and displays the packets in the trace window.

7. To terminate recording before the snapshot automatically

completes, click **Stop** 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 2 ns on 3.0 signalling), 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

Packet	Dir	Type	Data	Time Stamp
2734	-->	S	Sync	00000001 0xA5 721 0x0D 250 ns 996.883 µs 00010.2143 3631
2735	-->	S	SOF	00000001 0xA5 722 0x0F 233 ns 996.900 µs 00010.2151 3619
2736	-->	S	Frame #	00000001 0xA5 723 0x10 233 ns 350 ns 00010.2159 3607
2737	-->	S	SETUP	00000001 0xB4 0 0 0x08 233 ns 183 ns 00010.2159 3802
2738	-->	S	DATA0	00000001 0xC3 8 bytes 0xBB29 233 ns 483 ns 00010.2159 3987
2739	-->	S	ACK	00000001 0x4B 233 ns 983.200 µs 00010.2159 4510
2740	-->	S	SOF	00000001 0xA5 724 0x0E 250 ns 333 ns 00010.2167 3596
2741	-->	S	IN	00000001 0xA5 724 0x0E 250 ns 333 ns 00010.2167 3596

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

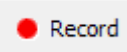
After installation, the system defaults to Snapshot recording. To change the default settings, refer to the "Recording Options" chapter of the *USB Protocol Suite User Manual*.

Traffic Generation

Systems configured with the Voyager exerciser option can generate USB 3.2 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. To start

traffic generation, select exerciser mode in recording option mode option: Mode: ☐ Analyzer ☒ **Exerciser**

Start Recording

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

Start Generation

For USB 3.2 exerciser, Select **Host Emulation** or **Device Emulation** in the Recording/Generating section of the Misc. USB 3.1 tab of the Recording Options dialog to enable ReadyLink™ emulation mode which initiates the USB 3.1 exerciser to continually 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/PD 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 Reupload 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.

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/sw/usb/
E-mail: psgsupport@teledyne.com
Support: teledynelecroy.com/support/contact

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