

Voyager™ M4x

USB Protocol Analyzer and Exerciser System



Key Features

- **Capture / Analyze USB4 including PD & SBU traffic** - See end-to-end host, hub, and device operation
- **Integrated analyzer / exerciser** - Multifunction system with future option allowing USB4 traffic generation
- **USB Type-C & PD analyzer** - Capture Type-C and Power Delivery protocol messages and state changes
- **CATC Trace Analysis Software** - Expand / Collapse transport layer for faster interpretation of USB traffic
- **32GB Recording Capacity** - Capture long recording sessions for analysis and problem solving
- **Detects numerous USB4 Link & Protocol errors** - Critical link and timing errors are detected and labeled
- **External Trigger In / Out** - Use the Voyager to identify any packet and toggle a scope or logic analyzer (via SMA connectors)
- **Cascade Multiple Analyzers** - Synchronize recordings across multiple analyzers including legacy USB 3.x Voyager systems
- **Hardware Triggering** - Trigger on USB4 protocol events to isolate important traffic, specific errors or data patterns
- **Gbe or USB 3.0 Upload** - Sustained transfer rates of 600Mbps over Gbe provide instant access to captured data

Teledyne LeCroy's legendary Voyager analyzer platform provides the industry's most accurate and reliable capture of USB4 and Thunderbolt 3™ protocol for fast debug, analysis and problem solving. The new platform leverages Teledyne LeCroy's cutting-edge T.A.P.4™ probe technology and industry-leading analysis software to create the ultimate, all-in-one test solution for USB.

Unmatched Accuracy

The Voyager M4x features the industry's highest fidelity probe design and provides unmatched reliability when testing devices at the full USB4 Gen3x2 (40Gb/s aggregate) speed. Designed to sit inline between host and hub, the M4x will non-intrusively record all USB Type-C signaling including USB4/TBT3 data, side-band and CC (PD) messages. Hot plug any combination of USB4 host and hub and the Voyager system will record the speed negotiation handshake and lock at the specified rate. The Voyager is fully compatible with both active and passive cable environments. The built-in triggering provides unprecedented flexibility with every header field configurable as a trigger event. The 32GB buffer allows extended recording sessions.

Analysis Software

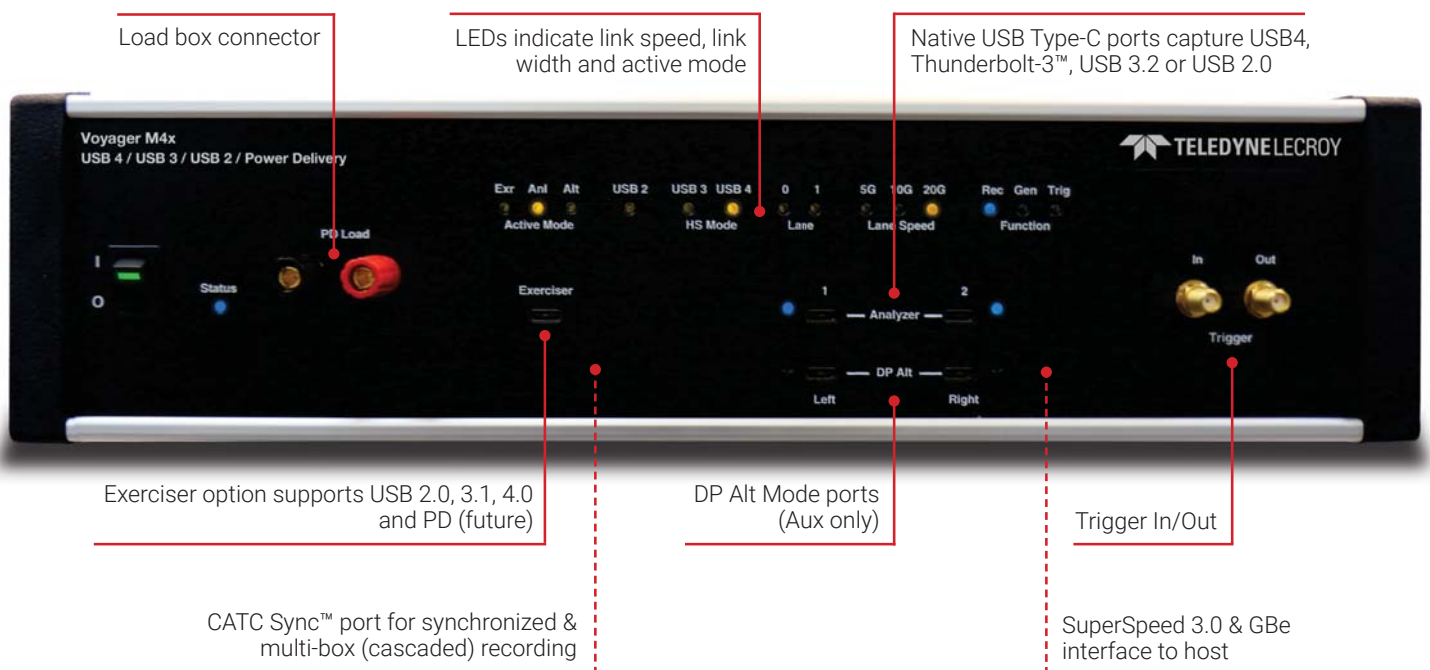
The Voyager utilizes the legendary CATC Trace - the industry's de facto standard display and shows all packets labeled and interleaved in a single view. Traffic from the logical USB4 and side-band channels can be individually filtered, searched or exported from the trace. The Transfer level can be expanded and collapsed to show the logical layer including all ordered sets and control packets. While in line, it will record and display all register reads and writes to provide an unambiguous picture of the router and path configuration space. The analysis mode provides full decoding of USB4 traffic with both automatic and manual assignment of Hop IDs and tunneled paths.

Triggering and Filtering

The Voyager provides hardware triggering to pinpoint protocol events of interest. Trigger events can be specified at the lowest levels including bus states, ordered sets, VBUS & CC voltages, PD messages, protocol errors or header fields including address or packet types.

Flexible Hardware

The front-end of the Voyager analyzer features USB4 rated connectors that support the full 40Gb/s data rate for loss-less capture of traffic from all active links simultaneously. The Voyager M4x platform includes 32GB of recording memory plus USB 3.0 and Gigabit Ethernet links for uploading recorded traffic to the host PC. Field upgradeable firmware ensures future support for new features or changes to the USB specification.



Future Enhancements

A comprehensive exerciser and compliance test capability will be available as optional enhancements in the future. Support for PD 3.0 and USB4 traffic generation using a script-based APIs will allow users to transmit any arbitrary sequence of USB4 and PD messages for functional and conformance testing. Future optional enhancements allowing capture of USB 3.2 bonded 10Gb/s protocol traffic will also fill a critical need for developers targeting Superspeed USB 3.2 applications.

Error Detection

The Teledyne LeCroy Voyager can detect and flag real USB4 and PD protocol errors. At the lower layers, training sequences, SCR content and CRC errors are automatically verified and flagged. Configuration Packet Timing is checked along with many of the USB4 logical layer timing requirements.

Type	Left	Right	Total
Unknown packet content	2	5	7
Error packet content	0	0	0
TS lane number error	0	0	0
TS lane bonding error	0	0	0
Bad sync bits packet	0	0	0
SCR content error	0	0	0
HEC Error	3	3	6
CRC Error	0	0	0
ECC Error	0	0	0
Data Size is invalid	0	0	0
Port Num is invalid	0	0	0
Notification Event code Warning	0	0	0
Notification PG Warning	0	0	0
Interdomain CM is invalid	0	0	0
Invalid gap between HS packets	0	0	0
Length and size values don't much	0	0	0
Payload length is invalid	1	0	1

Traffic Summary reports show detailed metrics on bus events including protocol errors



Capture and verify complete link training and control packet exchange for USB4 & Thunderbolt™ 3

Protocol Decoding

The Voyager performs full decoding of USB4 packets including DLLPs and TLPs. Users can organize traffic by manually assigning Hop ID's to traffic types. Read Request / Response transactions are grouped to simplify debug configuration space operations. DP Aux and alt-mode mode commands are captured and decoded on the DP Alt-mode ports.

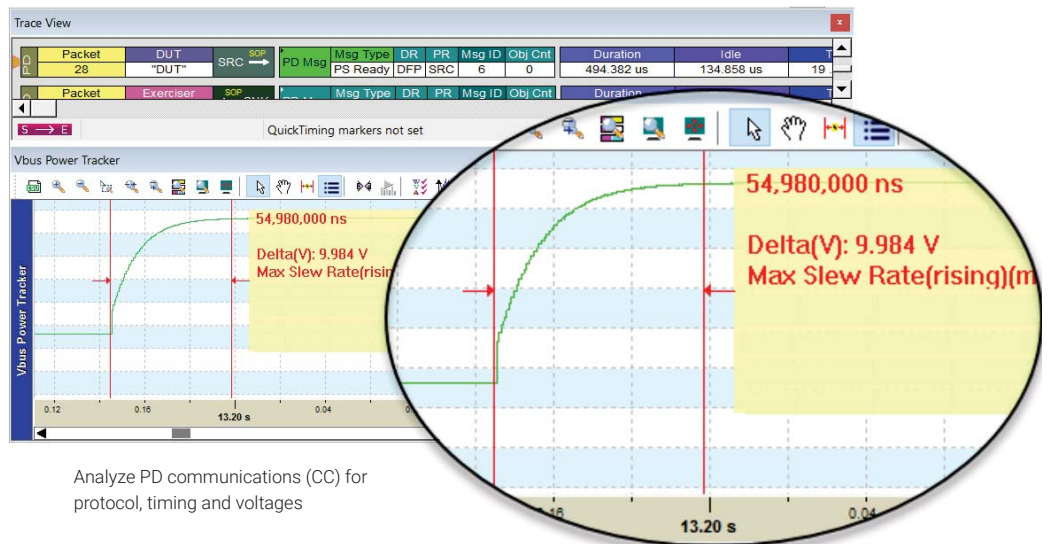
Find the Issues Fast

The Voyager software provides many mechanisms to measure and report on USB4 & PD protocol. With the Traffic Summary display, users can evaluate statistical reports at a glance or navigate to individual events. Users may select packets or link commands then jump to each occurrence with a single keystroke. Higher-level events are also tracked and reported at the logical USB4 transport layer.

Measure and Verify VBUS and CC Voltages with PowerTracker

The Voyager M4x Power Tracker option monitors and displays vBus power and current graphically in a time-line format. The voltages are synchronized to trace events allowing users to verify power state transitions at the protocol and electrical layers. Separate power graphs are provided for CC and VCONN making it easy to debug logical Type-C state transitions.

The Voyager system features countless innovations in data analysis to help reduce time-to-market for USB systems and devices. Combined with future enhancements bringing exerciser and compliance testing, the Voyager platform is well suited for low-level USB4 silicon validation as well as system and software level verification.



Analyze PD communications (CC) for protocol, timing and voltages

Specifications

Protocols Supported	USB4 links, Thunderbolt 3 links; Side-Band signals & CC (PD) messages
Host Hardware Requirements	Intel Core i5 with 16GB RAM
OS Requirements	Windows® 7, Windows 8 and Windows 10
Memory Size	32GB option
Signal Rate Supported	1.2Mb/s – 20Gb/s
Data Bus Interface	Full duplex differential (USB4) Side-band channel CC (PD) messages
Front Panel Connectors	Analyzer – one (1) USB4 recording channel with left/right USB4 Type-C Connectors Exerciser - one (1) USB4 generation channel with USB4 Type-C Connectors (future enhancement) DP Alt-Mode – one (1) DisplayPort over Type-C Auxiliary (Aux) channel & CC messages only
Front Panel Indicators	Platform LEDs: Power, Status Function LEDs : Rec, Gen, Trig Analyzer LEDs: 2.0, 3.0, 4.0 Active Mode LEDs : Exerciser, Analyzer, Alt-mode Lane LEDs : 1 or 2 Lane Speed LEDs : 5G, 10G, 20G
Dimensions (W x H x D)	(W x H x D) 406 x 101 x 406 mm (16" x 16" x 4")
Weight	11 lbs
Environmental	Operating Temperature: 0°C to 55°C (32 °F to 131 °F) Non-Operating Temperature: -20 °C to 80 °C (-4 °F to 176 °F) Humidity: Operating 10% to 90% RH (non-condensing)
External Trigger IN/OUT	SMA connectors
Warranty	12 Month Hardware Warranty

<お問い合わせ>

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Ordering Information

Product Description

Voyager M4x USB 4.0 Pro Analyzer Exerciser System

Voyager M4x USB 4.0 Pro Analyzer System

Medium Zero Carrying Case (for use with Summit T3-8 & Voyager M4x)

Product Code

USB-TZP4-V08-X

USB-T0P4-V08-X

AC007XXA-X



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