Ellisys USB Explorer 280
Multifunction USB 3.0 and 2.0 Test System

ellisys
Better Analysis.

Industry's Most Versatile USB SuperSpeed Protocol Test and Analysis System

Overview

The Ellisys USB Explorer 280 is a sophisticated protocol test and analysis system for USB SuperSpeed traffic monitoring, driver and software stack debugging, and performance analysis. The USB Explorer 280 is designed to reduce R&D time by finding issues early and debugging more efficiently, and can improve quality and reliability by verifying adherence to the specification.
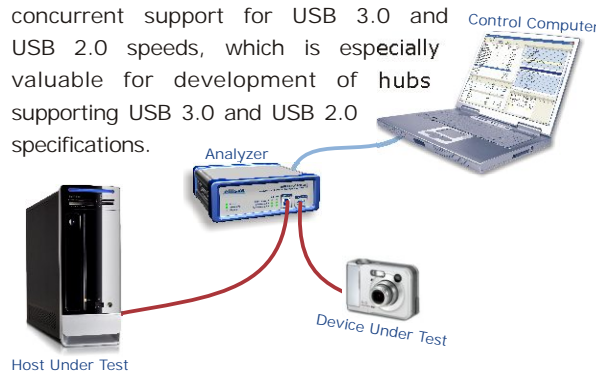
The multifunction USB Explorer 280 can:

- Analyze USB 3.0 (SuperSpeed) and USB 2.0 links (High Speed, Full Speed, Low Speed)
- Emulate USB hosts and devices
- Automatically detect link speed and SS receivers
- Upload and display live data during recording
- Record LFPS states and display state transitions
- Connect to differential SMA for alternative front-end probing during prototype stages

The USB Explorer 280 builds on a successful legacy of Ellisys USB analyzer and generator products, and delivers a superior design efficiency that includes an embedded 4GB of memory, configuration-flexible hardware, and a custom-made processor with the power needed to test and analyze the USB 3.0 5GT/s SuperSpeed mode.

Each Ellisys USB Explorer 280 hardware unit is capable of acting as either a protocol analyzer or packet generator, depending on the configuration.

Configurations

The Ellisys USB Explorer 280 Analyzer includes extensive protocol analysis features, including real-time monitoring and live upload of captured traffic, detailed decoding of standard and class requests, trigger, filter, and search functions, and comprehensive statistical analyses. Automated support for spread spectrum clocking (SSC), data scrambling, and receiver equalization techniques is included.

The USB Explorer 280 Analyzer is based on the intuitive Ellisys Visual USB™ software application that is well-proven for performance optimization and validation of device enumeration, bus operation, and interoperability testing. New analysis features designed specifically for USB SuperSpeed have been added to provide the user with a comprehensive analysis solution ideal for any USB design effort.

The Ellisys USB Explorer 280 Generator supplements protocol analysis by emulating USB hosts and devices. The USB Explorer 280 Generator is ideal for testing corner cases, error recovery protocols, link power state transitions, and link training issues. The Generator includes a low-level, powerful scripting interface favored by engineers looking to control protocol sequences and responses at precise timing granularities.

The Ellisys USB Explorer 280 Duo is a highly flexible bundle of two full-featured units that can be used as one analyzer and one generator, two analyzers, or two generators, depending on the needs of the user. Even more convenient that simply having these two functions on a single hardware unit, this innovative and flexible architecture allows engineers to share units among the R&D team.

Typical Analysis Setup

The USB Explorer 280 is connected in a logically passive mode to record traffic and bus events passing between host and device. The analyzer provides same-link concurrent support for USB 3.0 and USB 2.0 speeds, which is especially valuable for development of hubs supporting USB 3.0 and USB 2.0 specifications.

Control Computer

Analyzer

Host Under Test

Device Under Test

Host Emulation Setup

The USB Explorer 280 Generator is connected through a USB Explorer 280 Analyzer to a USB device. The Generator emulates the automated protocol processes of the USB host, while allowing the user full control over these processes, including arbitrary packet and error generation. The Analyzer records all traffic and gives real-time performance and compliance information.

Control Computer

Analyzer

Generator

Device Under Test
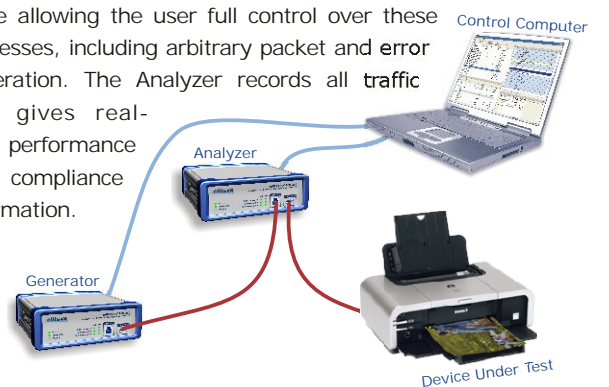
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Analyzer Applications

- USB host and device traffic monitoring
- Drivers and software stacks debugging
- Performance analysis
- Link state analysis

Generator Applications

- USB host and device emulation
- Testing of error recovery mechanisms
- Stress testing for performance
- Compliance verification

Analyzer Features

- Automatic detection of link speed
- Automatic detection of SS receivers
- Hardware triggering and filtering
- InstantTiming™ view for graphical, intuitive understanding of bi-directional traffic elements and critical timing measurements

Generator Features

- Generation of arbitrary packets with precise timing
- Error injection capabilities to test recovery mechanisms
- Replay of traces captured by analyzer
- Powerful scripting environment with integrated editor and debugger

Technical Specifications

Analyzer Characteristics

- Supported specifications: USB 3.0, USB 2.0, and USB 1.x
- Supported link speeds: 5GT/s, 480Mb/s, 12Mb/s and 1.5Mb/s
- Timestamp accuracy: 8ns for USB 3.0, and 16.7ns for USB 2.0/1.x
- Low-level error detection: CRC-5, CRC-16, CRC-32, state transition errors, invalid PID, framing errors, frame sequence errors, length errors
- Bus states: detection of SuperSpeed link operating states and all USB 2.0/1.x electrical bus states

Generator Characteristics

- Supported specifications: USB 3.0, USB 2.0, and USB 1.x
- Supported link speeds: 5GT/s, 480Mb/s, 12Mb/s and 1.5Mb/s
- Supported modes: host or device emulation
- Timing: 8ns for USB 3.0, and 16.7ns for USB 2.0/1.x

Embedded Memory

- 4 GBytes of FIFO Memory
- Data is stored in highly optimized format
- Analyzed data is uploaded in real time through a USB connection

Front-Panel Connectors

- Link under test: USB 3.0 STD-A and STD-B
- 8 SMA (early configurations as alternative front-end connection for SuperSpeed)

Rear-Panel Connectors

- Computer interface: USB STD-B
- Auxiliary equipment: supports connection of extension boards
- SMA trigger: in and out, 50 , max 5VDC
- Inter-equipment: in and out, supports connection of several units together
- Power: max 25W

Power Supply

- Universal 90-264VAC, 47-63Hz, Energy Star

InstantTiming™ View

- Horizontal zoom and pan modes
- Field-level fly-over descriptions
- Color-coded traffic elements

Front-panel Indicators

- Power: unit powered on
- Operating: unit performing requested task
- Trigger: trigger event detected

Enclosure

- 174 x 111 x 58 mm (6.9 x 4.4 x 2.3'')
- 1.2 kg (2.6 lbs)

Hardware Upgrade

- The decoding engine is automatically updated with each software release (no user intervention required)

Product Warranty

- Two years warranty

Ordering Information

Description	Code
USB Explorer 280 Analyzer (includes 1 hardware unit with USB analysis option, 1 CD-ROM, 2 USB cables and 1 carrying bag)	USBEX280A
USB Explorer 280 Generator (includes 1 hardware unit with USB generation option, 1 CD-ROM, 2 USB cables and 1 carrying bag)	USBEX280G
USB Explorer 280 Duo (includes 2 hardware units both able to operate as either analyzer or generator, 2 CD-ROMs, 4 USB cables and 2 carrying bags)	USBEX280DUO

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Options Chart

	Analyzer	Generator	Duo
Hardware units	1	1	2
USB analysis	yes		yes
USB generation		yes	yes
USB compliance		yes	yes