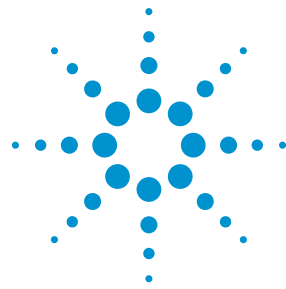


Agilent U4301A

PCI Express® 3.0
Analyzer Module



Data Sheet

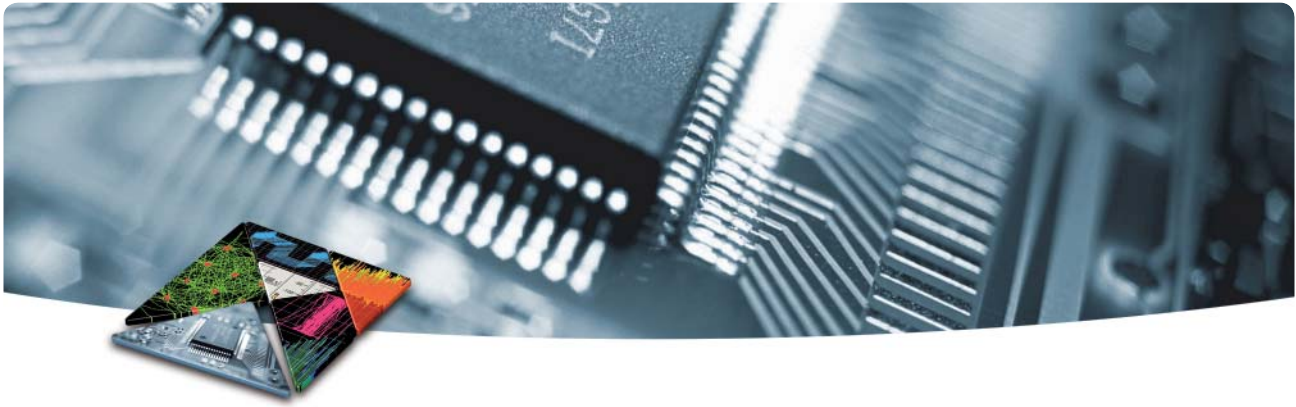


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... Agilent **MODULAR** Products



Agilent Technologies



OVERVIEW

Product description

Agilent Technologies' high speed U4301A PCI Express® 3.0 analyzer module is a protocol analyzer supporting all PCI Express® applications from Gen1 through Gen3 and speeds, including 2.5 GT/s (Gen1) and 5.0 GT/s (Gen2) through PCIe 8 GT/s (Gen3) and with link widths from X1 to X16. The U4301A analyzer captures and decodes PCI Express data and displays it in a Packet Viewer window.

The U4301A analyzer is a blade that is installed in an AXle two slot chassis or optionally the Agilent AMP two slot chassis.

Probing is provided by either the U4321A Solid Slot interposer or U4322A Mid Bus Probe based on Agilent's Soft Touch technology.

Stimulus and response testing of the PCIe system is accomplished with the addition of the U4305A PCIe Gen3 Exerciser. A link training sequencer state machine (LTSSM) exerciser provides stimulus for testing PCIe links up to the full speed of Gen3 systems.

Features

- Full speed support of PCIe generations 1, 2, and 3.
- Full speed support of X1, X4, X8 or X16 lane widths.
- Trigger in/out to synchronize with additional test tools
- Actual data displayed in lane view format with packet highlighting
- Stimulus response testing with the addition of the U4305A Exerciser
- Compact AXle modular system configuration

Analysis and debug



- Support for Gen1 through Gen3, x1 through x16 link width
- 4 GB of capture buffer per module
- Passive non-intrusive probing that leverages ESP technology

Industry leading probes



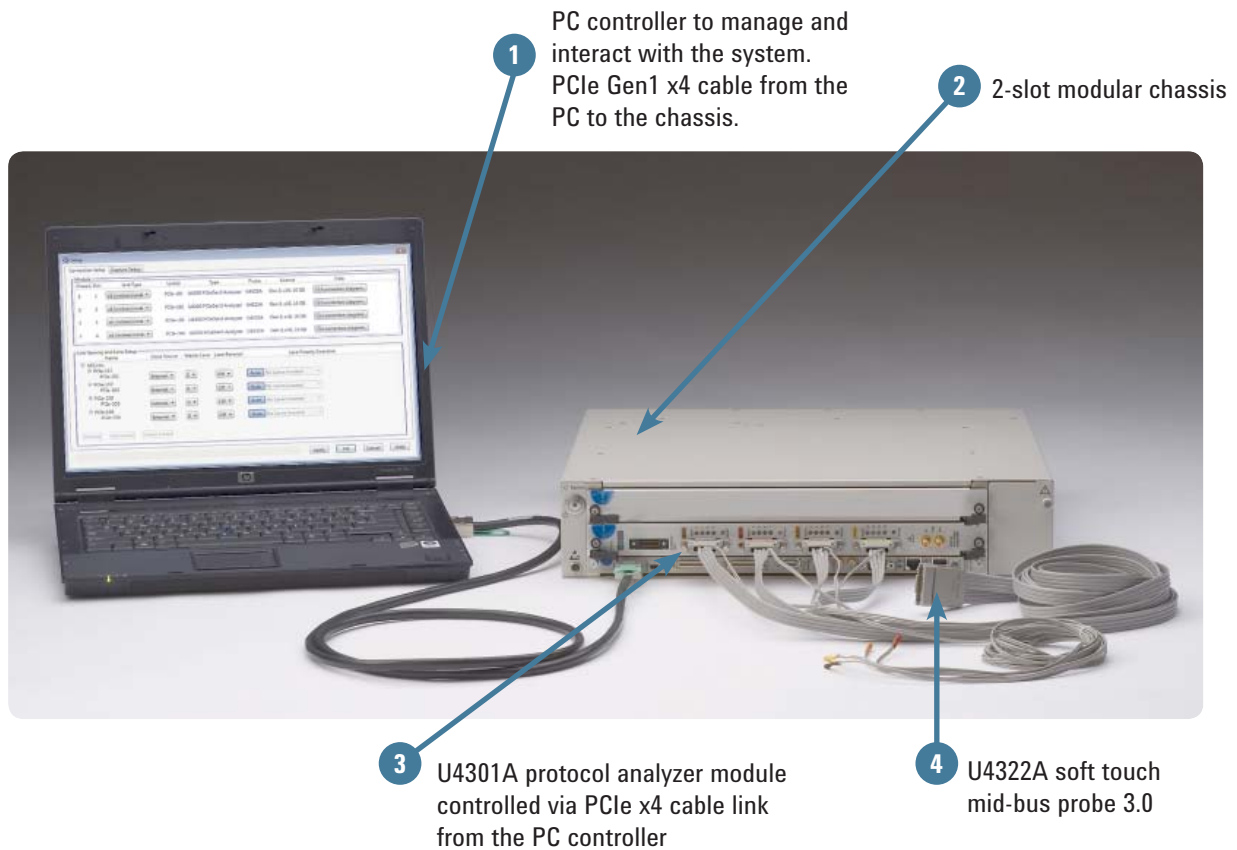
- The mid-bus probe supports x1 to x16 unidirectional or x1 to x8 bidirectional. The solid slot interposer will support x1 to x16 unidirectional or bidirectional.

Stimulus and test U4305A exerciser



- Support for Gen1 through Gen3 and link widths of X1 through X16
- Link testing from X1 through X16, using automated LTSSM exerciser
- PCIe, MR-IOV, and SR-IOV stimulus response testing
- Industry's smallest form-factor, and scalable architecture

SYSTEM ARCHITECTURE OVERVIEW



Configuration

Step 1	Order the U4301A analyzer module Select the option for the number of lanes to be tested and software license for 5 Gbps or 8 Gbps applications. Refer to the Ordering Information for details.
Step 2	Order a modular chassis Recommended chassis is the Agilent M9502A 2-slot AXIe chassis or optionally the Agilent M9505A 5-slot AXIe chassis
Step 3	Order the PCIe interface adapter and cable. Refer to Ordering Information for details.
Step 4	Order the probe for your measurement application <ul style="list-style-type: none"> • U4321A Solid Slot Interposer 3.0: Order the option for the number of lanes to be tested. • U4322A Mid Bus Probe based on Agilent Soft Touch technology
Step 5	Add the exerciser for stimulus/response testing <ul style="list-style-type: none"> • U4305 Exerciser: order the option for the number of lanes to be tested and software licenses for number of lanes to be tested as well as applications such as LTSSM, MR-IOV, and SR-IOV emulation.

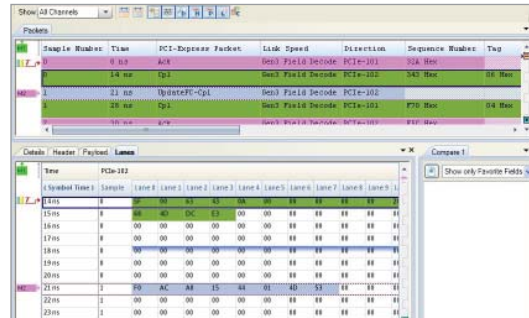
Note: The Slot Interposer and Exerciser lane width is fixed and is not upgradable due to the connector size being a function of lane width. A smaller lane width probe can be used in a wider lane application, but only those lower lanes will be tested. Agilent does not recommend or support the use of lane converters.

PRODUCT FEATURES AND BENEFITS OVERVIEW

U4301A Analyzer Module

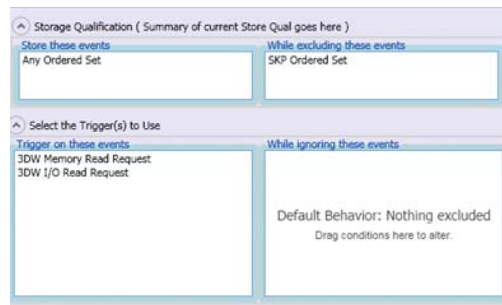
Effective presentation of protocol interactions from physical layer to transaction layer

- Lane view with packet highlighting to show the actual data on the bus
- Industry standard spreadsheet format protocol viewer with:
 - Highlighting by packet type or direction
 - Easy flow columns to better understand the stimulus and response nature of the protocols
 - Context sensitive columns to show only the relevant information, minimizing the need to scroll horizontally
- Flexible GUI configuration to meet debug needs, with pre-defined GUI layouts for Link Training debug, Config accesses and general I/O



Simple and powerful state-based triggering

- New simple trigger mode makes it easy to setup single event triggers
- Powerful state-based triggering including:
 - Four states supported in trigger sequencer.
 - Triggering on patterns (ordered set patterns or packet types).
 - Internal counters and timers.
- External trigger in/out



Powerful hardware features ensure capture of important transition events

- Large capture buffer, for long recording sessions with 4 GB per module (X1-X8 bidirectional) and 8 GB for X16 bidirectional
- PCIe Gen1 x4 link to the host PC, provides up to 10 Gb/s of data download saving valuable test time
- LEDs to show lane status and speed for fast understanding of current link status



U4301A Analyzer Module Characteristics and Specifications

*Environmental specifications as per the main frame except maximum operating temperature = 40 °C

Trigger input: Input Z = 50 ohms, Vmax = 3.3V

Trigger output: 2.0V

Minimum trigger duration: 20 ns

Host PC requirements

Processor speed: 1 GHz 32-bit (x86) or 1 GHz 64-bit (x64) 2 GB minimum available memory running Windows XP Professional (32-bit) or Windows 7 (32-bit or 64-bit);

Available hard disc space: 1.5 GB

Support for DirectX 9 graphics with 128 MB graphics memory recommended, (Super VGA graphics is supported).

Microsoft Internet Explorer 7 or greater.

Compatible with a PCIe Gen1 x4 interface module.

PRODUCT FEATURES AND BENEFITS OVERVIEW

Probing

Accurate data recovery with consistent representation of the signal

U4321A Slot Interposer

- ESP (Equalizing Snoop Probe) technology ensures accurate data recovery in all Gen3 platforms and all link width x1 through x16
- High fidelity signal capture ensures design problems can be reproduced
- Mechanical stabilization for the device under test's (DUT's) end point and to ensure firm PCIe slot connections



Characteristics

Power: 12vdc, 1.25A max

Power supply; Agilent part number 0950-5160

Input: 100-250 VAC, 50 to 60 Hz

Accurate data recovery with flexible use model

U4322A Mid Bus Probe

- Provides signal capture in situations where no PCIe connector is available.
- Micro spring-pin probe based on Agilent's Soft Touch technology provides reliable contact to signal pads
- Independent reference clock per four lanes for maximum layout flexibility



Characteristics

Input: 25V max or 3 Vrms into 250 ohms

Temperature: Operating 0 to 40 °C

Storage -40 to 70 °C

Humidity: 15 to 95% non-condensing

Altitude: 3,000 m (10,000 ft)

Thorough link testing

U4305A PCI Exerciser

- Addition of the U4305A provides PCIe,MR-IOV and SR-IOV stimulus response testing
- Predefined LTSSM sequences simplify state transition testing
- Full speed testing of Gen 1 through Gen 3 systems
- All lane widths supported at full speed
- End point emulation and act as a Down Stream Component (DSC)
- Root complex emulation and act as an Upstream Component (USC)



Specifications

Refer to the U4305A data sheet pub number 5990-8458EN for detailed characteristics and specifications.

ORDERING INFORMATION

U4301A analyzer module

A specific configuration is required to determine the lane width to be tested.

Model number	Description
U4301A-A01	Link width X1
U4301A-A04	Link width X4
U4301A-A08	Link width X8
U4301A-A16	Link width X16
U4301A-AN2	Software license for PCIe Gen2, 5 Gbps
U4301A-AN3	Software license for PCIe Gen3, 8 Gbps

Modular chassis and computer interface

The recommended chassis is the 2 slot AXIe configuration.

Chassis type	Model number	PC configuration	Interface	Cable
AXIe (recommended)	M9502A 2 slot AXIe	Lap top	M9045A	Y1200A
		Desk top	M9047A	Y1200A

Probe selection

Probe type	Model number	Description
Solid slot interposer 8 Gbps <i>Note: The U4321A Interposer probe lane width is fixed and is not upgradable to accommodate different lane widths due to the fact that the connector size is a function of lane width. Agilent does not recommend or support the use of lane converters.</i>	U4321A-A01	Link width X1
	U4321A-A04	Link width X4
	U4321A-A08	Link width X8
	U4321A-A16	Link width X16
Mid-bus probe	U4322A	Mid-bus probe based on Agilent Soft Touch technology for applications where no standard PCIe connector is available for testing
	U4322A-R05	Set of 5 retention modules
	U4317A	Gen3 to Gen2 mid bus adaptor

Stimulus/response tester

	Model number	Description
Exerciser card	U4305A-E01	Link width X1
	U4305A-E04	Link width X4
PCIe exerciser and PCIe LTSSM exerciser for PCIe 3.0, PCIe 2.0 and PCIe 1.0 <i>Note the U4305A PCIe exerciser lane width is fixed and is not upgradable to accommodate different lane widths due to the fact that the connector size is a function of lane width. Agilent does not recommend or support the use of lane converters.</i>	U4305A-E08	Link width X8
	U4305A-E16	Link width x16
	U4305A-EX3	Software license for the Exerciser
	U4305A-LT3	LTSSM software license
	U4305A-MR2	Multi-root visualization software license
	U4305A-022	ECRC testing
	U4305A-023	SR-IOV emulation
	U4305A-024	Increase to 5 function emulation

Related Agilent Literature

Publication title	Pub number
Hardware and Probing for PCI Express Gen3 User's Guide available at Agilent.com/find/U4301A	
Agilent Technologies PCI Express® Design and Test – From Electrical to Protocol Brochure	5989-5594EN
Agilent Technologies U4305A PCIe 3.0 Exerciser, Data Sheet	5990-8458EN



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