

PCI-Express™ Serial Analysis Probe

For Use With Agilent Logic Analyzers

FuturePlus Systems
Power Tools For Bus Analysis



FS4400 Serial Analysis Probe

- Low-cost PCI Express analysis
- ExpressCard™ support
- Supports most Agilent 16700-16800- and 16900-series logic analysis systems
- Includes protocol-decode software with Transaction Viewer
- Includes automatic logic analyzer configuration software



FuturePlus® FS4400 Key Features

- Support for X1, X2, X4, X8 and ExpressCard
- Data acquisition up to 2.5 GT/s
- 2- and 4-lane lane deskew for PCI-Express in both 8b and 10b data modes.
- Detects packet types and checks packet delimiters
- Packet-aware data filtering and logic analyzer triggering.
- Supports up to two machines for upstream and downstream directions or for two unrelated single direction links.
- Probe Manager software executes on a logic analyzer or PC for real time control

Straightforward, Reliable PCI Express Protocol Analysis

The FS4400 provides a mechanical, electrical and software interface between a PCI-Express bus and an Agilent logic analysis system. The probe provides quick, reliable connections to the system under test. Internal termination networks minimize loading effects and reflections on the PCI-Express bus. The protocol-decode software decodes and displays incoming data on your logic analyzer.



Helping You Design Tomorrow's Computer Buses, Today

FuturePlus Systems is the technology leader in protocol analysis tools for the computer design industry. Our analysis probes and software help you monitor and verify complex activities on your advanced-technology computer bus design. FuturePlus Systems offerings include bus-analysis solutions for HyperTransport®, PCI-X, DDR Memory, USB2.0, and most other popular computer buses.

Full-featured, Low-cost PCI Express Protocol Analysis

The FS4400 PCI Express Protocol Analysis Probe is a low-cost logic analyzer analysis probe capable of non-intrusively probing a PCI-Express bus at a serial data rate of 2.5 Gbps. It is equipped with a full-sized mid-bus probe that can intercept various combinations of 8 channels out of the possible 16. Protocol decode software is included to decode and display incoming data using an Agilent logic analyzer. The probe and decode software are designed to handle a single uni-directional link, a pair of uni-directional links, or a bi-directional link (both links may have a different Reference Clock).

The probe hardware and decode software treat the two links individually. For analysis of interactions between two links, the logic analyzer inter-machine triggering function is used. For comprehensive protocol analysis, decode software merge functionality is available.

With the FS4400, the X1, X2, X4 and X8 "bidirectional" footprints can be probed at all locations. The unidirectional footprint is also supported.

Protocol-decode Software

The probe acquires serial data, converts it to parallel form, recognizes and filters packets, and clocks the information into the analyzer. The data sent to the analyzer includes:

- Captured data (in 8b or 10b representation)
- Information about packet types
- Packet state information
- Packet recognizers, and error indicators

This data is processed by the protocol decoder for display of packets, transactions and errors. Although the probe hardware has the ability to filter and trigger, the software interface provides bits arranged to support the use of logic-analyzer-based trigger functions, even on packet-based data.

Probe Connections

The FS4400 accommodates a variety of connection methods. Choose from interposer, mid-bus and lead-set cables, as well as connections supporting standard industry connectorless probing technology.

Sample Number	String	Hex	Hex0	Hex1	Hex
-42	Log cal 8b	7 8905	000	000	
-41	Log cal 8b	7 8905	000	000	
-38	Log cal 8b	7 8905	000	000	
-37	Log cal 8b	7 8905	000	000	
-36	Log cal 8b	7 8905	000	000	
-35	Log cal 8b	7 8905	000	000	
-34	Log cal 8b	7 8905	000	000	
-33	Log cal 8b	7 8905	000	000	
-25	Data=25000000h	7 8905	000	000	
-21	Data=00000000h	7 8905	000	000	
-20	Data=00000000h	7 8905	000	000	
-14	Data=00000000h	7 8905	000	000	
-3	Data=00000000h	7 8905	000	000	
9	Data=40000000h	7 8905	000	000	
10	Data=00000000h	7 8905	000	000	
28	Data=00000000h	7 8905	000	000	
29	Data=00000000h	7 8905	000	000	
30	Data=00000000h	7 8905	000	000	
42	Data=07000000h	7 8905	000	000	
47	Data=00000000h	7 8905	000	000	
49	Data=13000000h	7 8905	000	000	
53	Data=20000000h	7 8905	000	000	
56	Log cal 8b	7 8905	000	000	
57	Log cal 8b	7 8905	000	000	
58	Log cal 8b	7 8905	000	000	

Protocol Decode Display

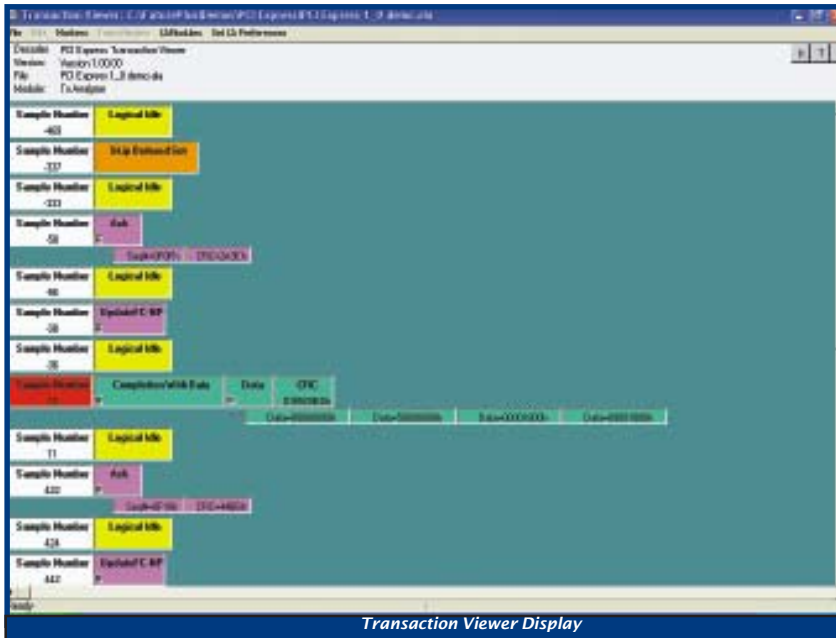
Probe Manager Software

Probe Manager software runs on a logic analyzer or a Windows PC and interfaces to the probe via a USB interface. The software provides an interface to setup and monitor probe pattern recognizers and filters.

Auto Configuration Gets You Up and Running Fast

The FS4400 includes configuration files that set up the Agilent logic analyzer labels, symbols, and clock assignments necessary for correct capture and decode of the PCI Express data.

These files provide rapid setup, letting you begin analyzing data in just a few minutes.



Transaction Viewer A graphical View of Bus Transactions.

The FS4400 includes Transaction Viewer software that runs on your 1680- 16800- or 16900-series logic analyzer to graphically display bus transactions. Start with a high-level summary view for quick scanning of transactions. Then use the drill-down feature to expose lower-level details of transactions of interest.

Key Features of the FS4400 PCI Express Protocol Analysis Probe

- Data acquisition up to 2.5 Gb/s
- Two-way monitoring of X1, X2, X4 and X8 links
- Spread spectrum clocking support
- Packet-level decode
- Support for Ordered Sets, TLP, DLLP and Electrical Idle
- Fast Training Sequence (without extension bit) synchronization in 14-16 FTS
- Six Separate 24-byte pattern recognizers sufficient for the maximum PCIe header size in 8-bit decoding mode
- Software controlled polarity inversion and lane reversal
- Filtering by traffic class or virtual channel (8-bit decoding only)
- Jitter specification (valid data eye) - 140 ps (0.65 unit interval)
- Two Link Processors
- Two Reference clocks
- Performs 2- and 4-lane word align (lane deskew) for PCI-Express in both 8b and 10b data modes.
- Power - +5V DC external supply, included
- Detects packet types and checks packet delimiters (minimal protocol checking).
- Provides means for user to enable or disable de-scrambling.
- Packet-aware data filtering and logic analyzer triggering.
- Supports up to two machines for upstream and downstream directions or for two unrelated single direction links.
- User-selectable lane inversion and lane-numbering reversal as needed to probe the target system
- Probe Manager software executes on a logic analyzer or a PC to control probe over a USB interface in real time
- Built-in 40- and 90-pin logic analyzer connectors eliminate the need for termination adapters.
- Several different adapter cables are available

Supported Agilent Logic Analyzers

Logic Analyzer Channel Requirements: The FS4400 requires from eight to 16 logic analyzer pods, depending on modules used and number of directions to be monitored.

Agilent 16900 Series - Supports X1, X2, X4 and X8, one- or two-way, with adequate module configuration

Agilent 16900-series supported Modules: 16750 -16752, 16753 - 16756, 16760, 19910, 16911 and 16950

Agilent 16800 Series - Supports X1, X2, X4 and X8, one- or two-way, with adequate number of pods

Agilent 1680 and 1690 Series - Supported for X1, one- or two-way only

Agilent 16700 Series - Supports X1, X2, X4 and X8, one- or two-way, with adequate module configuration

Agilent 16700-series supported Modules:16717A, 16718A, 16719A, 6750A, 16751A, 16752A 16753A, 16756A and16760A

See www.futureplus.com for the most up-to-date system-configuration details.

Ordering Information

FS4400.....PCI Express Analysis Probe

Choose one or more of the following adapter cables

FS1031..... Connectorless full-size footprint X1, X2, X4
FS1032..... Connectorless half-size footprint X1, X2 X4
FS1033..... ExpressCard Interposer
FS1034..... Interposer for X1
FS1035..... Interposer for X4
FS1036..... Flying Lead Set
FS1037..... Interposer for X8
FS1038..... Connectorless Full-size Footprint, X8, (Requires two FS4400s)
FS1039..... X8, Uni-shape (Requires two FS4400s)

Support

We offer excellent technical support and quick delivery.

Ask about our free newsletter, *The Bus Analyzer*

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