

DisplayPort 1.2 Link Layer Testing and Validation

Keysight Technologies and FuturePlus Systems

Accelerate the development of DisplayPort devices by analyzing Main link and Aux channel transactions simultaneously



DisplayPort is a digital display interface standard supported by the Video Electronics Standards Association (VESA). DisplayPort 1.2, provides much higher bandwidth allowing increased resolution and greater color depth in digital display devices. The DisplayPort architecture utilizes two separate buses that operate at different data rates. To perform link layer testing on this standard requires that both buses are probed and monitored in a way that is non-intrusive and that doesn't disturb the communications taking place between the digital display (Sink) and its driving device (Source).

The FuturePlus FS4439 DisplayPort 1.2 analysis probe addresses this problem by providing a mechanical, electrical and software interface between a Keysight logic analyzer and the DisplayPort link. The two DisplayPort buses are the uni-directional high-speed Main link operating at up to 5.4 Gbps and the bi-directional auxiliary (Aux) channel operating at 1 MB/s. Observing both links simultaneously requires two separate logic analyzers each operating with different clock domains.

- DisplayPort 1.2 analysis probe used with Keysight logic analyzers such as the 16900 and U4154 series
- Probes and monitors main link and aux channel simultaneously
- Analyzes 1, 2, or 4 lane DisplayPort links versions 1.1a and 1.2 MST, SST and eDP1.3
- Acquires data up to 5.4 Gbps
- Probe manager software for set up and control
- Powerful protocol decode software decodes and displays Main link and Aux channel activity
- Choice of cable Repeater or flying lead adapters to connect to system
- Reduces test time and accelerates product development

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The Keysight 16900 Series modular logic analysis system is ideal for this task. With two logic analyzer modules in the same logic analyzer frame, you can trigger one logic analyzer on an event on the auxiliary channel and then use that to trigger the other logic analyzer module that is monitoring the high speed main link. This cross-bus analysis technique is invaluable when troubleshooting multiple domain DisplayPort link layer problems that would be difficult to discern if only one link was observed.

The need to probe the bus physically without disturbing the communications offers a particular challenge, especially at 5.4 Gbps. FuturePlus offers two different probing techniques. The FS1036B flying lead adapter connects to the capacitors required for the AC-coupled DisplayPort signals on the motherboard of the Source. The FS1041 Repeater connects in series with the cable from the Source to the Sink. The FS1043 and FS1044 Repeaters provide connections to 30 and 40 pin eDP (embedded) links.

PC-based probe control software that is used to set up the probe for a test is included as part of the FS4439. The FuturePlus solution also includes logic analyzer software that acquires the data from the probe, reconstructs the link transactions, and displays them in standard DisplayPort mnemonics. The probe manager software controls the FS4439 via a USB link and defines complex protocol aware filters for use with the logic analyzer

The FuturePlus FS4439 can be used for the design and debug of computer motherboards, monitors, home theater systems, and silicon chips incorporating DisplayPort technology. The FS4439, when used in conjunction with an Keysight 16900 or U4154 series logic analyzer, allows you to test the two busses simultaneously saving you time and accelerating your product development.

System Components

Keysight Technologies

16902B	Modular logic analysis system
16950B	Logic analyzer module
16962A	Timing logic analyzer module
OR	
M9502A	AXIe 2 slot chassis
U4154B	Logic Analyzer Module, 136 channels, 2 required
U4201A	Logic Analyzer Cable, 4 required

FuturePlus Systems

FS4439	DisplayPort 1.2 analysis probe
FS1036B	Flying leads adapter (2.7Gbps)
FS1041	DisplayPort 1.2 cable Repeater
FS1043	Repeater for eDP 30 pin connector
FS1044	Repeater for eDP 40 pin connector

To learn how this solution can address your specific needs please contact Keysight's solutions partner, FuturePlus Systems
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Power Tools for Bus Analysis

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FuturePlus Systems has been in business for over 20 years and has become the world's leading manufacturer of analysis tools for industry standard computer buses. FuturePlus provides both the acquisition hardware and the software that executes in the Keysight logic analyzer.
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