DATA SHEET

D9010PAMA

PAM-N Analysis Software for Infiniium Oscilloscopes

The switch from NRZ to PAM creates many new design and measurement challenges. D9010PAMA gives you analysis capabilities for today's PAM systems, with the ability to grow as higher levels of PAM are introduced.

KEYSIGHT TECHNOLOGIES

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Product Overview

The Keysight D9010PAMA PAM-N analysis software extends the ease-of-use advantages of the Infiniium oscilloscopes to the analysis of PAM-3 or PAM-4 signals. A wizard walks you quickly through the steps required to setup measurements for a PAM encoded signal, to select methods for clock recovery, and then the measurements you wish to have performed on your PAM signal. Our PAM software is also able to accurately set the individual threshold levels of your PAM signal and render each individual eye.

Clock recovery

You can choose different, software-based clock methods that include first and second order phase-locked loop or constant frequency clock recovery. In addition, if you have a reference clock available, you can route that clock signal to an unused scope channel that you configure as an explicit reference clock for your PAM-4 signal. Transition qualified clock recovery delivers flexible transition-specific reference levels for patterns with low uniform density.

Electrical and optical analysis

D9010PAMA performs accurate analysis on electrical PAM-4 signals using measurements integrated directly into the Infiniium user interface (no external application is required). Communication links using PAM typically operate at much higher Symbol Error Rate (SER) than traditional NRZ links, so the analysis algorithms have been engineered to provide robust measurements on real world waveforms including those from severely degraded signals.

Since PAM-4 often uses forward error correction (FEC), it is now possible to use an oscilloscope to perform BER and SER testing. Use the BER/SER measurements to determine error count and to show waveform location of errors for repeating patterns (such as PRBS7 1). BER/SER cumulative measures statistical BER level, and BER/SER per acquisition helps to identify and locate burst errors. PAM-4 eye unfolding shows location of BER/SER errors in your actual PAM-4 waveform.

Deeper analysis with de-embedding and equalization

The existing library of Infiniium optional software analysis features also support more advanced analysis of PAM signals, providing even more insight into your designs. Using the Infiniium signal processing interface tools for real-time oscilloscopes, you can (for example), cascade S-parameter models and/or equalizers to model your transmission line, or backplane, and receiver.

The optional D9020ASIA includes InfiniiSim Serial Data Equalization Software, which adds powerful software equalization capability. You can leverage CTLE and FFE/LFE.

The optional D9010DMBA includes InfiniiSim Basic, which can simulate PAM signals at the end of a channel (embed) or remove the effects of a cable or channel (de-embedding). If you need to simulate more than one element to de-embed or embed, consider D9020ASIA, which includes InfiniiSim advanced.

Features Supported

Decode Specifications and Characteristics	
Oscilloscopes supported	90000 Series, S-Series, V-Series, Z-Series, UXR-Series
PAM levels supported	3, 4
Eye measurements	Eye center, eye width, eye height, eye skew, eye level
Level measurements	Level mean, level RMS, level thickness, level skew
Other measurements	Rise/fall times (for all edges at once) Noise measurements (levels can be specified, graphed) Jitter measurements (levels can be specified, graphed) BER (cumulative or per acquisition) SER (cumulative or per acquisition) PBRS13Q (J4u, Jrms, EOJ) Clock recovery rate Pattern length
Equalizers	CTLE, FEE/LFE (requires D9020ASIA)
De-embedding of:	Channels, cables, fixtures (requires D9010DMBA)

Ordering information and related literature

This option is offered as perpetual or time-based (subscription) license, as described in the tables and examples below. A valid support contract is included in the pricing for the term of any time-based licenses. For perpetual license holders, a separate support contract is required to access Keysight technical support and receive software updates.

Types	Description	Pricing Formula
Node-Locked	Allows you to use the license on one specified instrument/computer	
Transportable	Allows you to use the license on one instrument or computer at a time. This license may be transferred to another instrument or computer using Keysight's online tool.	130% of node-locked
USB Portable	Allows you to move the license from one instrument/computer to another by end-user only with a certified USB dongle, which is purchased separately.	130% of node-locked
Floating	Allows you to access the license on networked instruments / computers from a server, one at a time. For concurrent access, multiple licenses may be purchased.	140% of node-locked
Perpetual	Software license can be used in perpetuity.	
Time-Based	Software license is time limited to a defined period, such as 12 months.	38% of a perpetual for a 12-month license
Support contract (for perpetual licenses)	Allows license holder access to Keysight technical support and all software upgrades.	15% of perpetual for 12 months of support

Software license and support subscription contract model number format:

R-B	<Term / Service>	P -	<License Type> -	<License / Support Contract Term>
	4 = Time Based License 5 = Perpetual 6 = Subscription		001 = Node-Locked 002 = Floating 004 = Transportable 005 = USB Portable	A = Fixed B = Floating (Single Site) D = Floating (Transportable Perpetual) E = USB F = 6 Month Term L = 12 Month Term X = 24 Month Term Y = 36 Month Term Z = 60 Month Term

Examples

Software License and Support Configuration Examples	Model Number	Perpetual License	Support Contract
Node-locked perpetual license and 12-month renewable support contract (most common) for an Infiniium S-Series	D9010PAMA	R-B5P-001-A	R-B6P-001-L
Floating 24-month license subscription for an Infiniium Z-Series	D9020PAMA	N/A	R-6BP-002-X

Benefits of flexible license types (transportable, floating, USB portable)

- Maximize the flexibility of your test assets by sharing measurement applications between your Infiniium oscilloscopes
- Save money and increase your return on test asset investments as project needs change by purchasing fewer applications per instrument
- Save time by transporting the licenses to the test bench nearest you, instead of physically moving the test equipment or DUT
- Use the same application in different time zones, departments, and/or test benches
- Keep up with your changing project needs by transporting measurement application licenses; use a simple Keysight server connection with an instrument or a PC to check-in/out licenses

Related literature

Type	Description / URL
Brochure	Infiniium S-Series (500 MHz to 8 GHz real time oscilloscope)
Brochure	Infiniium V--Series (8 GHz to 33 GHz real time oscilloscope)
Data Sheet	Infiniium UXR Series (13 GHz to 110 GHz real time oscilloscope)
Brochure	30 Things Only Infiniium Oscilloscopes Can Do

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

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