Signal Integrity Test Confidence Achieved Through Cable Superiority

As digital communication systems continue pushing toward higher data rates, links become increasingly sensitive to noise and transmission impairments, with less tolerance for signal degradation before errors occur. As a result, engineers must accurately simulate and evaluate real-world channel conditions to ensure reliable system performance.

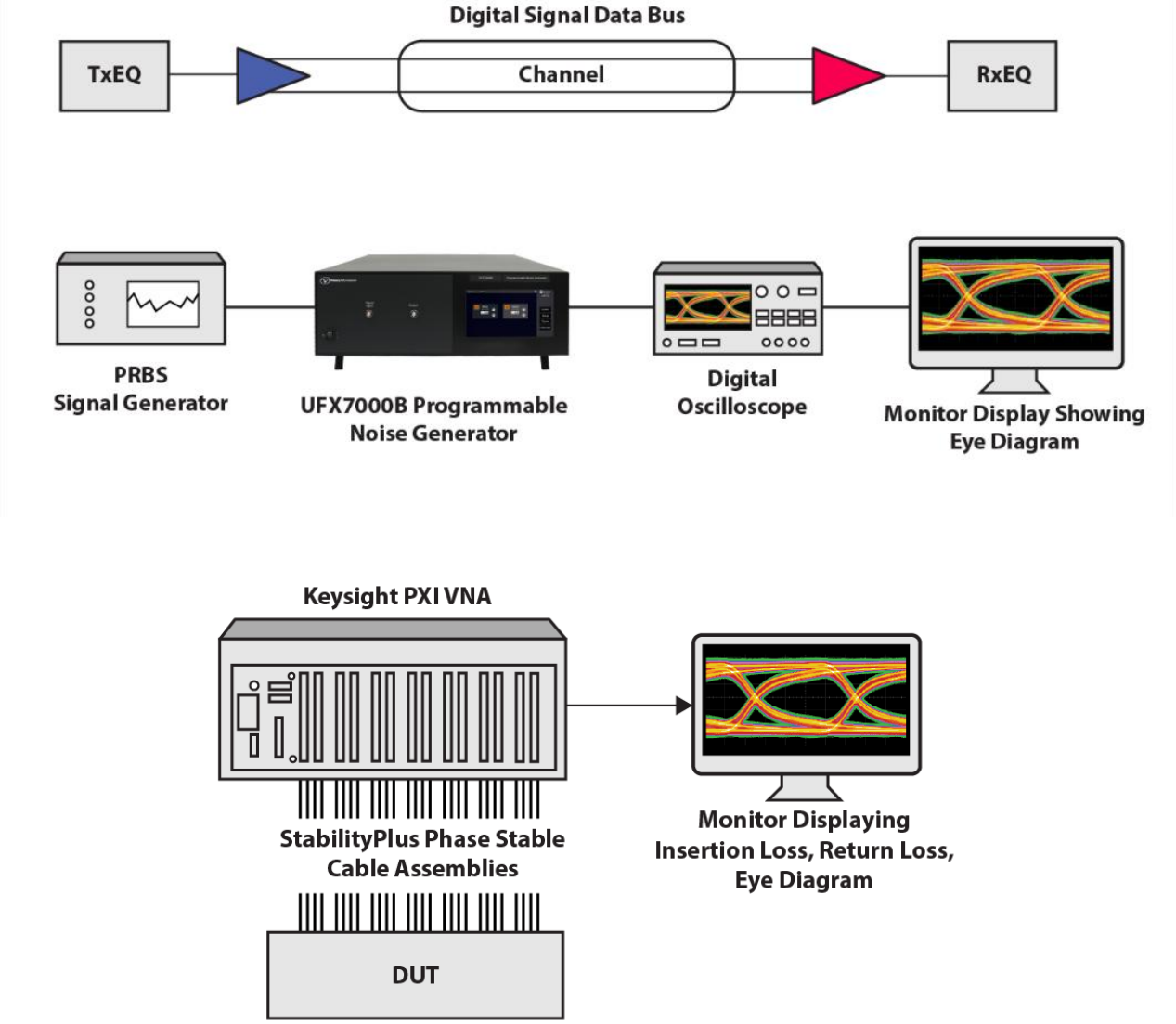
This demonstration shows how the Maury Microwave UFX7000B Programmable Noise Generator injects controlled additive white Gaussian noise (AWGN) into a high-speed digital signal path to evaluate signal quality and overall link performance. A PRBS signal generator creates a pseudo-random binary sequence that acts as the clean transmitted data stream for testing. The PRBS signal is fed into the UFX7000B, which adds broadband AWGN to vary carrier-to-noise conditions and emulate real-world impairments.

The impaired signal is then analyzed on a digital oscilloscope using an eye diagram, which displays signal quality over time. As noise is combined with the signal, the eye opening begins to close. The reduced eye opening indicates signal degradation, lowering the receiver SNR threshold and increasing the bit error rate (BER). The precision attenuators allow AWGN to be added in small step sizes for precise BER testing on high-speed signals while providing test repeatability.

Also featured is a high-speed digital interconnect measurement setup utilizing a Keysight PXI multiport VNA and Maury StabilityPlus™ phase stable cable assemblies. The system characterizes cables, connectors, and backplanes through measurements such as insertion loss, return loss, and eye diagrams, supporting high-speed serial link validation, PCIe/Ethernet/PAM4 characterization, channel compliance testing, and TDR/TDT measurements. StabilityPlus cable assemblies help ensure excellent measurement repeatability and high-confidence results.

2900 Inland Empire Blvd., Ontario, CA 91764 USA
+1 909 987 4715 +1 909 987 1112 sales@maurymw.com maurymw.com

Demo Setup



Target Users

Target users include RF and test engineers who need to characterize high-speed interconnects, validate link performance, and evaluate signal integrity under realistic noise conditions.

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Product Overview

UFX7000B Programmable Noise Generator

The UFX7000B broadband AWGN generator has a powerful single board computer with a flexible architecture used to create complex custom noise signals for advanced test systems. This versatile platform allows the user to meet their most challenging design requirements. Precision components provide high output power with superior flatness, and the flexible computer architecture allows control of multiple attenuators, switches, and filter banks.

KEY SPECIFICATIONS AND FEATURES:

- Output White Gaussian noise
- Output power up to +30 dBm
- 127 dB of attenuation; 0.1 dB step size
- Units > 2 GHz have total attenuation of 79.9 dB
- Low distortion signal path
- Power 115 VAC, 60 Hz

StabilityPlus Cable Assemblies

StabilityPlus (SP-series) sets the standard for high-performance ruggedized microwave/RF cable assemblies. Designed specifically for phase-stable and amplitude-stable applications, the SP-series offer excellent measurement repeatability even after cable flexure.

KEY SPECIFICATIONS AND FEATURES:

- The industry's best amplitude and phase stability with flexure
- Flexible to facilitate easy installation
- Durable, ruggedized and crush-resistant
- Color-coded connectors to avoid damage caused by connector mismatch

More Resources

Visit maurymw.com/info/ims-2026 to learn more about Maury solutions.

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