RSoft Application: 10GBASE-LRM Gigabit Ethernet Backbone

Providing Connectivity to the Internet of Things

Overview

A U.S.-based Internet of Things (IoT) system designer wanted to explore ways of upgrading existing 1 Gbps Ethernet links to support 10 Gbps over the same distance in compliance with the IEEE 10GBASE-LRM standard.

The Challenge

Ethernet connectivity is essential for interconnected devices in IoT. Upgrading existing 1 Gbps to 10 Gbps while maintaining the IEEE-specified distance of 300 meters is challenging due to modal dispersion in multimode fiber systems. In addition, single-mode fiber and advanced modulation formats can be expensive.

The Solution

RSoft™ ModeSYS™ provides powerful modeling capabilities for multimode fiber (MMF) systems. Feed-forward and decision feedback equalization (FFE, DFE) can be applied in electronic domain for compensating modal dispersion penalties.
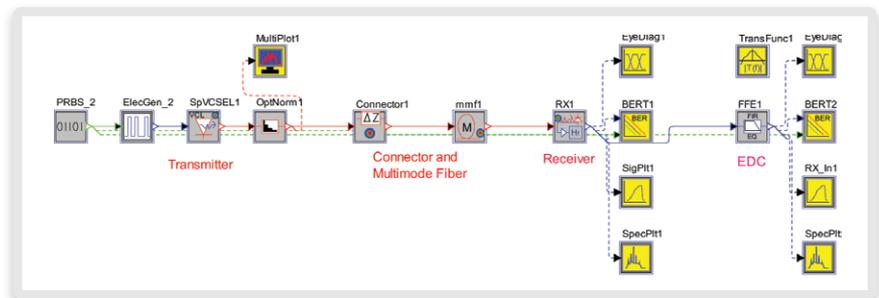

Figure 1. 10GBASE-LRM layout in ModeSYS

OptSim™ and ModeSYS provide a library of models including FFE and DFE with optimization options.

Figure 2. Parameter window of the FFE model to specify information on equalizer taps

The Result

The received eye (Figure 3, left) at 10Gbps over 300 m of MMF shows intersymbol interference (ISI). A 3-tap FFE with optimized weights can compensate for the modal dispersion (Figure 3, right), thereby making it possible to upgrade existing 1Gbps systems over existing MMF to 10Gbps in compliance with the IEEE 10GBASE-LRM standard.
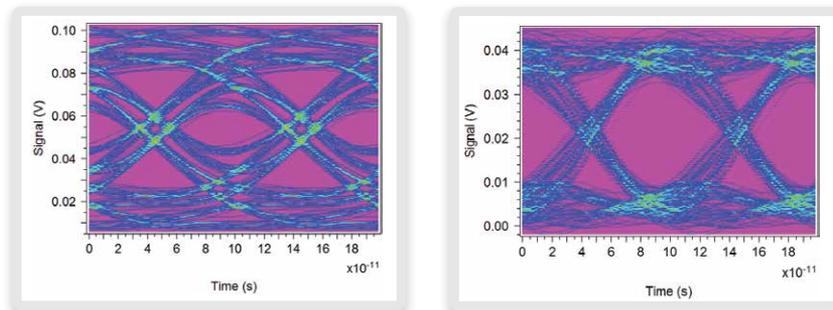

Figure 3. ModeSYS received eye before (left) and after (right) EDC

For more information, please contact Synopsys' Optical Solutions Group at (626) 795-9101, visit http://optics.synopsys.com/rsoft/, or send an e-mail to rsoft_sales@synopsys.com.