Time domain reflectometry (TDR) is the standard technique used to verify the performance of high-speed interconnects. Standards such as Thunderbolt, PCI Express, SATA, HDMI, DisplayPort, and USB 3.0 and others increasingly call for the use of S-parameters and impedance measurements to ensure system performance and interoperability. A vector network analyzer equipped with time domain reflectometry provides the rapid, accurate and robust measurements you need to efficiently characterize your high-speed interconnect designs.

The latest high-speed interconnect standards implement much higher, multi-Gbps, transmission rates. Thunderbolt specifies a bit rate of 10 Gbps and greater, SATA up to 6 Gbps and USB 3.0, 5 Gbps. These signals place a greater burden on the physical channel. With this increase in bit rate, issues such as reflection and losses cause distortion in digital signals leading to bit errors. Timing skew of signal paths becomes critical as the acceptable time margin for proper device operation decreases. The ability to make accurate return loss and eye mask measurements is critical to ensure your high-speed interconnect devices operate correctly and conform to the relevant standards.

Ensure your high-speed interconnect designs conform to the relevant standards

- Network analyzer time domain reflectometry measurements
- For characterizing all high-speed interconnects
- Ensure your devices conform to standards
- GRL testing services based on Keysight E5071C Option TDR
- E5071C Option TDR allows fast, accurate measurements
- Simple and intuitive interface, high resistance to ESD
Network Analyzer Time Domain Reflectometry Measurements

Granite River Labs (GRL) has exceptional experience in all aspects of signal integrity testing and provides a comprehensive range of test and characterization services for all of the high-speed interconnect standards. GRL provides signal and power integrity analysis, signal integrity model creation and validation, independent compliance testing, IC characterization and stress testing, debugging, and field failure support.

GRL uses a range of Keysight Technologies test equipment but when making time domain reflectometry measurements with a vector network analyzer it uses the Keysight E5071C ENA Option TDR.

The E5071C Option TDR combines both frequency and time domain analysis allowing a range of tests to be undertaken, including TDR/TDT and S-parameter measurements. Single connection forward and return transmission and reflection measurements allow the sources of losses, reflections and crosstalk to be rapidly located. The network analyzer also provides simulated eye diagram analysis eliminating the requirement for a separate pulse pattern generator. The instrument comes with a suite of predefined eye diagram masks that conform to the industry standards to allow easy comparison of actual to expected results.

The Keysight vector network analyzer provides the performance and accuracy required by GRL to meet the needs of its customers. By using the services of GRL based on the Keysight E5071C Option TDR you can ensure your high-speed interconnect devices are characterized comprehensively and meet all of the necessary standards.

System Components

<table>
<thead>
<tr>
<th>Keysight Technologies</th>
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<tr>
<td>E5071C</td>
<td>ENA network analyzer</td>
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<tr>
<td>E5071C-TDR</td>
<td>Enhanced time domain analysis</td>
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Granite River Labs provides a comprehensive range of signal integrity, stress test, compliance and characterization services for all high-speed interconnect standards.