

Advanced Measurements Seminars

Time Domain / Frequency Domain
Real-Time Acquisition from DC to 30 GHz
Best Practice for Signal Integrity

Reliable, accurate and repeatable measurements are fundamental to improving your design. Flexibility, processing capabilities and deep analysis give you confidence in your own design.



FREE of charge half-day seminars – select your 3 modules of interest

Five modules provide a comprehensive snapshot of many different key basic concepts associated with the best measurements practice leveraging on the latest innovative and affordable test equipment technology.

- **Module 1:** Time Domain Reflectometry (TDR) and S-Parameters Extraction
- **Module 2:** Jitter and Jitter Breakdown Analysis
- **Module 3:** Advanced Analysis for High Speed Serial Data Stream
- **Module 4:** Real-Time Acquisition from DC up to 30 GHz and 80 GS/s
- **Module 5:** "Sampling" and "Real-Time" Oscilloscopes

Each module will include a practical measurements example (Lab) using live signals and real-life products.

Both LeCroy sampling (WaveExpert 100H) and real-time oscilloscopes (Serial Data Analyzer Zi Series) will be used.

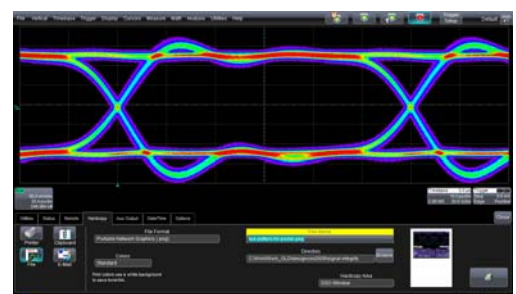
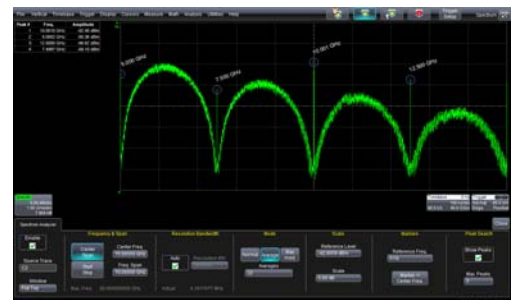
Register now:
Simply select your 3 modules of interest

Please return your registration by email to the LeCroy contact below or simply return the fax form on the back.

You will promptly receive a confirmation with full details.

Contact:

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Email: miguel@adler-instrumentos.es



Agenda LeCroy Seminar:

“Advanced Measurements ...not only Signal Integrity “

This half day seminar (max 3 different modules) will take place on (when) and (where)

This seminar will cover best measurement practice and basic theory and concepts for Signal Integrity organized in three different sessions.

✓ Module 1

Time Domain Reflectometry (TDR) and S-parameters extraction

Review of basic:

TDR and TDT single-ended and differential measurements; Deskew and Reference plane calibration; (NEXT/FEXT) Near End/Far End Cross-talk characterization; Return Loss / Insertion Loss and S-parameters extraction and definition; TDR vs. VNA.

Practical Lab:

TDR and TDT measurements and set-up (reference plane calibration and de-skew) using a Sampling Oscilloscope WE100H equipped with 2 x ST-20 TDR electrical sampling heads on a real board and S-parameter calculation.

✓ Module 2

Jitter and Jitter Breakdown Analysis

Review of basic:

Time Interval Error Measurements (TIE) and Reference Clock Recovery; the different types of jitter: Deterministic (Dj), Random (Rj), Data Dependent Jitter (DDj) and Inter-Symbolic Interference (ISI); How cross-talk is impacting Jitter; comparison about different jitter breakdown models: Spectrum-based and Q-scale.

Practical Lab:

Jitter and Jitter breakdown measurements on live PCI Express Gen2 (5 GBit/s) from a video card signal using a Real-Time Zi oscilloscope equipped with SDAII Serial Data Measurement suite.

✓ Module 3

Advanced Analysis for High Speed Serial Data Stream

Review of basic:

“How much bandwidth” for my serial data stream?; Eye Diagram and BER Contour (Iso-BER) mapping; test fixture de-embedding; back-plane emulation; Transmitter's Pre-emphasis and Receiver equalization: "The Receiver's Point of View"; SNR benefit using Virtual Probing.

Practical Lab:

Cable de-embedding and rise time accuracy improvement. Signal degradation on a real live signal emulating a backplane and recovery using receiver FFE equalization. Add/remove pre-emphasis at the transmitter and Experience the FFT, CTLE, DFE equalization at the receiver on a real live signal.

✓ Module 4

Measurements from DC up to 30 GHz on a Real-Time Acquisition

Review of basic:

DC to 30 GHz and 80 GS/s sampling rate: Digital Bandwidth Interleaving (BDI) technology; FFT and Spectrum Analysis benefits; Time Domain and Real-Time Frequency Analysis; Cable de-embedding; S-parameter de-embed/emulate on a real-life signal; Processing capabilities and custom algorithms implementation.

Practical Lab:

Signal analysis in the time domain and accuracy improvement de-embedding cables. Optimization of the frequency response based on application. Signal analysis in the Frequency domain using the FFT algorithm and using the Spectrum Analyzer emulation (SA option). De-embedding and emulating devices, providing S-parameters files, on a live signal. Implement processing and user-defined algorithms on live signal.

✓ **Module 5**

Measurement Accuracy using Sampling and Real-Time Oscilloscopes

Review of basic:

Sampling and Real-Time oscilloscopes: What are the differences?; Scope's performances : "How much Bandwidth and Sampling Rate do I need ?; Frequency Response and Frequency Response Optimization; Coherent Interleaving sampling (CIS) and Digital Bandwidth Interleaving (BDI) technology; Processing and custom algorithms implementation.

Practical Lab:

Optimization for the real-time oscilloscope of the frequency response based on application and frequency response for the sampling oscilloscope Implement processing and user-defined algorithms on live signal. Overview of time base and trigger functionalities. Compare the sampling and real-time oscilloscope on the same live signal.

Who Should Attend?

The Seminar modules have been tailored to those who wish to improve their own design and testing procedure using in the most effective way the today test equipment. Design engineers, research engineers, RF engineers, test and evaluation engineers interested in reliable, accurate and repeatable measurements and in getting deeper in the analysis using flexibility and processing capabilities. Engineer interested to enrich the theory technical background and to experience and practice innovative testing methodology in an affordable way.

The content will give the attendees a comprehensive snapshot of many different key theory concepts associated with the best measurement practice leveraging on the latest innovative and affordable test equipments technology.

Agenda can be tuned around the customer interest under previous agreement.