TELEDYNE LECROY
Everywhereyoulook™

LabMaster 10 Zi-A High Bandwidth Modular Oscilloscopes

20 GHz – 100 GHz

Key Features

- **Up to 100 GHz Industry leading analog bandwidth**
  - 4 channels at 36 GHz
  - 2 channels at 65 GHz
  - 1 channels at 100 GHz
- **Up to 240 GS/s sample rate**
- **Long Memory - Up to 1.5Gpt/ch**
- **Modular Design - build system with up to 80 36 GHz channels**
- **ChannelSync™ Architecture for 130 fs matching between channels**
- **Multi-Lane eye, Jitter and Noise Analysis with SDAIII-CompleteLinQ**
- **Optical Modulation Analysis with Optical-LinQ**
- **PAM4 Eye, Jitter and Noise Measurements with PAM4 Signal Analysis**
- **Industries only true hardware 14.1 GB/s serial trigger**

The LabMaster 10 Zi-A series of real-time oscilloscopes boasts the world's highest bandwidh and fastest sampling rate at 100 GHz and 240 GS/s. This world-leading performance is key to acquiring, analyzing and understanding the fastest phenomena found in R&D labs, where engineers are working on next-generation communication systems, high bandwidth electrical components and fundamental scientific research.

The Fastest Oscilloscope for the Most Demanding Signals

Whether working on communications technology capable of terabit/s symbol rates, analyzing the quickest and most energetic laser pulses, or building links using very high speed NRZ or PAM4 signals, the LabMaster 10 Zi-A Series oscilloscopes can acquire and analyze the waveforms.

For those who need more than two channels at the industries highest bandwidths, multiple LabMaster aquisition modules can be combined with one Master Control Module to build a system of up to 80 channels @ 36 GHz, 40 channels @ 65 GHz, or even 20 channels at 100 GHz.

Sophisticated Software for Sophisticated Analysis

The LabMaster 10 Zi-A Series offers an extensive set of standard math tools and add-on software packages that integrate seamlessly into the oscilloscope "MAUI" interface. LabMaster 10 Zi-A oscilloscopes excel at performing in-depth analysis of complicated signals. For NRZ signals, the SDAIII-CompleteLinQ package compares eye, jitter and noise on up to four lanes, simultaneously. With the Optical-LinQ package, analyze coherent optical signals such as DP-QPSK, DP-16QAM. Additionally, the PAM4 Signal Analysis package performs eye, jitter and noise measurements on PAM4 signals.Since the fastest signals often require custom analysis, LabMaster 10 Zi-A also comes standard with the ability to run MATLAB scripts in-stream.

World's Highest Bandwidth Real-Time Oscilloscope

LabMaster 10 Zi-A modular oscilloscopes break bandwidth, sample rate, and channel count barriers providing more "bandwidth density" than any other oscilloscope. Its modular design provides the simplest upgrade path in bandwidth and number of channels. In one acquisition module, it provides four channels at 36 GHz with the ability to use 20 modules, for 80 channels simultaneously.

Performance across multiple modules is guaranteed with ChannelSync, which ensures precise synchronization of all channels in all acquisition modules using a single distributed 10 GHz clock and a single trigger circuit. Synchronization is identical to that provided with a single oscilloscope, <130fsrms jitter between all channels.

The modular design means the LabMaster 10 Zi-A is future proof and upgrading is easy. Start with one acquisition module and add more channels or higher bandwidth modules later as needed.

No bitrate or symbol rate is too high for the LabMaster 10 Zi-A with industry leading bandwidth and sample rate. LabMaster 10 Zi-A is perfect for 10-16 Gb/s technologies such as 40/100 GBASE-R Ethernet, SAS12, and PCI Express Gen4 that benefit from 80 GS/s on four or more channels at up to 36 GHz. Ultra-high speed technologies, such as CEI-25/28, CEI-56, and coherent optical formats including DP-QPSK, 16-QAM, MIMO benefit from 65 or 100 GHz bandwidths and four or more channels.

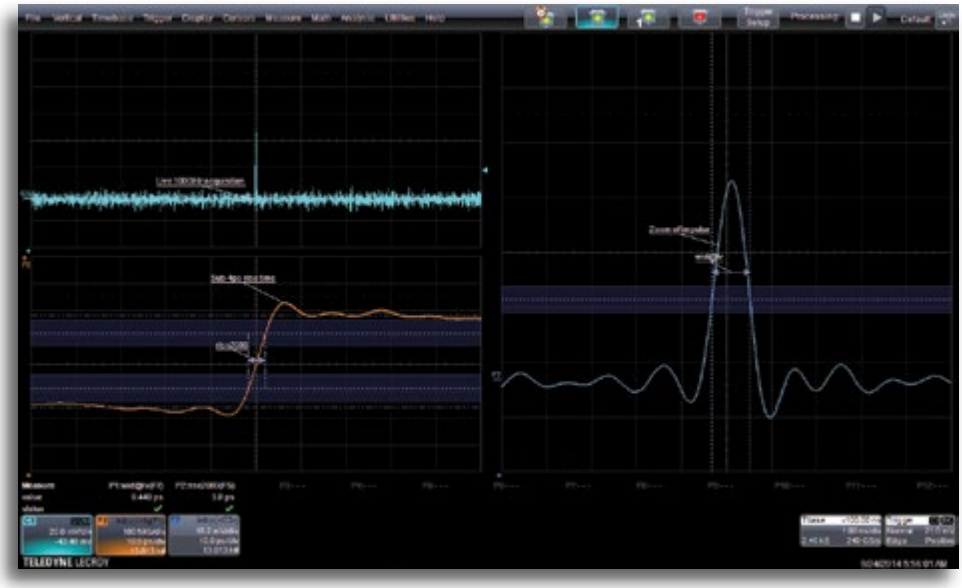
A LabMaster 10 Zi-A oscilloscope that provides one channel at 100 GHz, two channels at 65 GHz and four channels at 36 GHz

Add up to twenty acquisition modules for 20 channels at 100 GHz, 40 channels at 65 GHz or 80 channels at 36 GHz.

1. World's Highest Performing Real-Time Oscilloscope — 100 GHz bandwidth, (3.5 ps risetime$_{20\ –\ 80\%}$), 240 GS/s sample rate, up to 1.5 Gpts of analysis memory
2. Modular — start with four channels and grow the system over time.
3. Wide bandwidth upgrade range from 20 to 100 GHz provides long-term investment protection
4. ChannelSync architecture utilizes a 10 GHz distributed clock for precise alignment of all acquisition systems
5. Single trigger circuit for all modules eliminates additive trigger jitter that occurs with 10 MHz clocking and trigger synchronization of multiple conventional oscilloscopes
6. Simple modular setup, just connect and acquire signals.
7. 325 MB/s data transfer rate from the LabMaster to a separate PC with Teledyne LeCroy Serial Interface Bus (LSIB) option
8. Server-class multi-core processor combines with X-Stream II streaming architecture for fast acquisition and analysis — 20 cores of processing power and 32 GB of RAM standard, expandable to 192 GB
9. Utilize the built-in 15.3" widescreen (16 x 9) high resolution WXGA color touch screen display or connect a monitor with up to WQXGA 2560 x 1600 pixel resolution
10. Highly stable timebase (50fs$_{rms}$) over long acquisitions, low Jitter Measurement and Rj noise floor.
11. Deepest standard toolbox with more measurements, more math, more power
12. Eye Doctor™ II and Virtual Probe Signal Integrity Toolsets provide real-time de-embedding, emulation, and equalization on serial data channels
13. Up to 14.1 Gb/s Serial Trigger available – 80-bit NRZ, 8b/10b and 64b/66b symbol triggering

FASTEST DIGITIZER FOR THE FASTEST SIGNALS

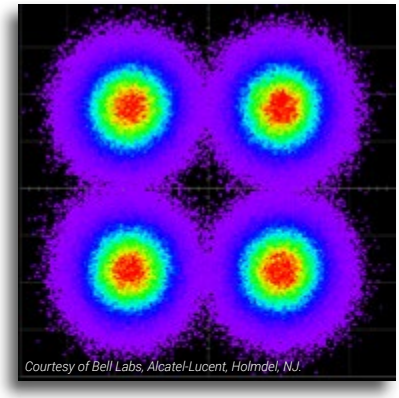
For over 30 years, Teledyne LeCroy has consistently shown industry leadership by pushing forward the limits of oscilloscope performance and waveshape analysis. The LabMaster 10 Zi-A continues this tradition of engineering excellence, incorporating custom chip design and patented innovations to reach unprecedented digitization performance: 100 GHz bandwidth and 240 GS/s sample rate.



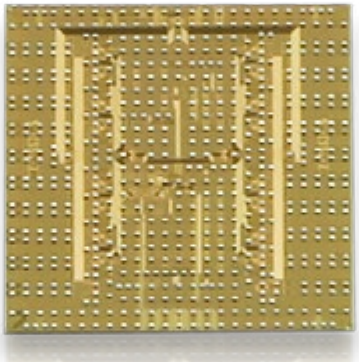
Acquisition and analysis of femtosecond laser pulse by LabMaster 10-100Zi-A.

Capturing and Characterizing the Fastest Phenomena

Scientific research of phenomena that occur at the shortest timescales require the fastest digitization speeds. At 240 GS/s, samples are acquired at time intervals of 4.17 ps, 50% faster than the next-fastest digitizer, yielding excellent signal reconstruction.
For applications and experiments requiring multi-channel, the patented ChannelSync architecture provides matching between channels that is unrivaled: <130 fs channel-to-channel jitter. Such precision is not possible with conventional methods of synchronizing two independent oscilloscopes. This synchronization is key for applications requiring closely matched channels, such as optical modulation analysis.



I & Q components from 160 GBaud QPSK signals are captured by a two-channel LabMaster 10-100Zi-A oscilloscope.



Custom Chip Design

The LabMaster 10 Zi-A acquisition system utilizes multiple custom monolithic ICs, including designs for the track & hold, analog-to-digital converters and fast acquisition memory. These designs are at the heart of our industry-leading 4 channel 36 GHz, 80 GS/s design. No other 4-channel oscilloscope on the market achieves 36 GHz bandwidth.

Digital Bandwidth Interleaving

Digital Bandwidth Interleaving uses high-precision diplexers and mixers to split the input signal into separate 36 GHz bands for digitization, and recombines them to achieve record breaking bandwidths. DBI technology, first used in 2005, is now in its 8th generation in the LabMaster 10-100Zi-A, where it is almost triples the 36 GHz ADC bandwidth to 100 GHz. In the LabMaster 10-65Zi-A, DBI is used in a doubler configuration to achieve 65 GHz bandwidth.

ENABLING HIGH-SPEED SERDES DEVELOPMENTS

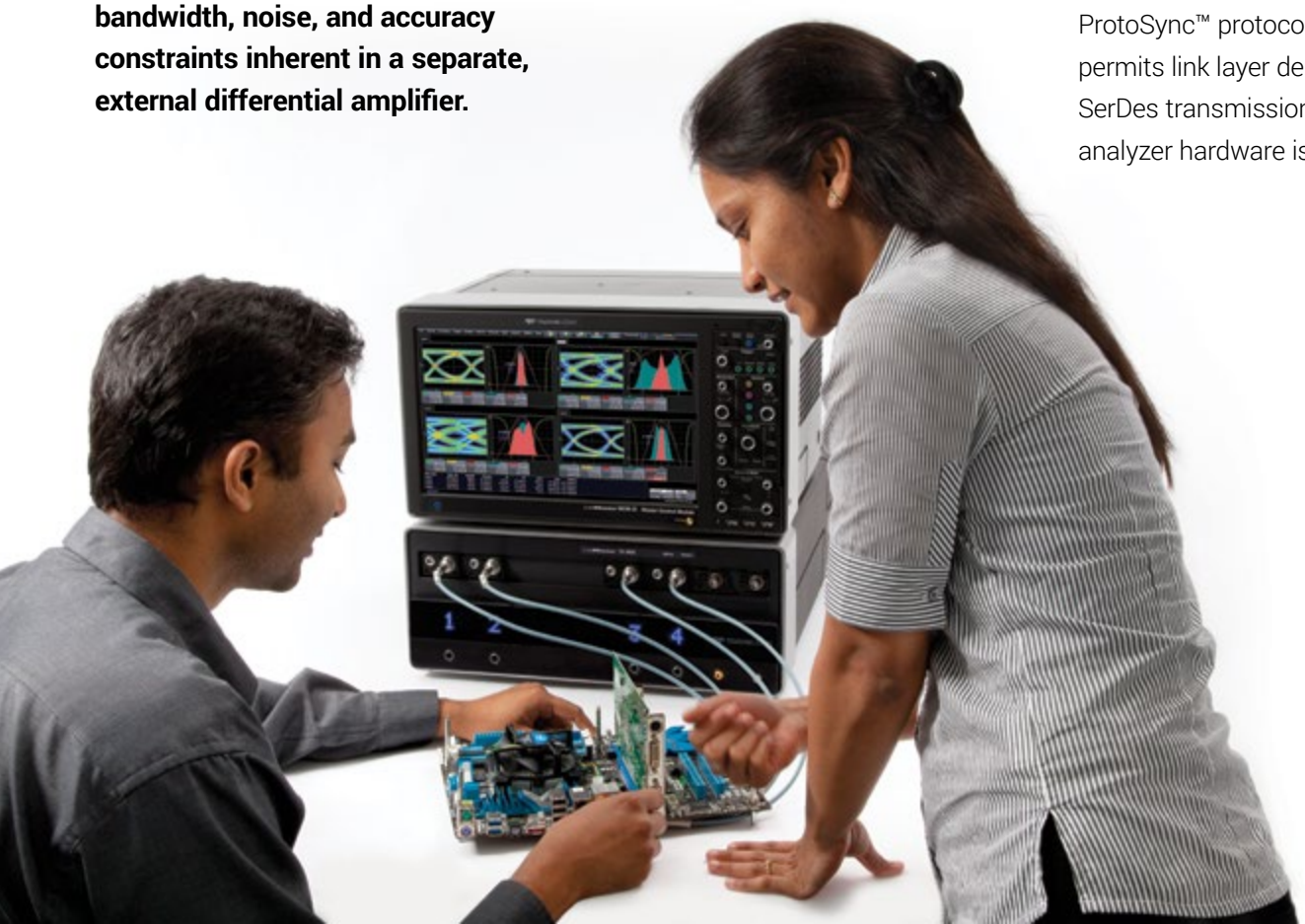
LabMaster 10 Zi-A is uniquely suited to the demands of the high-speed SerDes market. For differential signalling requirements, the LabMaster 10-65Zi-A provides two channels at 65 GHz, and accurately characterizes 28 – 32 Gb/s signals. Oscilloscope risetime$_{20-80}$% is an impressive 4.9 ps, a necessary speed when the unit interval (UI) is a mere 36 ps wide (or less). The 1024 Mpts/Ch acquisition memory provides the ability to capture very long waveforms, permitting deterministic jitter (Dj) decomposition on long patterns — something not possible in a sampling oscilloscope. Two input channels provides the ability to input a differential signal pair into the oscilloscope, eliminating the bandwidth, noise, and accuracy constraints inherent in a separate, external differential amplifier.

Multiple Configurations Provide Flexibility

In addition to 2 channels at 65 GHz, a LabMaster 10 Zi-A system will also provide 4 channels at 36 GHz for testing and debugging of multiple lanes at lower bandwidth. This can be especially useful for crosstalk analysis or lane skew testing when multiple lanes are deployed. Thus, a 65 GHz LabMaster can deployed in a variety of ways and serve many important application needs in the same lab. For the fastest digitization possible, use the 100 GHz LabMaster 10-100Zi-A acquisition module. Multiple MCM-Zi-A Master Control Modules and Acquisition Modules can even be mixed and matched as needs change.

Superior Serial Data/Crosstalk Analysis and Debug Tools

Teledyne LeCroy's SDAIII-CompleteLinQ Serial Data and Crosstalk Analysis products provide unique capability to simultaneously calculate, display and compare eye diagrams, jitter and noise measurements from four separate lanes or one lane probed or modeled in four different locations. EyeDoctorII and VirtualProbe tools use S-parameters to de-embed/emulate fixtures and interconnects and show you the signal where you can't put a probe. Use the optional 14.1 Gb/s true-hardware serial trigger for capturing rare events. A variety of serial decode annotations are available for common encoding schemes, as well as serial protocols. Teledyne LeCroy's combination of serial decoders and ProtoSync™ protocol analysis views permits link layer debugging on initial SerDes transmissions before protocol analyzer hardware is typically available.



WORLD'S LEADING OPTICAL MODULATION ANALYZER

LabMaster 10 Zi-A combines the world's fastest real-time bandwidth and four input channels with pristine signal fidelity to meet the advanced research and development requirements for optical coherent modulation analysis on long-haul telecommunication systems.

The World's Leading Optical Modulation Analyzer (OMA)

Teledyne LeCroy and Coherent Solutions Ltd have teamed up to bring you the world's highest performing OMA. The analyzer is comprised of a LabMaster 10 Zi-A oscilloscope and a Coherent Solutions IQScope-RT Series Coherent Optical Receiver, that is seamlessly integrated and controlled by the oscilloscope software. The integrated Optical-LinQ analysis software was co-developed by Teledyne LeCroy and Coherent Solutions.

Premiere Performance

No other OMA on the market delivers the performance of the Teledyne LeCroy / Coherent Solutions OMA. DP-QPSK signals with baud rates up to 130 GBaud are detectable by integrating an industry leading coherent receiver (with 70 GHz electrical bandwidth) with a 4-channel LabMaster 10-65Zi-A oscilloscope. The analyzer runs the Optical-LinQ software package, which includes all of the software tools and DSP algorithms to completely characterize the optical signal under test.

OMA with LabMaster 10-65Zi-A and IQScope-RT (Option HBW)

OMA system bandwidth: 65 GHz
Max detectable baud rate: 130 GBaud

OMA with LabMaster 10-36Zi-A and IQScope-RT (Option SBW)

OMA system bandwidth: 36 GHz
Max detectable baud rate: 72 Gbaud

IQScope-RT Series Coherent Optical Receiver

- Up to 70 GHz electrical outputs for X & Y polarization of I & Q signals.
- Built in LO, C and/or L band
- Laser wavelength/frequency and power adjustable via Optical-LinQ or front panel

coherent solutions

COMPLETE ANALYSIS WITH OPTICAL-LINQ

The Optical-LinQ software package performs optical modulation analysis when using either the integrated Coherent Solutions IQScope-RT or other coherent receiver.

Analysis of a DP-QPSK optical signal.

Extensive set of analysis tools

The Optical-LinQ software from Coherent Solutions includes an extensive selection of visualizations that let users gain a complete understanding of the quality and impairments in the transmitted optical signal. Visualizations include constellations, trajectories, eye diagrams and tracks, of I, Q, phase EVM, and much more. Parametric measurements include EVM%, I & Q Bias Error, Quad Error, IQ Skew and offset. See the OMA brochure for complete information.

True BER analysis

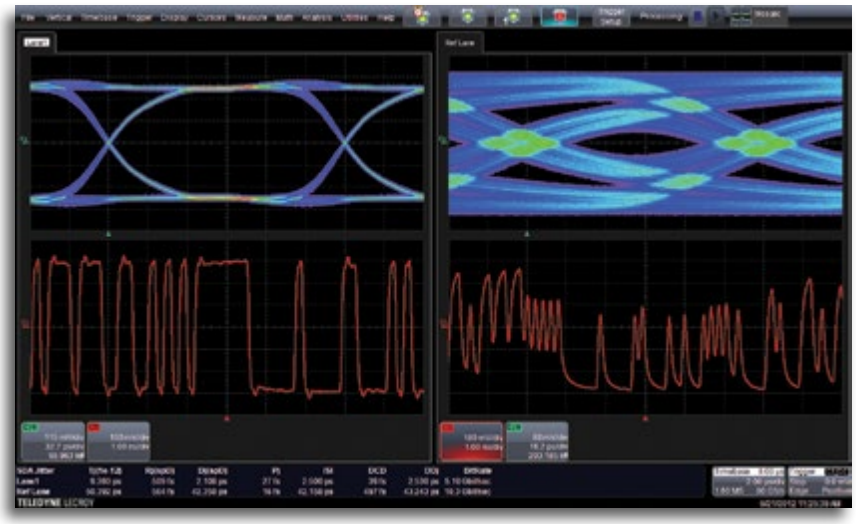
Optical-LINQ offers both quick and convenient BER Estimates along with true and accurate BER counting capabilities. The BER set up panel allows the configuration of the coding scheme from one of the common pre-set options, or any custom-defined bit sequence and multiplex options.

Use Built-in or Custom DSP Algorithms

Test and validation of digital signal processing (DSP) algorithms is a vital part of the transceiver development. Optical-LINQ is equipped with built-in DSP algorithms for polarization demultiplexing, dispersion compensation and carrier recovery such as CMA, MMA, and Viterbi & Viterbi to use as tested reference algorithms. The custom code integration feature permits validation of custom algorithms in MATLAB format.

Complete Modulation Format Support

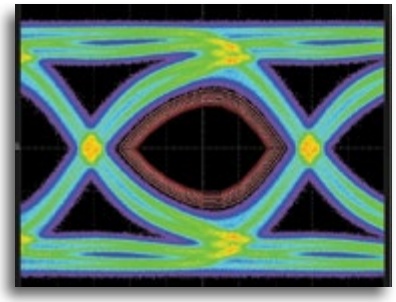
Optical-LINQ comes with pre-set support for many of the common optical modulation formats, including QPSK, 16QAM and 64QAM. If you are developing or working with non-conventional modulation formats, you can define your own format using Optical-LINQ's powerful custom modulation format definition capability



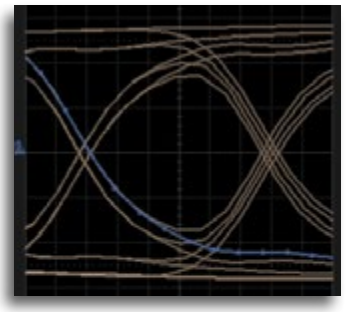
The Teledyne LeCroy SDAIII-CompleteLinQ Serial Data Analysis products contain multi-lane eye and jitter analysis, LaneScape™ comparison modes, vertical noise measurements, and crosstalk analysis tools. These capabilities provide the deepest insight into the behavior of multi- or single-lane serial data systems.

SDAIII Core Toolset

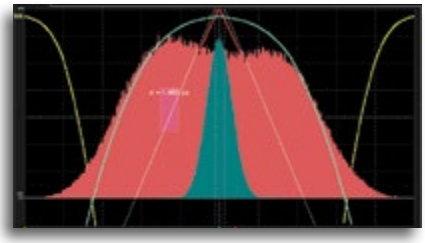
Teledyne LeCroy provides the most complete toolset in the industry for jitter measurements and eye diagram/jitter analysis. Rj and Dj are separated and Dj is decomposed using one of three dual-Dirac algorithms. Eye diagrams containing all acquired unit intervals are rendered 10-100x faster than competitive systems. Eye diagram analysis tools, such as the extrapolated IsoBER plot, aid insight. Multiple additional tools, such as Tracks, Histograms, and Spectrum waveforms, enhance the understanding of jitter causes. Sophisticated pattern analysis tools, such as Intersymbol Interference (ISI) measurements and plots, provide deep insight into Data Dependent Jitter (DDj) behavior.



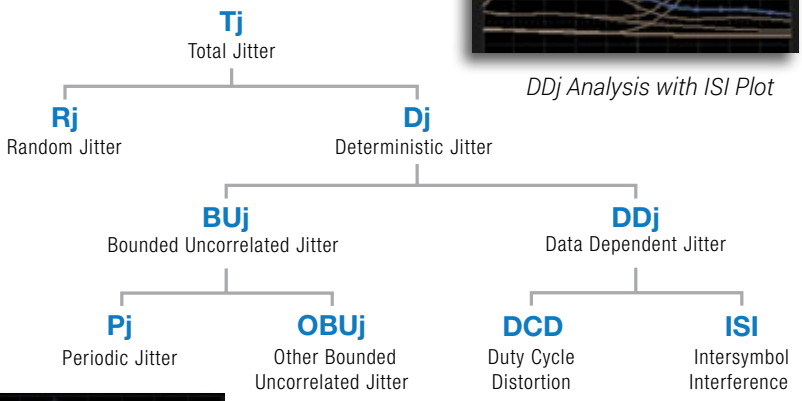
Eye with IsoBER

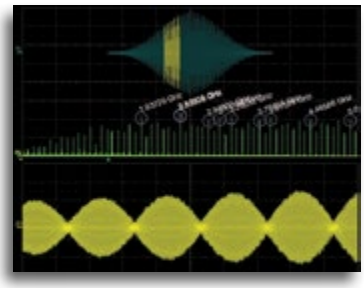


DDj Analysis with ISI Plot



Rj+BUj Analysis



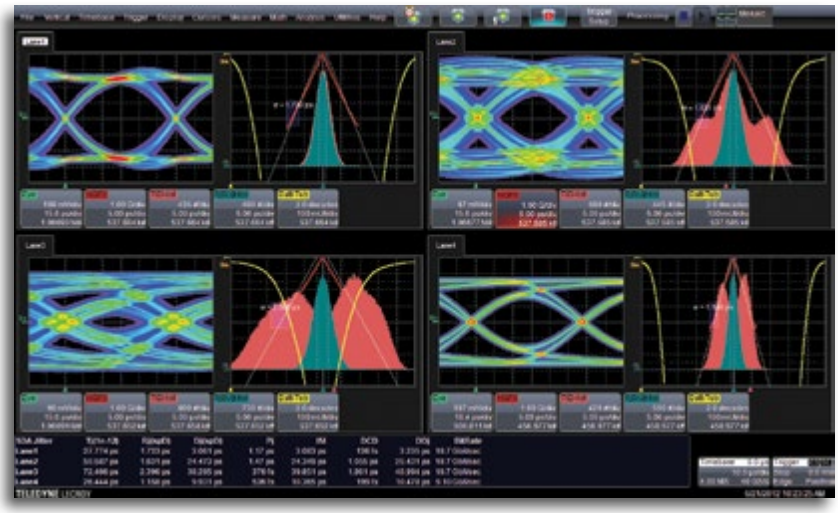


Pj Analysis

Three Jitter Methodologies

Choose from three dual-Dirac models to separate jitter into total, random and deterministic components (Tj, Rj, Dj). The Spectral Rj Direct method determines Rj directly from the jitter spectrum, and is the most used algorithm. Spectral Rj+Dj CDF Fit follows the FibreChannel MJSQ model. In situations where large amounts of crosstalk/BUj raise the spectral noise floor, the NQ-Scale method will provide more accurate separation of Rj and Dj, and therefore more accurate Tj results.

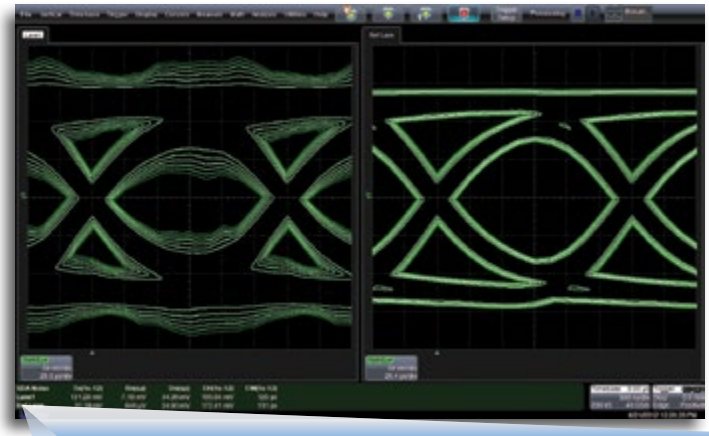
Measure up to 4 Lanes Simultaneously



"LinQ" products provide extensive multi-lane analysis capabilities. Quickly understand lane-to-lane differences in jitter measurements, eye diagrams, and jitter analysis. Perform aggressor on/off analysis, and see the results from both scenarios simultaneously. Save the analysis of a particular scenario to the Reference Lane, and configure a LaneScape™ Comparison mode to compare the Reference to either one, two or all lanes. Each "lane" can be a different serial data lane, or a different analysis of data from a single serial data lane - ideal for comparing different equalization schemes (using Eye Doctor II option) or examining system behaviors at different locations in the lane (using probes or the VirtualProbe option).

Vertical Noise and Crosstalk

The Crosstalk and CrossLinQ packages provide vertical noise measurements and crosstalk analysis tools for complete aggressor/victim analysis. Use one of three dual-Dirac models to measure and separate noise into total (Tn), random (Rn) and deterministic (Dn) components, and further decompose Dn into Intersymbol Interference Noise (ISIn) and Periodic Noise (Pn). Only Teledyne LeCroy performs this analysis on real-time oscilloscopes. Similar to jitter analysis, noise can be viewed as a noise track, histogram and spectrum, providing insight into the vertical noise resulting from coupling to other active serial data lanes or other interference sources. The Crosstalk Eye shows the probabilistic extent of noise both inside and outside the eye, quickly showing the impact of excessive noise that is not possible to see in a traditional eye diagram.



SDA Noise	Tn(1e-12)	Rn(sp)	Dn(sp)	EH(1e-12)	EW(1e-12)
Lane1	131.28 mV	7.18 mV	34.39 mV	105.04 mV	125 ps
Ref Lane	33.38 mV	646 µV	24.93 mV	172.41 mV	131 ps

CompleteLinQ Does it All

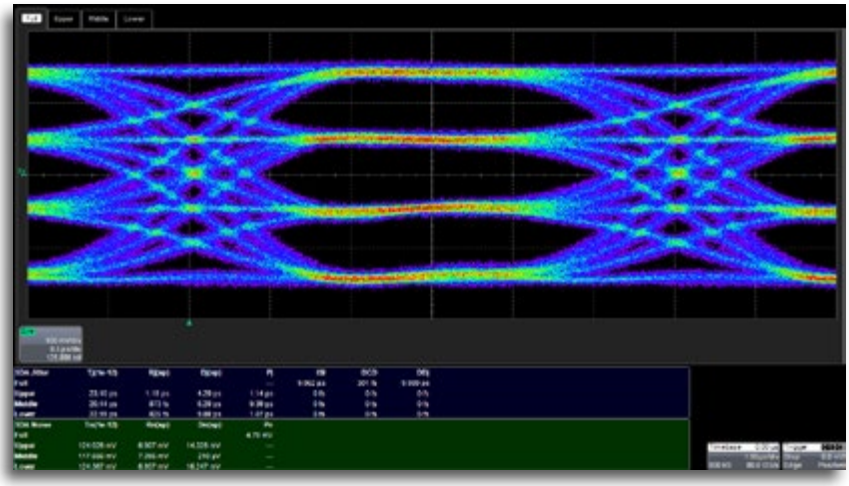
The CompleteLinQ user interface framework provides easy access to all features described above, and also integrates EyeDoctorII and VirtualProbe capabilities for Tx/Rx equalization and fixture/channel de-embedding/emulation. Order SDAIII-CompleteLinQ to equip your oscilloscope with all of Teledyne LeCroy's Serial Data Analysis and Signal Integrity tools.

Learn More:
teledynelecroy.com/SDAIII

View our short introductory video:
http://lcry.us/YB0qyY

EYE, JITTER AND NOISE ANALYSIS OF PAM4 SIGNALS

PAM4 signaling is seen as the next step in the evolution of serial data signal formats, allowing two bits of information to be transmitted per UI rather than one. Next generation standards from OIF and IEEE including CEI-56G-VSR and 100GBASE-KP4 utilize PAM4 signaling. Teledyne LeCroy's PAM4 analysis package extends our industry-leading eye, jitter and noise analysis capabilities to perform a complete analysis of all three eye openings in a PAM4 signal.



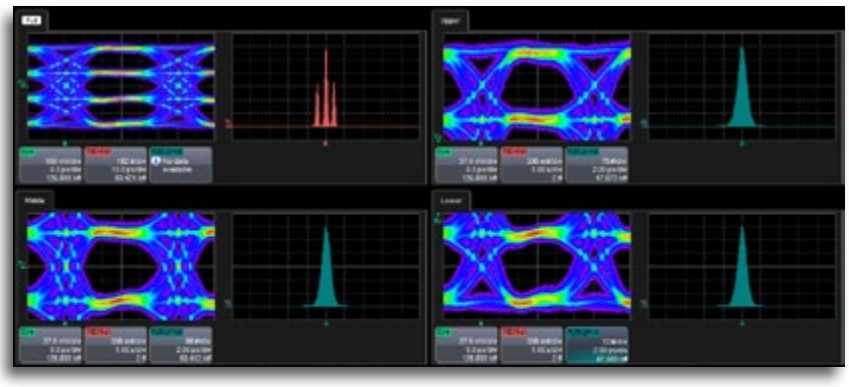
Measure Eye, Jitter and Noise

For each of the three eye openings, the PAM4 software package performs a complete analysis to determine the eye openings, jitter and noise as a function of BER. Measurements for each opening include: Eye Height, Width Tj, Rj, Dj, Tn, Rn and Dn. Mean and RMS vales for each level are also determined, as well as periodic noise and jitter results.

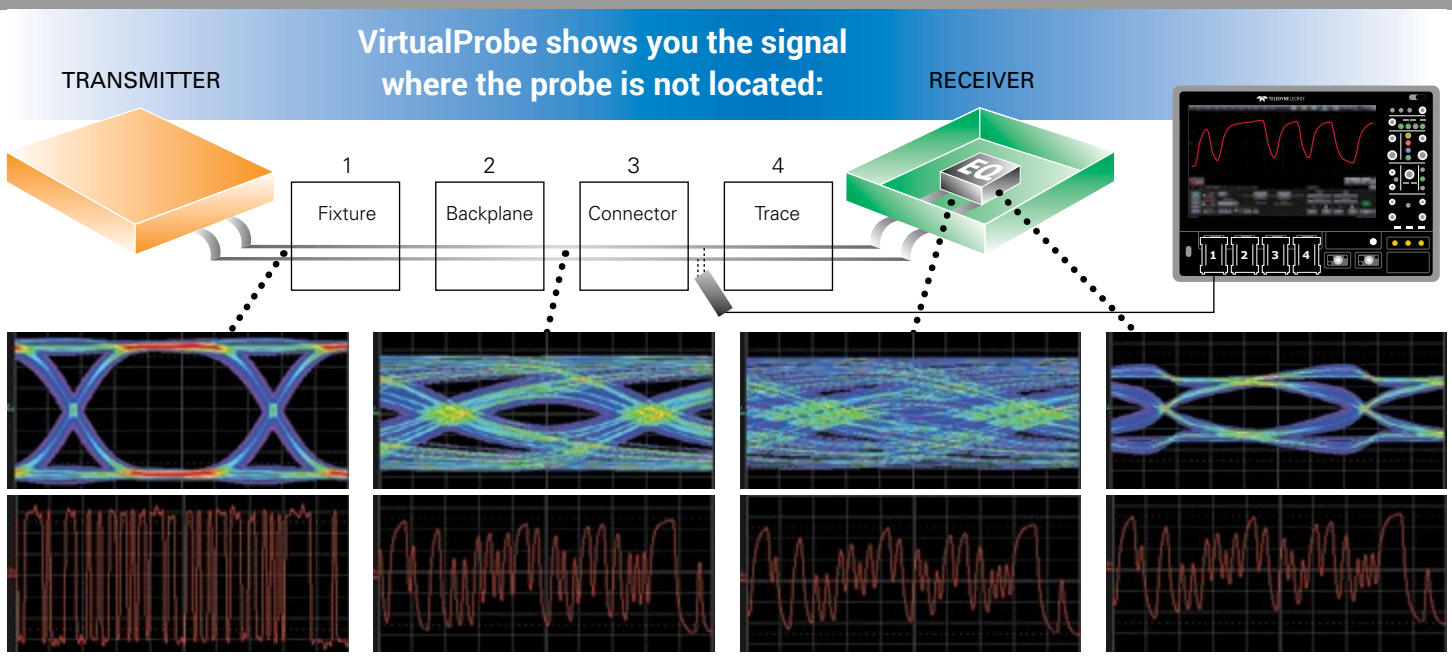
SDA Jitter	Tj(1e-12)	Rj(sp)	Dj(sp)	Pj	ISI	DCD	DDj
Full					9.962 ps	301 fs	9.989 ps
Upper	23.10 ps	1.18 ps	4.29 ps	1.14 ps	0 fs	0 fs	0 fs
Middle	20.14 ps	873 fs	6.28 ps	9.39 ps	0 fs	0 fs	0 fs
Lower	22.99 ps	925 fs	9.88 ps	1.07 ps	0 fs	0 fs	0 fs
SDA Noise	**Tn(1e-12)**	**Rn(sp)**	**Dn(sp)**	**Pn**			
Full				4.78 mV			
Upper	124.026 mV	6.907 mV	14.325 mV				
Middle	117.656 mV	7.396 mV	210 µV				
Lower	124.367 mV	6.807 mV	16.247 mV				

Deeper Understanding with Additional Views of Jitter and Noise

The PAM4 package includes the views of noise and jitter utilized in the SDAIII-CompleteLinQ package. Enhance understanding of jitter and noise by displaying histograms, spectra, bathtub and IsoBER curves for each eye opening. PAM4 analysis is compatible with EyeDoctorII, allowing users to de-embed channel and fixture effects, emulate a channel, or apply equalization.



EYEDOCTOR™II AND VIRTUALPROBE SIGNAL INTEGRITY TOOLS



Virtually probe the signal at the transmitter with the fixture present, and then de-embed its effects form the measurement.

View the signal between structures to understand losses, ISI and crosstalk caused by backplanes, interconnects and connectors.

See what the eye looks like at the receiver - even if it is not in reach of a differential probe.

Use EyeDoctor to open the eye by modeling CTLE, FFE and DFE equalizers used by your receiver.

As signal speeds and data rates continue to rise, signal integrity effects such intersymbol interference (ISI) and crosstalk become more prevalent and challenging. Use Teledyne LeCroy's Advanced Signal Integrity tools to transform your measured signal to include the effects of de-embedding, emulation and equalization algorithms.

De-embed, Equalize and Emulate with EyeDoctorII

Curious to know what your signal would look like without fixture effects? Do you need to understand how ISI and crosstalk of a modeled channel will affect your jitter margin? Or are you seeking to determine which equalization schemes will do the best job of opening a closed eye? The EyeDoctorII package includes easy configuration of basic de-embed/emulation scenarios, CTLE, DFE and FFE equalizers, and transmitter emphasis/de-emphasis.

Advanced De-embedding, Emulation and Virtual Probing

The VirtualProbe package expands the de-embedding and emulation capabilities of EyeDoctorII. Configure a multi-block circuit using modeled S-parameters or measured with a Teledyne LeCroy SPARQ (or other VNA), and VirtualProbe will build the transfer function that returns the signal as it would appear before or after any block in the circuit. The electrical behavior of a block to reflect and transmit signals can be included, added or removed in order to de-embed or emulate fixtures or channels. Probe loading effects can also be removed. When used in conjunction with the Crosstalk, CrossLinQ or CompleteLinQ SDAIII options, crosstalk between lanes can be modeled using 8 and 12-port S-parameters. Use the Teledyne LeCroy SPARQ to measure these S-parameters at a fraction of the price of a VNA.

Use EyeDoctorII and VirtualProbe with SDAIII CompleteLinQ products

When using EyeDoctorII and VirtualProbe on oscilloscopes enabled within the SDAIII-CompleteLinQ products, configure de-embedding, emulation and equalization from the same simple flow-chart dialog as all other serial data analysis features. When enabled with the "LinQ" option to enable 4 lanes, users can configure EyeDoctorII and VirtualProbe configurations on each lane, facilitating rapid comparisons of different de-embedding and equalization setups.

Learn More

teledynelecroy.com/dl/1023
teledynelecroy.com/vid/M0T6WEC0JYQ
teledynelecroy.com/dl/1216
teledynelecroy.com/dl/1136

MOST COMPLETE DEBUG SOLUTION

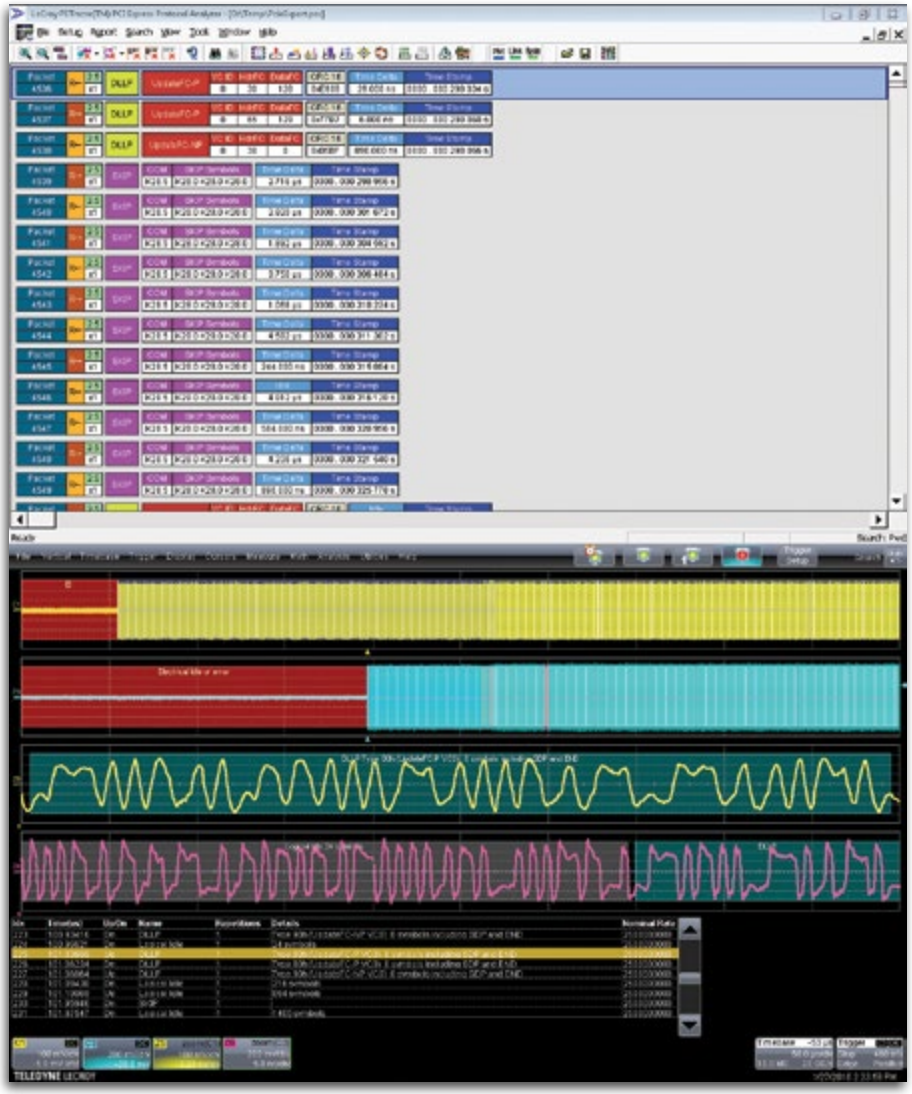
Connecting a problem with its root cause often requires viewing the signal in multiple domains. The LabMaster 10 Zi-A allows you to combine multiple analysis types into a single, correlated display:

- **Analog signals**
- **Protocol decodes**
- **Eye diagrams**
- **Jitter and noise breakdown**
- **Measurement parameters**
- **Frequency-domain traces**

Serial Decode—A Whole New Meaning to Insight

Over 19 different protocols are supported with serial decoders. Use ProtoSync with PCIe, USB, SATA, SAS, and Fibre Channel to get a dual-display view of both oscilloscope-generated decode annotations and protocol analyzer software views. Search on protocol data in a table and export table data to an Excel file.

Learn More
teledynelecroy.com/dl/3005



Get more insight with multiple views of your serial data transmissions.

More Trigger Capability Isolates More Problems Quickly

12 GHz Edge trigger, 14.1 Gb/s true-hardware serial trigger (optional, includes capability for 80-bit NRZ and 8b/10b symbol, ten different SMART triggers, four-stage Cascade™ triggering, Measurement trigger, and TriggerScan™ are all standard and allow you to isolate the problem quickly and begin to focus on the cause.

Search and Scan to Understand

Search a captured waveform for hundreds of different measurement parameters or other conditions using WaveScan. Set complex conditions, view search results on the waveform and in a table, and quickly zoom and jump to an entry. “Scan” for events that can’t be triggered in hardware.

All Oscilloscope Tools are Not Created Equal

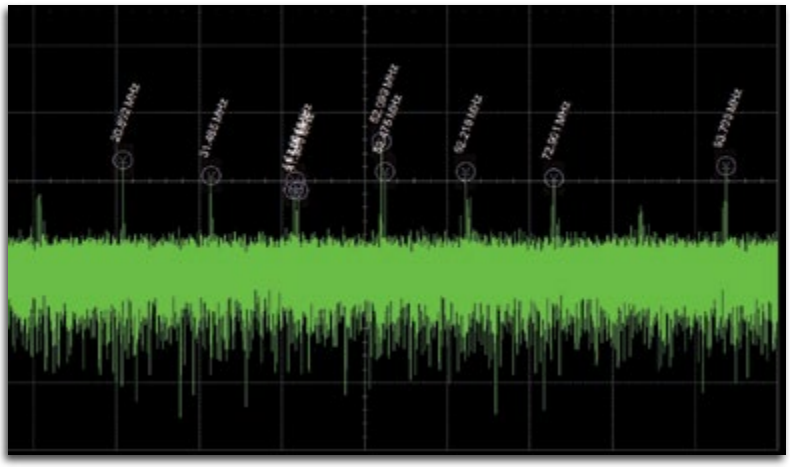
LabMaster 10 Zi has the deepest standard toolbox of any oscilloscope, providing more measure, math, graphing, statistical, and other tools, and more ways to leverage the tools to get the answer faster. While many other oscilloscopes provide similar looking tools, Teledyne LeCroy allows the most flexibility in applying the tools to any waveform.

Customized Tools

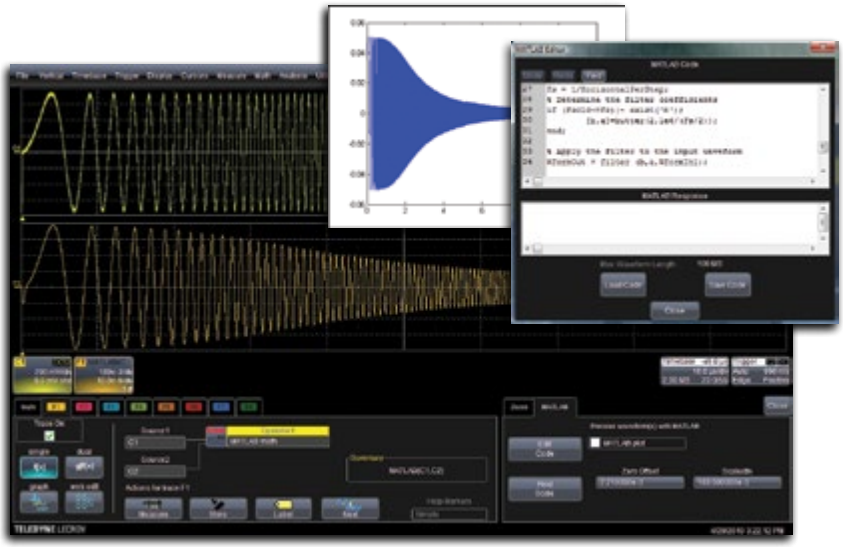
Only Teledyne LeCroy completely integrates third party programs into the oscilloscope's processing stream by allowing you to create and deploy a new measurement or math algorithm directly into the oscilloscope environment and display the result on the oscilloscope in real-time! There is no need to run a separate program, or ever leave the oscilloscope window. Use C/C++, MATLAB, Excel, JScript (JAVA), and Visual Basic to create your own customized math functions, measurement parameters, or other control algorithms.

Graphical Track, Trend, and Histogram Views

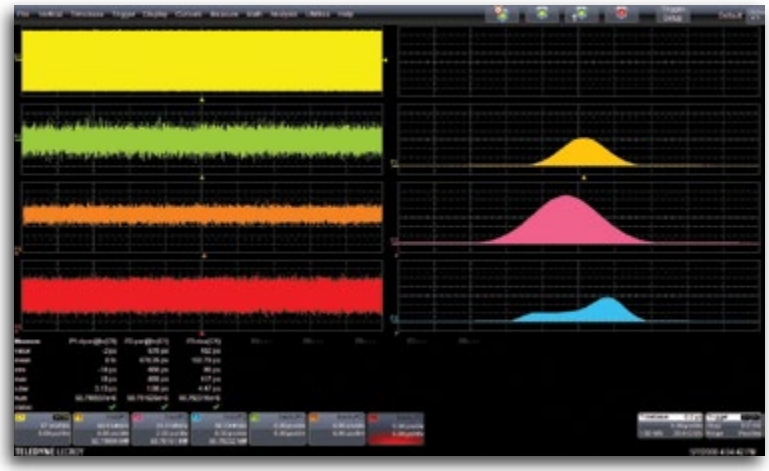
Track plots measurement values on the Y-axis and time on the X-axis to display a measurement change time-correlated to the original channel acquisition—perfect for intuitive understanding of behaviors in frequency modulated (FM) or pulse width modulated (PWM) circuits and jitter measurements, including modulation or spikes. Histograms provide a visual distribution representation of a large sample of measurements, allowing faster insight. Trends are ideal for plotting slow changes in measurement values.



X-Stream II fast throughput streaming architecture makes difficult analysis and deep insight possible. Above, an FFT is applied to a 50 Mpts waveform to determine root cause failure. The high frequency resolution this provides enables deep insight into signal pathologies.



XDEV Customization software package being used to implement a 1 MHz Butterworth filter using MATLAB®.



Capture a single clock channel (yellow) and display Track graphs and Histograms simultaneously of multiple jitter parameters.

MODULAR DESIGN FOR EXPANDABILITY

LabMaster 10 Zi-A leverages the unique LabMaster ChannelSync architecture with next-generation 8HP SiGe chipsets to produce the world's highest bandwidth, four channel oscilloscope – 36 GHz. When combined with patented DBI technology, bandwidth nearly doubles and triples, to 65 GHz and 100 GHz, with sample rates of 160 GS/s and 240 GS/s.

LabMaster 10 Zi-A oscilloscopes are fundamentally better – they are modular, inherently upgradeable, and infinitely flexible while retaining all the simplicity of operation expected from a conventional oscilloscope. LabMaster 10 Zi-A oscilloscopes can be configured for massive numbers of channels at up to 100 GHz – completely eliminating technology and test barriers.

ChannelSync technology ensures precise synchronization of all channels in all acquisition modules by using a single-distributed 10 GHz clock and a single trigger circuit. External clocking is not required, and trigger jitter from multiple trigger circuits is non-existent. Jitter between all channels is an ultra-low <130 fs_{rms}. Conventional 10 or 100MHz reference clocks simply cannot achieve this level of performance. Multi-module synchronization performance is identical to that provided with a single, standard oscilloscope package, and all captured waveforms and analysis appears on one oscilloscope display.

Typical LabMaster 10 Zi-A Systems

The Master Control Module (which includes the display) simply and quickly connects to one or more acquisition modules to create a functional, single oscilloscope package, but without the normal input channel or bandwidth limitations—operation is the same as a conventional oscilloscope. All waveforms are viewable on the built-in 15.3" display or on a variety of optional or user-supplied displays (up to 2560 x 1600 resolution). The entire system design speaks to a level of sophistication and integration not seen before in laboratory equipment.

4 Channels at 36 GHz

The base configuration is a LabMaster MCM-Zi-A Master Control Module and a single Acquisition Module. This provides four channels at up to 36 GHz and 80 GS/s. Acquisition modules are available at 20, 25, 30 and 36 GHz.

4 Channels at 65 GHz
8 Channels at 36 GHz

Buld a 4-channel 65 GHz oscilloscope by connecting two acquisition modules. This system can also be used as an 8-channel, 36 GHz oscilloscope. In addition to 65 GHz acquisition modules, 50 and 59 GHz units are available.

The OC910 oscilloscope cart is ideal for housing systems with up to 4 acquisition modules.

Maximum Flexibility

Start with one Master Control Module and one Acquisition Module. Upgrade Acquisition Modules to include more memory or more bandwidth. Add additional acquisition modules at any time without returning equipment to the factory for modification or re-calibration.

Master Control Module

The LabMaster MCM-Zi-A Master Control Module provides the display, control panel, CPU, and ChannelSync 10 GHz distributed clock to provides precise and unmatched synchronization between all oscilloscope channels. High-speed PCIe cables connect to the acquisition modules for control and data transfer. The MCM-Zi-A includes a server-class CPU with Xeon™ E5-2680 v2 processors and 32 GB of RAM standard (up to 192 GB optional). Coupled with Teledyne LeCroy's X-Stream II architecture, the CPU muscles its way through the immense amounts of acquisition data made possible by LabMaster 10 Zi-A.

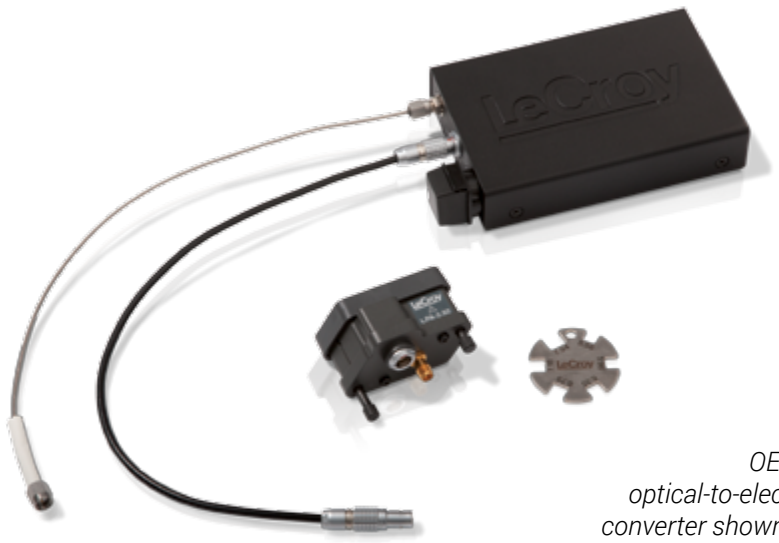
Additional Acquisition Modules

LabMaster 10 Zi-A acquisition modules are available at a variety of bandwidths, from 20 GHz to 100 GHz. All modules include four channels at 36 GHz bandwidth. The 50, 59, and 65 GHz models also provide 2 channels at the rated bandwidth; the 100 GHz module includes 1 channel. Each acquisition module is tightly integrated to the Master Control Module (MCM-Zi-A) with a ChannelSync 10 GHz distributed clock and two PCIe cables. Up to 20 acquisition modules can be used in one system. All acquired data is sent to the server-class CPU for processing.

ChannelSync Mainframe Hub

Easily expand beyond 5 acquisition modules with the LabMaster CMH-20Zi ChannelSync Mainframe Hub. The CMH-20Zi synchronizes up to 80 channels at 36 GHz with the same <130 fs precise performance as 4-channel system. The hub redistributes the 10 GHz clock and PCIe synchronization signals to up to 20 acquisition modules. One "card" is used for each connected acquisition module; cards can be purchased at any time to minimize the upfront cost.

OPTICAL-TO-ELECTRICAL CONVERTER (OE695G)



OE695G optical-to-electrical converter shown with supplied RF and Power cables

Teledyne LeCroy's OE695G wide-band optical-to-electrical converter is ideal for measuring optical datacom and telecom signals with data rates from 622 Mb/s to 12.5+ Gb/s. Connection to a real-time Teledyne LeCroy oscilloscope is through the 2.92 mm interface, with a provided adapter to connect to ProLink interfaces.

Built-in Reference Receiver

The OE695G contains built-in software reference receiver filters for common Fiber Channel, Ethernet, and ITU telecom standards. These reference receiver filters provide a 4-pole Bessel Thompson low pass filter response for the combined oscilloscope and optical-to-electrical (O-E) system with the -3dBe (electrical) at 0.75*bit rate. Combined passband response (compared to ideal) is ±1.6dBe (typical). If desired, a custom reference receiver for any bit rate up to 12.5Gb/s can also be applied. Additionally, the OE695G can be operated without any reference receiver applied, providing 9.5 GHz of bandwidth at -3 dB and Tr(10-90%) of approximately 45 ps when used with a Teledyne LeCroy oscilloscope of ≥ 20 GHz of bandwidth.

Calibration Option for Maximum Accuracy

If guaranteed reference receiver response is required (±0.85 dB max through the passband, with a relaxed requirement through 1.5*bit rate, per the reference receiver requirement), the optional OE695G-REFCAL may be ordered with the OE695G. This will provide a documented calibration response for the various standard reference receivers and up to 12.5Gb/s "custom" reference receiver on all four oscilloscope channels at specific gain ranges (with typical response provided at other gain ranges).

Key Features

- Compatible with LabMaster 10 Zi oscilloscopes
- Frequency range DC to 9.5 GHz (electrical, -3 dB)
- Reference receiver support from 8GFC to 10GFC FEC, or Custom (<12.5Gb/s)
- Full bandwidth mode (no reference receiver applied)
- 62.5/125 µm multi-mode or single-mode fiber input
- Broad wavelength range (750 to 1650 nm)
- +7 dBm (5 mW) max peak optical power
- Low noise (as low as 25 pW/√Hz)
- Ideal for Eye Mask, Extinction Ratio, and Optical Modulation Amplitude (OMA) testing

Ultra-wideband Architecture for Superior Signal Fidelity

Teledyne LeCroy's WaveLink® high bandwidth differential probes utilize advanced differential traveling wave (distributed) amplifier architecture to achieve superior high frequency analog broadband performance.

Highest Bandwidth (25 GHz) Solder-In Lead

Up to 25 GHz Solder-In performance with system (probe + oscilloscope) rise times equal to that of the oscilloscope alone.

Ultra-compact Positioner (Browser) Tip

The most compact positioner tip browser with bandwidth up to 22 GHz makes probing in confined areas easy.

Superior Probe Impedance Minimizes Circuit Loading

Circuit and signal loading is reduced by more than 50% with WaveLink high bandwidth probes compared to competitive probes. In the mid-band frequency range, the difference is even more apparent.

Superior Signal Fidelity and Lowest Noise

WaveLink has exceptional noise performance. In fact, the combination of the probe and the oscilloscope results in measurement performance that is nearly identical to that of a cable input.

D2505-A-PS 25 GHz probe system with Solder-In lead and browser positioner tip.

	D1305-A, D1305-A-PS	D1605-A, D1605-A-PS	D2005-A, D2005-A-PS	D2505-A, D2505-A-PS
Bandwidth	**Dxx05-SI and Dxx05-PT Tips** 13 GHz	**Dxx05-SI and Dxx05-PT Tips** 16 GHz	**Dxx05-SI and Dxx05-PT Tips** 20 GHz	**Dxx05-SI Lead** 25 GHz **Dxx05-PT Tip** 22 GHz typical 20 GHz guaranteed
Rise Time (10–90%)	**Dxx05-SI and Dxx05-PT Tips** 32.5 ps (typical)	**Dxx05-SI and Dxx05-PT Tips** 28 ps (typical)	**Dxx05-SI and Dxx05-PT Tips** 20 ps (typical)	**Dxx05-SI Lead** 17.5 ps (typical) **Dxx05-PT Tip** 19 ps (typical)
Rise Time (20–80%)	**Dxx05-SI and Dxx05-PT Tips** 24.5 ps (typical)	**Dxx05-SI and Dxx05-PT Tips** 21 ps (typical)	**Dxx05-SI and Dxx05-PT Tips** 15 ps (typical)	**Dxx05-SI Lead** 13 ps (typical) **Dxx05-PT Tip** 14 ps (typical)
Noise (Probe)	< 14 nV/√Hz (1.6 mV_{rms}) (typical)	< 14 nV/√Hz (1.8 mV_{rms}) (typical)	< 18 nV/√Hz (2.5 mV_{rms}) (typical)	< 18 nV/√Hz (2.8 mV_{rms}) (typical)
Input Dynamic Range	2.0 $V_{pk\text{-}pk}$ (±1.0 V) (nominal)			
Input Common Mode Voltage Range	±4 V (nominal)			
Input Offset Voltage Range	±2.5 V Differential (nominal)			
Impedance (mid-band, typical)	**Dxx05-SI Lead:** 300 Ω at 6 GHz, 525 Ω at 13 GHz, 600 Ω at 16 GHz, 300 Ω at 20 GHz, 120 Ω at 25 GHz **Dxx05-PT Tip:** 160 Ω at 6 GHz, 450 Ω at 13 GHz, 240 Ω at 16 GHz, 210 Ω at 20 GHz			

SPARQ SIGNAL INTEGRITY NETWORK ANALYZER

The SPARQ signal integrity network analyzers connect directly to the device under test (DUT) and to PC-based software through a single USB connection for quick, multi-port S-parameter measurements.

SPARQ is the ideal instrument for characterizing multi-port devices common in signal integrity applications at a fraction of the cost of traditional methods. It is ideal for:

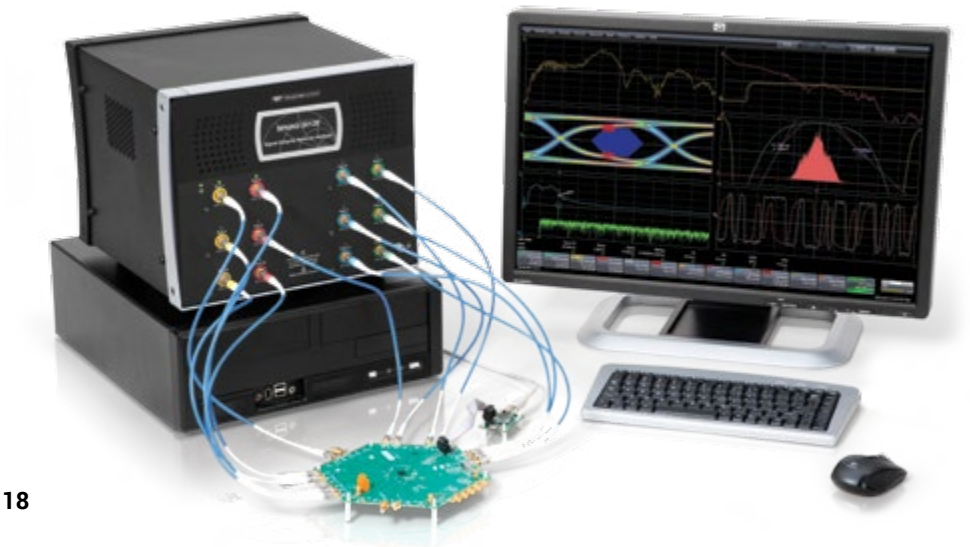
- **Development of measurement-based simulation models**
- **Design validation**
- **Compliance testing**
- **High-performance TDR**
- **PCB testing**
- **Portable measurement requirements**

High-bandwidth, Multi-port S-parameters for the Masses

S-parameter measurements are most often produced by the vector network analyzer (VNA), a difficult instrument that is beyond many budgets. SPARQ is very affordable and simplifies measurements, making S-parameters accessible to all.

PC-based, Small and Portable

Traditional instruments that produce S-parameters are large and fundamentally stationary. The SPARQ, in contrast, is small and weighs less than 20 lbs. It connects to any standard PC through a USB 2.0 interface, allowing SPARQ to run where computing power is easily upgraded.



S-parameters, Quick

VNA measurements begin with the unpleasant and complex task of calibration. This involves multiple connections that can produce misleading results due to operator error. The SPARQ provides calibrated measurements with a single connection to the DUT and offers simple setup choices. Start and complete the entire measurement with a single button press.

Internal Calibration

SPARQ takes a revolutionary approach to calibration by building in calibration standards. This enables measurements to be made without multiple connection steps and removes the need for additional electronic calibration (ECAL) modules. Calibration proceeds quickly without user intervention, so one can calibrate often without resorting to the use of out-of-date saved calibrations.

Characterize Crosstalk with 8 and 12-port SPARQs

Don't just model crosstalk – measure it. With the 8 and 12 port SPARQs, characterize interconnects with two and three differential lanes in order to obtain S-parameters needed for simulations of aggressor/victim/aggressor topologies.

SPECIFICATIONS

Standard

Math Tools

Display up to 8 math function traces (F1 – F8). The easy-to-use graphical interface simplifies setup of up to two operations on each function trace, and function traces can be chained together to perform math-on-math.

absolute value
average (summed)
average (continuous)
correlation (two waveforms)
derivative
deskew (resample)
difference (–)
enhanced resolution (to 11-bits vertical)
envelope
exp (base e)
exp (base 10)
fft (power spectrum, magnitude, phase, up to max Mpts)
floor
integral
interpolate (cubic, quadratic, sinx/x)
invert (negate)
log (base e)
log (base 10)
product (x)
ratio (/)
reciprocal
rescale (with units)
roof
sparse
square
square root
sum (+)
zoom (identity)

Measure Tools

Display any 12 parameters together with statistics, including their average, high, low, and standard deviations. Histicons provide a fast, dynamic view of parameters and wave shape characteristics. Parameter Math allows addition, subtraction, multiplication, or division of two different parameters.

amplitude
area
base
cycles
data
delay
Δ delay
duty cycle
duration
falltime (90–10%, 80–20%, @ level)
frequency
first
last
level @ x
maximum
mean
median
minimum
narrow band phase
narrow band power
number of points
+ overshoot
– overshoot
peak-to-peak
period
risetime (10–90%, 20–80%, @ level)
rms
std. deviation
top
width
median
phase
time @ minimum (min.)
time @ maximum (max.)
Δ time @ level
Δ time @ level from trigger
x @ max.
x @ min.

Pass/Fail Testing

Simultaneously test multiple parameters against selectable parameter limits or pre-defined masks. Pass or fail conditions can initiate actions including document to local or networked files, e-mail the image of the failure, save waveforms, send a pulse out at the front panel auxiliary BNC output, or (with the GPIB option) send a GPIB SRQ.

Basic Jitter and Timing Analysis Tools

This package provides toolsets for displaying parameter values vs. time, statistical views of parameters using histograms, and persistence view math functions. These tools include:

- "Track" graphs of all parameters, no limitation of number
- Histograms expanded with 19 histogram parameters and up to 2 billion events
- – Cycle-Cycle Jitter
  – N-Cycle
  – N-Cycle with start selection
  – Frequency @ level
  – Period @ level
  – Half Period
  – Width @ level
  – Time Interval Error @ level
  – Setup
  – Hold
  – Skew
  – Duty Cycle @ level
  – Duty Cycle Error

Trend (datalog) of up to 1 million events

- Track graphs of all parameters
- Persistence histogram, persistence (range, sigma)

Standard (cont'd)

Advanced Customization

Provides capability to create a math function or measurement parameter in MATLAB, Excel, C++, JavaScript, or Visual Basic Script (VBS) format and insert it into the oscilloscope's processing stream. All results are processed and displayed on the oscilloscope grid, and are available for further processing. Also permits the creation of customized plug-ins that can be inserted into the scope user interface, control of the scope via Visual Basic scripts embedded in customized functions, and use of Teledyne LeCroy's Custom DSO capabilities.

Software Options

SDAIII Serial Data Analysis Software (LM10Zi-SDAIII)
(Included in LM9Zi-SDAIII option, Standard on SDA MCM-Zi-A and DDA MCM-Zi-A Models)

Total Jitter

A complete jitter measurement and analysis toolset with the SDAIII-CompleteLinQ user interface framework. The CompleteLinQ framework provides a single user interface for "LinQ", "Crosstalk", "EyeDrII" and "Virtual Probe" capabilities (purchased separately).

SDAIII provides complete serial data and clock jitter and eye diagram measurement and analysis capabilities. Eye Diagrams with millions of UI are quickly calculated from up to 512 Mpt records, and advanced tools may be used on the Eye Diagram to aid analysis. Complete TIE and Total Jitter (Tj) parameters and analysis functions are provided. Comparison of eye diagrams and jitter analysis between captured lanes and one "reference" location is provided. Includes:

- Time Interval Error (TIE) Measurement Parameter, Histogram, Spectrum and Jitter Track
- Total Jitter (Tj) Measurement Parameter, Histogram
- Spectrum
- Eye Diagram Display (sliced)
- Eye Diagram IsoBER (lines of constant Bit Error Rate)
- Eye Diagram Mask Violation Locator
- Eye Diagram Measurement Parameters
  - – Eye Height
  - – One Level
  - – Zero Level
  - – Eye Amplitude
  - – Eye Width
  - – Eye Crossing
  - – Avg. Power
  - – Extinction Ratio
  - – Mask hits
  - – Mask out
  - – Bit Error Rate
  - – Slice Width (setting)
- Q-Fit Tail Representation
- Bathtub Curve
- Cumulative Distribution Function (CDF)
- PLL Track

Jitter Decompostion Models

Three dual-dirac jitter decomposition methods are provided for maximum measurement flexibility. Q-Scale, CDF, Bathtub Curve, and all jitter decomposition measurement parameters can be displayed using any of the three methods.

- Spectral, Rj Direct
- Spectral, Rj+Dj CDF Fit
- NQ-Scale

Random Jitter (Rj) and Non-Data Dependent Jitter (Rj+BUj) Analysis

- Random Jitter (Rj) Meas Param
- Periodic Jitter (Pj) Meas Param
- Rj+BUj Histogram
- Rj+BUj Spectrum
- Rj+BUj Track
- Pj Inverse FFT

Deterministic Jitter (Dj) Analysis

- Deterministic Jitter (Dj) Measurement Parameter

Software Options (cont'd)

SDAIII Serial Data Analysis Software (continued)

Data Dependent Jitter (DDj) Analysis

- Data Dependent Jitter (DDj) Param
- Duty Cycle Distortion (DCD) Param
- InterSymbol Interference (ISI) Param
- Digital Pattern display
- DDj Plot (by Pattern or N-bit Sequence)
- DDj Histogram
- ISI Plot (by Pattern)

Reference Lane

- Compare current acquisition to Reference with a side-by-side or single (tabbed) display mode

SDAIII "LinQ" Capability
(SDAIII-LinQ, SDAIII-CrossLinQ, and SDAIII-CompleteLinQ Options)

In addition to all SDAIII capabilities, "LinQ" options includes 4 lanes of simultaneous serial data analysis plus the reference lane. If EyeDrII or VirtualProbe are purchased with SDAIII "LinQ" capability, then those capabilities are provided for all four lanes.

Lanescape Comparison Mode

When multiple lanes are enabled for display, Lanescape Comparison Modes is used. Selections for this mode are as follows:

- Single: One lane is displayed at a time.
- Dual: Two lanes are selected for display.
- Mosaic: All enabled lanes are displayed.

SDAIII "Crosstalk" Capability
(Included in SDAIII-Crosstalk and SDAIII-CrossLinQ Options)

In addition to all SDAIII capabilities, "Crosstalk" options add the following noise and crosstalk measurements and analysis tools:

- Total, Random and Deterministic noise (Tn, Rn, Dn) measurements
- Breakdown of Dn into InterSymbol Interference noise (ISIn) and Periodic noise (Pn)
- Noise-based eye height and width: EH(BER) and EW(BER)
- Random noise (Rn) + Bounded Uncorrelated noise (BUn) Noise Histogram
- Q-fit for Noise Histogram
- Rn+BUn Noise Spectrum and Peak threshold
- Pn Inverse FFT Plot
- Rn+BUn Noise Track
- Crosstalk Eye Contour Plot

SDAIII-CompleteLinQ

The ultimate in serial data single or multi-lane link analysis. Provides all the capabilities mentioned above in SDAIII, "LinQ", and "Crosstalk", and also includes EyeDrII and Virtual Probe capabilities.

Eye Doctor II Advanced Signal Integrity Tools (LM10Zi-EYEDRII)

Complete set of channel emulation, de-embedding and receiver equalization simulation tools. Provides capability to emulate a serial data link, de-embed or embed a fixture, cable or serial data channel, add or remove emphasis, and perform CTLE, FFE, or DFE equalization. If purchased with SDAIII, then capabilities are accessed from within the SDAIII-CompleteLinQ user interface framework.

Virtual Probe Signal Integrity Tools (LM10Zi-VIRTUALPROBE)

Provides ability to define a complex serial data channel or topology with up to six circuit elements that may be embedded or de-embedded, allowing "probing" at a location different than the measured position. If purchased with SDAIII and EyeDrII (or with the EYEDRII-VP or CompleteLinQ options), then capabilities are accessed from within the single SDAIII-CompleteLinQ user interface framework.

Software Options (cont'd)

Clock and Clock-Data Timing Jitter Analysis Package (LM10Zi-JITKIT)

Provides convenient setup and four views of jitter (statistical, time, spectrum, and overlaid) for a variety of horizontal, amplitude, and timing parameters. Direct display of jitter measurement values. Supports multiple simultaneous views with fast selection of multiple parameter measurements for fast and easy validation.

Cable De-embedding (LM10Zi-CBL-DE-EMBED)
(Standard on SDA MCM-Zi-A)

Removes cable effects from your measurements. Simply enter the S-parameters or attenuation data of the cable(s) then all of the functionality of the SDA 8 Zi can be utilized with cable effects de-embedded.

8b/10b Decode (LM10Zi-8B10B D)
(Standard on SDA MCM-Zi-A)

Intuitive, color-coded serial decode with powerful search capability enables captured waveforms to be searched for user-defined sequences of symbols. Multi-lane analysis decodes up to four simultaneously captured lanes.

Spectrum Analyzer Mode (LM10Zi-SPECTRUM)

This package provides a new capability to navigate waveforms in the frequency domain using spectrum analyzer type controls. FFT capability added to include:

- Power averaging
- Power density
- Real and imag components
- Freq domain parameters
- FFT on up to 128 Mpts

Disk Drive Measurements Package (LM10Zi-DDM2)
(Standard on DDA MCM-Zi-A)

This package provides disk drive parameter measurements and related mathematical functions for performing disk drive WaveShape Analysis. Disk Drive Parameters are as follows:

– amplitude assymetry
– local base
– local baseline separation
– local maximum
– local minimum
– local number
– local peak-peak
– local time between events
– local time between peaks
– local time between troughs
– local time at minimum
– local time at maximum
– local time peak-trough
– local time over threshold
– local time trough-peak
– local time under threshold
– narrow band phase
– narrow band power
– overwrite
– pulse width 50
– pulse width 50 –
– pulse width 50 +
– resolution
– track average amplitude
– track average amplitude –
– track average amplitude +
– auto-correlation s/n
– non-linear transition shift

SPECIFICATIONS

LabMaster 10 Zi Series	20 GHz	25 GHz	30 GHz	36 GHz	50 GHz	59 GHz	65 GHz	100 GHz
Vertical System								
Analog Bandwidth @ 50 Ω (-3 dB) (1.85mm Inputs)					50 GHz (≥10 mV/div)	59 GHz (≥10 mV/div)	65 GHz (≥10 mV/div)	100 GHz (≥10 mV/div)
Analog Bandwidth @ 50 Ω (-3 dB) (2.92mm Inputs)	20 GHz (≥5 mV/div)	25 GHz (≥5 mV/div)	30 GHz (≥5 mV/div)	36 GHz (≥5 mV/div)				
Rise Time (10–90%, 50 Ω) (test limit, flatness mode)	19.3 ps	15.4 ps	12.8 ps	10.7 ps	8.0 ps	6.9 ps	6.5 ps	4.5 ps
Rise Time (20–80%, 50 Ω) (flatness mode)	14.5 ps	11.6 ps	9.6 ps	8.0 ps	6.0 ps	5.2 ps	4.9 ps	3.5 ps
Input Channels	Up to 80, depending on configuration selected. (Any combination of up to 80 2.92mm input channels)				Up to 40, depending on configuration selected. Up to 80 @ 36 GHz.			
Bandwidth Limiters	1 GHz, 3 GHz, 4 GHz, 6 GHz, 8 GHz, 13 GHz, 16 GHz	1 GHz, 3 GHz, 4 GHz, 6 GHz, 8 GHz, 13 GHz, 16 GHz 20 GHz	1 GHz, 3 GHz, 4 GHz, 6 GHz, 8 GHz, 13 GHz, 16 GHz 20 GHz 25 GHz	1 GHz, 3 GHz, 4 GHz, 6 GHz, 8 GHz, 13 GHz, 16 GHz 20 GHz 25 GHz 30 GHz 33 GHz	**For ≤ 36 GHz Mode:** 1 GHz, 3 GHz, 4 GHz, 6 GHz, 8 GHz, 13 GHz, 16 GHz, 20 GHz 25 GHz, 30 GHz, 33 GHz **For > 36 GHz Mode:** None	**For ≤ 36 GHz Mode:** 1 GHz, 3 GHz, 4 GHz, 6 GHz, 8 GHz, 13 GHz, 16 GHz, 20 GHz 25 GHz, 30 GHz, 33 GHz **For > 36 GHz Mode:** 50 GHz	**For ≤ 36 GHz Mode:** 1 GHz, 3 GHz, 4 GHz, 6 GHz, 8 GHz, 13 GHz, 16 GHz, 20 GHz 25 GHz, 30 GHz 33 GHz **For > 36 GHz Mode:** 50 GHz, 60 GHz	
Input Impedance	**2.92mm Inputs:** 50 Ω ±2%				**2.92mm Inputs:** 50 Ω ±2% **1.85mm Inputs:** 50 Ω ±2% **1mm Input:** 50 Ω ±2% (10-100 Zi-A only)			
Input Coupling	**2.92 mm Inputs:** 50 Ω: DC, GND				**2.92 mm Inputs:** 50 Ω: DC, GND **1.85 mm Inputs:** 50 Ω: DC **1mm Input:** 50 Ω DC (10-100 Zi-A only)			
Maximum Input Voltage	**2.92 mm Inputs:** ±2 Vmax @ <76 mV/div, 5.5V_{rms}@ ≥76 mV/div				**2.92 mm Inputs:** ±2 Vmax @ <76 mV/div, 5.5V_{rms}@ ≥76 mV/div **1.85 mm Inputs:** ±2 Vmax @ ≤80 mV/div **1mm Input:** ±2 Vmax @ ≤80 mV/div (10-100 Zi-A only)			
Channel-Channel Isolation	**DC to 36 GHz:** 60 dB (>1000:1) (For any two 2.92mm input channels, same or different v/div settings, typical)				**DC to 36 GHz:** 60 dB (>1000:1) (For any two 2.92mm input channels, same or different v/div settings, typical) **36 to 65 GHz:** 40 dB (>100:1) (For any two 1.85mm input channels, same or different v/div settings, typical)			NA
Vertical Resolution	8 bits; up to 11 bits with enhanced resolution (ERES)							
Sensitivity	**50 Ω (2.92mm):** 5 mV–500mV/div, fully variable (5-9.9 mV/div via zoom)				**50 Ω (2.92mm):** 5 mV–500mV/div, fully variable (5-9.9 mV/div via zoom) **50 Ω (1.85mm, 1mm):** 10 mV–80mV/div, fully variable. Higher gain settings possible through use of external attenuators.			
DC Vertical Gain Accuracy (Gain Component of DC Accuracy)	±1% F.S. (typical), offset at 0V; ±1.5% F.S. (test limit), offset at 0V							
Vertical Noise Floor (50 mV/div)	1.39 mV_{rms} (typical)	1.57 mV_{rms} (typical)	1.69 mV_{rms} (typical)	1.88 mV_{rms} (typical)	3.1 mV_{rms} (typical)	3.7 mV_{rms} (typical)	3.9 mV_{rms} (typical)	5.4 mV_{rms} (typical)
Offset Range	**50 Ω:** ±500 mV @ 5-75 mV/div ±4 V @ 76 mV/div -500mV/div				**50 Ω (2.92mm):** ±500 mV @ 5-75 mV/div ±4 V @ 76 mV/div -500mV/div **50 Ω (1.85 mm, 1mm):** ±500 mV @ 10–80 mV/div			
DC Vertical Offset Accuracy	±(1.5% of offset setting + 1.5% F.S. + 1 mV) (test limit)							

SPECIFICATIONS

LabMaster 10 Zi Series	20 GHz	25 GHz	30 GHz	36 GHz	50 GHz	59 GHz	65 GHz	100 GHz

Horizontal System

Timebases	Internal timebase with 10 GHz clock frequency common to all input channels. Single, distributed 10 GHz clock for all channels ensures precise synchronization with timing accuracy between all channels identical to that provided within a single, conventional oscilloscope package.							
Time/Division Range	10 ps/div–256 s/div (maximum capture time is based on minimum sample rate of 200kS/s and installed memory).				**For >36 GHz Mode:** 10 ps/div - 640 µs/div (maximum capture time is based on 160 GS/s and installed memory). **For ≤36 GHz Mode:** 10 ps/div–256 s/div (maximum capture time is based on minimum sample rate of 200kS/s and installed memory).			
Clock Accuracy	<0.1 ppm + (aging of 0.1 ppm/yr from last calibration)							
Sample Clock Jitter	**Up to 3.2ms Acquired Time Range:** $50fs_{rms}$ (Internal Timebase Reference) $50fs_{rms}$ (External Timebase Reference) **Up to 6.4ms Acquired Time Range:** $130fs_{rms}$ (Internal Timebase Reference) $130fs_{rms}$ (External Timebase Reference)							
Delta Time Measurement Accuracy	$\sqrt{2} * \sqrt{\left(\frac{Noise}{SlewRate}\right)^2 + (Sample\ Clock\ Jitter_{rms})^2 + (clock\ accuracy * reading)}$							
Jitter Measurement Floor	$\sqrt{\left(\frac{Noise}{SlewRate}\right)^2 + (Sample\ Clock\ Jitter_{rms})^2}$							
Jitter Between Channels (Measured at maximum bandwidth)	<250fs$_{rms}$				<190fs$_{rms}$	<150fs$_{rms}$	<130fs$_{rms}$	
Trigger and Interpolator Jitter	< 0.1 ps$_{rms}$ (typical, software assisted), 2 ps$_{rms}$ (typical, hardware)							
Channel-Channel Deskew Range	±9 x time/div. setting or 25 ns max. (whichever is larger), each channel							
External Timebase Reference (Input)	10 MHz; 50 Ω impedance, applied at the rear input of MCM-Zi Master Control Module							
External Timebase Reference (Output)	10 MHz; 50 Ω impedance, output at the rear of MCM-Zi Master Control Module							

Acquisition System

Single-Shot Sample Rate/Ch	80 GS/s on each channel.				80 GS/s on each channel in ≤36 GHz Mode. 160 GS/s on each channel in >36 GHz Mode. 240 GS/s on 100 GHz (10-100 Zi-A only)			
Maximum Trigger Rate	1,000,000 waveforms/second (in Sequence Mode, up to 4 channels)							
Intersegment Time	1 µs							
Maximum Acquisition Memory	512 Mpts/Ch				1024 Mpts/Ch (2 Ch operation)			1536 Mpts (1 channel)
Standard Memory (Number of Segments)	S-32 Memory Option (See below for details on memory length) (3,500)							

Memory Options

	≤ 36 GHz/Ch	50-65 GHz	100 GHz	Number Segments
S-32	32 Mpts	64 Mpts	96 Mpts	3,500
M-64	64 Mpts	128 Mpts	192 Mpts	7,500
L-128	128 Mpts	256 Mpts	384 Mpts	15,000
VL-256	256 Mpts	512 Mpts	768 Mpts	15,000
XL-512	512 Mpts	1024 Mpts	1536 Mpts	15,000

Acquisition Processing

Averaging	Summed averaging to 1 million sweeps; continuous averaging to 1 million sweeps
Enhanced Resolution (ERES)	From 8.5 to 11 bits vertical resolution
Envelope (Extrema)	Envelope, floor, or roof for up to 1 million sweeps
Interpolation	Linear or Sin x/x

SPECIFICATIONS

LabMaster 10 Zi Series	20 GHz	25 GHz	30 GHz	36 GHz	50 GHz	59 GHz	65 GHz	100 GHz

Triggering System

Modes	Normal, Auto, Single, and Stop
Sources	Any Ch 1-4 (Edge, Window, SMART, Cascade triggers), AUX, internal Fast Edge; or any input channel (Edge trigger only) on additional 10-xxZi Acquisition Modules (Channels 5 and higher). Slope and level unique to each source except line trigger.
Coupling Mode	DC, AC, HFRej, LFRej
Pre-trigger Delay	0–100% of memory size (adjustable in 1% increments of 100 ns)
Post-trigger Delay	0–10,000 divisions in real time mode, limited at slower time/div settings
Hold-off by Time or Events	From 2 ns up to 20 s or from 1 to 99,999,999 events
Internal Trigger Range	±4.1 div from center
Trigger Sensitivity with Edge Trigger (1.85/2.92mm Inputs)	For Ch 1-80 of a LabMaster 10 Zi system: 3 div @ <12 GHz 1.5 div @ <8 GHz 1.0 div @<5 GHz (for DC coupling, ≥ 10 mV/div, 50 Ω)
External Trigger Sensitivity, (Edge Trigger)	For Ch 1-4 only of any LabMaster 10xx-Zi Acquisition Module: 2 div @ < 1 GHz, 1.5 div @ < 500 MHz, 1.0 div @ < 200 MHz, (for DC coupling)
Max. Trigger Frequency, SMART Trigger	For Ch 1-4 of a LabMaster 10xx-Zi Acquisition Module: 2.0 GHz @ ≥ 10 mV/div (minimum triggerable width 200 ps)
External Trigger Input Range	For any LabMaster 10xx-Zi Acquisition Module: Aux (±0.4 V) (Only Ch1-4 Acquisition Module has "active" AUX Input)

Basic Triggers

Edge	Triggers when signal meets slope (positive, negative, or either) and level condition.
Window	Triggers when signal exits a window defined by adjustable thresholds

SMART Triggers™

State or Edge Qualified	Triggers on any input source only if a defined state or edge occurred on another input source. Holdoff between sources is selectable by time or events
Qualified First	In Sequence acquisition mode, triggers repeatably on event B only if a defined pattern, state, or edge (event A) is satisfied in the first segment of the acquisition. Holdoff between sources is selectable by time or events
Dropout	Triggers if signal drops out for longer than selected time between 1 ns and 20 s
Pattern	Logic combination (AND, NAND, OR, NOR) of 5 inputs (4 channels and external trigger input). Each source can be high, low, or don't care. The High and Low level can be selected independently. Triggers at start or end of the pattern

SMART Triggers with Exclusion Technology

Glitch	Triggers on positive or negative glitches with widths selectable as low as 200ps to 20 s, or on intermittent faults
Width (Signal or Pattern)	Triggers on positive, negative, or both widths with widths selectable as low as 200ps to 20 s, or on intermittent faults
Interval (Signal or Pattern)	Triggers on intervals selectable between 1 ns and 20 s
Timeout (State/Edge Qualified)	Triggers on any source if a given state (or transition edge) has occurred on another source. Delay between sources is 1 ns to 20 s, or 1 to 99,999,999 events
Runt	Trigger on positive or negative runts defined by two voltage limits and two time limits. Select between 1 ns and 20 ns
Slew Rate	Trigger on edge rates. Select limits for dV, dt, and slope. Select edge limits between 1 ns and 20 ns
Exclusion Triggering	Trigger on intermittent faults by specifying the expected behavior and triggering when that condition is not met

Cascade (Sequence) Triggering

Capability	Arm on "A" event, then Trigger on "B" event. Or Arm on "A" event, then Qualify on "B" event, and Trigger on "C" event. Or Arm on "A" event, then Qualify on "B" then "C" event, and Trigger on "D" event
Types	Cascade A then B: Edge, Window, Pattern (Logic) Width, Glitch, Interval, Dropout, or Measurement. Measurement can be on Stage B only. Cascade A then B then C (Measurement): Edge, Window, Pattern (Logic), Width, Glitch, Interval, Dropout, or Measurement. Measurement can be on Stage C only. Cascade A then B then C: Edge, Window, Pattern (Logic) Cascade A then B then C then D: Edge, Window, Pattern (Logic), or Measurement. Measurement can be on Stage D only.
Holdoff	Holdoff between A and B, B and C, C and D is selectable by time (1ns to 20s) or number of events. Measurement trigger selection as the last stage in a Cascade precludes a holdoff setting between the prior stage and the last stage

SPECIFICATIONS

LabMaster 10 Zi Series	20 GHz	25 GHz	30 GHz	36 GHz	50 GHz	59 GHz	65 GHz	100 GHz

High-speed Serial Protocol Triggering (Optional)

Data Rates	Option LM10Zi-6GBIT-80B-8B10B-TD: 600 Mb/s to 6.5 Gb/s, Channel 4 input only Option LM10Zi-14GBIT-80B-8B10B-TD: 600 Mb/s to 14.1 Gb/s, Channel 4 input only	Option LM10Zi-6GBIT-80B-8B10B-TD: 600 Mb/s to 6.5 Gb/s, Channel 4 input only Option LM10Zi-14GBIT-80B-8B10B-TD: 600 Mb/s to 14.1 Gb/s, Channel 4 input only (Note: Channel 3 input will capture signal for triggering when oscilloscope is in ≥25 GHz mode)
Pattern Length	80-bits, NRZ or eight 8b/10b symbols	
Clock and Data Outputs	No Clock and Data Recovery outputs provided	

Color Waveform Display

Type	On LabMaster MCM-Zi-A Master Control Module: Color 15.3" flat panel TFT-Active Matrix LCD with high resolution touch screen
Resolution	WXGA; 1280 x 768 pixels
Number of Traces	Display a maximum of 40 traces. Simultaneously display channel, zoom, memory and math traces
Grid Styles	Auto, Single, Dual, Quad, Octal, X-Y, Single + X-Y, Dual + X-Y, Twelve, Sixteen, Twenty
Waveform Representation	Sample dots joined, or sample dots only

Integrated Second Display

Type	Supports touch screen integration of user-supplied second display with split-grid capability. (Note: touch screen driver for second display may not be a Fujitsu driver)
Resolution	Determined by display chosen by user

High-Speed Digitizer Output (Option)

Type	Option LSIB-2. Installs in LabMaster MCM-Zi-A Master Control Module and uses one available PCIe slot normally used by a LabMaster 10-xxZi-A Acquisition Module.
Transfer Rates	Up to 325 MB/s (typical) - Maximum of 4 channels (consult Teledyne LeCroy for >4 channels)
Output Protocol	PCI Express, Gen 1 (4 lanes utilized for data transfer)
Control Protocol	TCP/IP
Command Set	Via Windows Automation, or via Teledyne LeCroy Remote Command Set

Processor/CPU

Type	In LabMaster MCM-Zi-A Master Control Module: Intel® Xeon™ X5660 2.8 GHz (or better). There are two processors in each CPU, and each processor has 10 cores for a total of 20 cores and an effective processor speed of 33.6 GHz.
Processor Memory	32 GB standard. Up to 192 GB optionally available
Operating System	Microsoft Windows® 7 Professional Edition (64-bit)
Real Time Clock	Date and time displayed with waveform in hardcopy files. SNTP support to synchronize to precision internal clocks

Setup Storage

Front Panel and Instrument Status	Store to the internal hard drive, over a network, or to a USB-connected peripheral device

Interface

Remote Control	Via Windows Automation, or via Teledyne LeCroy Remote Command Set
Network Communication Standard	VXI-11 or VICP, LXI Class C (v1.2) Compliant
GPIB Port (optional)	Supports IEEE – 488.2. Installs in LabMaster MCM-Zi-A Master Control Module and uses one available PCIe slot normally used by a LabMaster 10-xxZi-A Acquisition Module.
LSIB Port (optional)	Supports PCIe Gen1 x4 protocol with Teledyne LeCroy supplied API. Installs in LabMaster MCM-Zi-A Master Control Module and uses one available PCIe slot normally used by a LabMaster 10-xxZi -AAcquisition Module.
Ethernet Port	Supports 10/100/1000BaseT Ethernet interface (RJ45 port)
USB Ports	LabMaster MCM-Zi-A Master Control Module: minimum 2 total USB 2.0 ports on rear of unit to support Windows compatible devices LabMaster MCM-Zi-A Master Control Module: minimum 3 total USB 2.0 ports on front of unit to support Windows compatible devices
External Monitor Port	Dual Link DVI compatible to support internal display on MCM-Zi-A Master Control Module (1280 x 768 pixel resolution) and customer-supplied monitor with up to WQXGA (2560 x 1600 pixel) resolution using extended desktop mode.

SPECIFICATIONS

LabMaster 10 Zi Series	20 GHz	25 GHz	30 GHz	36 GHz	50 GHz	59 GHz	65 GHz	100 GHz

Power Requirements

Voltage	LabMaster 10-xxZi-A Acquisition Module: 100–240 VAC ±10% at 45-66 Hz; 100-120 VAC ±10% at 380-420 Hz; Automatic AC Voltage Selection, Installation Category II LabMaster MCM-Zi-A Master Control Module: 100–240 VAC ±10% at 45-66 Hz; Automatic AC Voltage Selection, Installation Category II	
Max. Power Consumption	LabMaster 10-xxZi-A Acquisition Module - 1225 W / 1225 VA. LabMaster MCM-Zi-A Master Control Module - 450 W / 450 VA. Each Module and the CPU has a separate power cord.	LabMaster 10-xxZi-A Acquisition Module - 1275 W / 1275 VA. LabMaster MCM-Zi-A Master Control Module - 450 W / 450 VA. Each Module and the CPU has a separate power cord.

Environmental

Temperature (Operating)	+5 °C to +40 °
Temperature (Non-Operating)	–20 °C to +60 °C
Humidity (Operating)	5% to 80% relative humidity (non-condensing) up to +31 °C Upper limit derates to 50% relative humidity (non-condensing) at +40 °C
Humidity (Non-Operating)	5% to 95% relative humidity (non-condensing) as tested per MIL-PRF-28800F
Altitude (Operating)	Up to 10,000 ft. (3048 m) at or below +25 °C
Altitude (Non-Operating)	Up to 40,000 ft. (12,192 m)
Random Vibration (Operating)	0.5 g_{rms} 5 Hz to 500 Hz, 15 minutes in each of three orthogonal axes
Random Vibration (Non-Operating)	2.4 g_{rms} 5 Hz to 500 Hz, 15 minutes in each of three orthogonal axes
Functional Shock	20 g_{peak}, half sine, 11 ms pulse, 3 shocks (positive and negative) in each of three orthogonal axes, 18 shocks total

Physical Dimensions

Dimensions (HWD)	LabMaster MCM-Zi-A Master Control Module - 10.9"H x 18.2"W x 15.6"D (277 x 462 x 396 mm), LabMaster 10-xxZi-A Acquisition Module - 8.0"H x 18.2"W x 26"D (202 x 462 x 660 mm)	
Weight	LabMaster 10-xxZi-A Acquisition Module - 53 lbs. (24 kg) LabMaster MCM-Zi-A Master Control Module - 47 lbs. (21.4 kg)	LabMaster 10-xxZi-A Acquisition Module - 58 lbs. (24 kg) LabMaster MCM-Zi-A Master Control Module - 47 lbs. (21.4 kg)
Shipping Weight	LabMaster 10-xxZi-A Acquisition Module - 71 lbs. (32.3 kg) LabMaster MCM-Zi-A Master Control Module - 56 lbs. (25.5 kg)	LabMaster 10-xxZi-A Acquisition Module - 76 lbs. (34.5 kg) LabMaster MCM-Zi-A Master Control Module - 56 lbs. (25.5 kg)

Certifications

CE Compliant, UL and cUL listed; conforms to EN 61326, EN 61010-1,
EN61010-2-030, UL 61010-1 3rd edition, and CSA C22.2 No. 61010-1-12

Warranty and Service

3-year warranty; calibration recommended annually.
Optional service programs include extended warranty, upgrades, and calibration services

ORDERING INFORMATION

LabMaster 10 Zi-A Series Master Control Modules

Product Description	Product Code
LabMaster Master Control Module with 15.3" WXGA Color Display.	LabMaster MCM-Zi-A
SDA Master Control Module with 15.3" WXGA Color Display (provides add'l standard software and 64 Mpt/Ch memory)	SDA MCM-Zi-A

LabMaster 10 Zi-A Series Acquisition Modules

Product Description	Product Code
20 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input	LabMaster 10-20Zi-A
25 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input	LabMaster 10-25Zi-A
30 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input	LabMaster 10-30Zi-A
36 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input	LabMaster 10-36Zi-A
50 GHz, 160 GS/s, 2 Ch, 64 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input (36 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch)	LabMaster 10-50Zi-A
59 GHz, 160 GS/s, 2 Ch, 64 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input (36 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch)	LabMaster 10-59Zi-A
65 GHz, 160 GS/s, 2 Ch, 64 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input (36 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch)	Labmaster 10-65Zi-A
100 GHz, 160 GS/s, 2 Ch, 64 Mpts/Ch LabMaster 10 Zi Acquisition Module with 50 Ω input (36 GHz, 80 GS/s, 4 Ch, 32 Mpts/Ch)	Labmaster 10-100Zi-A

Included with LabMaster MCM-Zi-A Standard Configuration

Power Cable for the Destination Country, Optical 3-button Wheel Mouse USB 2.0, Printed Getting Started Manual, Anti-virus Software (Trial Version), Microsoft Windows 7 License, Commercial NIST Traceable Calibration with Certificate, 3-year Warranty

Included with LabMaster 10-xxZi-A Standard Configuration

2.92mm Connector Saver: Qty. 4, 1.85mm Barrel Adapter: Qty. 2 (50-65 GHz units only), PCIe x 8 cable, 2m long, PCIe x 4 cable, 2m long, Power Cable for the Destination Country, ChannelSync 10 GHz clock cable, 2m long, Commercial NIST Traceable Calibration with Certificate, 3-year Warranty

ChannelSync Expansion Products

Product Description	Product Code
ChannelSync Mainframe Hub to permit LabMaster expansion to up to 20 acquisition modules	LabMaster CMH20-Zi
Expansion ChannelSync module card for ChannelSync Mainframe Hub. One required per connected acquisition module	LabMaster CMH-1ACQMODULE-Zi

Memory Options

Product Description	Product Code
32 Mpts/Ch Standard Memory for LabMaster 10 Zi Acquisition Module	LM10Zi-STD
64 Mpts/Ch Standard Memory for LabMaster 10 Zi Acquisition Module. Used with SDA MCM-Zi	SDA10Zi-STD
64 Mpts/Ch Memory Option for LabMaster 10 Zi Acquisition Modules	LM10Zi-M-64
128 Mpts/Ch Memory Option for LabMaster 10 Zi Acquisition Modules	LM10Zi-L-128
128 Mpts/Ch Memory Option for LabMaster 10 Zi Acquisition Modules. Used with SDA MCM-Zi-A	SDA10Zi-L-128
256 Mpts/Ch Memory Option for LabMaster 10 Zi Acquisition Modules	LM10Zi-L-256
256 Mpts/Ch Memory Option for LabMaster 10 Zi Acquisition Modules. Used with SDA MCM-Zi-A	SDA10Zi-L-256
512 Mpts/Ch Memory Option for LabMaster 10 Zi Acquisition Modules	LM10Zi-XL-512
512 Mpts/Ch Memory Option for LabMaster 10 Zi Acquisition Modules. Used with SDA MCM-Zi	SDA10Zi-XL-512

ORDERING INFORMATION

Product Description	Product Code
CPU, Computer and Other Hardware Options for LabMaster MCM-Zi Master Control Module	
Additional 500 GB Hard Drive for MCM-Zi-A	MCM-Zi-500GB-RHD-02
Upgrade to 64 GB RAM for MCM-Zi-A	MCMZI-32-UPG-64GB
Upgrade to 128 GB RAM for MCM-Zi-A	MCMZI-32-UPG-128GB
Upgrade to 192 GB RAM for MCM-Zi-A	MCMZI-32-UPG-192GB
GPIB Option for LabMaster MCM-Zi-A	GPIB-3
Serial Data and Crosstalk Analysis	
Bundle - Multi-Lane SDA LinQ Framework, including Eye, Jitter, Noise, Crosstalk Measurements, with EyeDrII and VirtualProbe	LM10Zi-SDAIII-CompleteLinQ SDA10Zi-CompleteLinQ DDA10Zi-CompleteLinQ
Multi-Lane Serial Data Analysis LinQ Framework, Eye, Jitter, Noise and Crosstalk Measurements	LM10Zi-SDAIII-CrossLinQ SDA10Zi-CrossLinQ DDA10Zi-CrossLinQ
Multi-Lane Serial Data Analysis LinQ Framework, Eye and Jitter Measurements	LM10Zi-SDAIII-LinQ SDA10Zi-LinQ DDA10Zi-LinQ
Single-Lane Serial Data Analysis Framework, Eye, Jitter, Noise and Crosstalk Measurements	LM10Zi-SDAIII-Crosstalk SDA10Zi-Crosstalk DDA10Zi-Crosstalk
Single-Lane Serial Data Analysis Framework, Eye and Jitter Measurements	LM10Zi-SDAIII
PAM4 Eye, Jitter and Noise Analysis	LM10ZI-PAM4
Signal Integrity Toolkits	
Advanced De-embedding, Emulation and Virtual Probing Toolkit	LM10Zi-VIRTUALPROBE
Signal Integrity Toolkit - Channel & Fixture De-embedding/Emulation, Tx/Rx Equalization	LM10Zi-EYEDRII
Bundle - EyeDrII and VirtualProbe Toolkits	LM10Zi-EYEDRII-VP
Cable De-embed Option	LM10Zi-CBL-DE-EMBED
Serial Data Compliance	
QualiPHY Enabled 10GBase-KR Software Option	QPHY-10GBase-KR
QualiPHY Enabled 10GBase-T Software Option.	QPHY-10GBase-T
QualiPHY Enabled LPDDR2 Software Option	QPHY-LPDDR2
QualiPHY Enabled DDR3 Software Option	QPHY-DDR3
QualiPHY Enabled DDR4 Software Option	QPHY DDR4
QualiPHY Enabled DisplayPort Software Option	QPHY-DisplayPort
QualiPHY Enabled HDMI Software Option	QPHY-HDMI†
QualiPHY Enabled PCIe 3.0 Software Option	QPHY-PCIe3
QualiPHY Enabled PCIe Gen1 Software Option	QPHY-PCIe
QualiPHY Enabled SATA Software Option	QPHY-SATA-TSG-RSG
QualiPHY Enabled SAS-2 Software Option	QPHY-SAS2
QualiPHY Enabled SAS3 Software Option	QPHY-SAS3
QualiPHY Enabled SFI Software Option	QPHY-SFI
QualiPHY Enabled SuperSpeed USB Transmitter/ Receiver Compliance Software Option	QPHY-USB3-Tx-Rx

† TF-HDMI-3.3V-QUADPAK required.

PCI Express, SuperSpeed USB (USB 3.0) and SATA Complete Hardware/Software Test Solutions are available. Consult Factory.

Product Description	Product Code
Serial Data Test Fixtures	
HDMI 50 Ω Pull-Up Terminator	TF-HDMI-3.3V
HDMI Pull-Up Terminator Quad Pack	TF-HDMI-3.3V-QUADPAK
SATA 1.5 Gb/s, 3.0 Gb/s and 6.0 Gb/s Compliance Test Fixture	TF-SATA-C
SATA 1.5 Gb/s, 3.0 Gb/s and 6.0 Gb/s Compliance Test Fixture Measure Kit	TF-SATA-C-KIT
SuperSpeed USB Compliance Test Fixture	TF-USB3
100 ps Rise Time Filter	RISE-TIME-FILTER-100PS
150 ps Rise Time Filter	RISE-TIME-FILTER-150PS
20 dB SMA Attenuators	20DB-SMA-ATTENUATOR
Serial Data Triggers and Decoders	
600 Mb/s to 14.1 Gb/s 80-bit NRZ, 8b/10b and 64b/66b Serial Trigger. Also includes 8b/10b and 64b/66b Decode.	LM10ZI-14GBIT-80B-SYMBOL-TD
600 Mb/s to 6.5 Gb/s 80-bit NRZ, 8b/10b, 64b/66b Serial Trigger. Also includes 8b/10b abd 64b/66b Decode.	LM10ZI-6GBIT-80B-SYMBOL-TD
64b/66b Decode Annotation Option	LM10Zi-64b66b D
8b/10b Decode Decode Annotation Option	LM10Zi-8B10B D
ENET Decode Option	LM10Zi-ENETbus D
Ethernet 10G Decode Option	LM10Zi-ENET10Gbus D
PCI Express Decode Annotation Option	LM10Zi-PCIEbus D
USB 3.0 Decode Annotation Option	LM10Zi-USB3bus D
USB 2.0 Decode Annotation Option	LM10Zi-USB2bus D
USB2-HSIC Decode Option	LM10Zi-USB2-HSICbus D
SATA Decode Annotation Option	LM10Zi-SATAbus D
SAS Decode Annotation Option	LM10Zi-SASbus D
Fibre Channel Decode Annotation Option	LM10Zi-FCbus D
D-PHY Decode Option	LM10Zi-DPHYbus D
DigRF 3G Decode Option	LM10Zi-DigRF3Gbus D
DigRF v4 Decode Option	LM10Zi-DIGRFv4bus D
Audiobus and Decode Option for I^2S, LJ, RJ, and TDM	LM10Zi-Audiobus D
Audiobus, Decode, and Graph Option for I^2S, LJ, RJ, and TDM	LM10Zi-Audiobus DG
Manchester Decode Option	LM10Zi-Manchesterbus D
MIPI D-PHY Decode Annotation Option	LM10Zi-DPHYbus D
MIPI D-PHY Decode and Physical Layer Test Option	LM10Zi-DPHYbus DP
MIPI M-PHY Decode Annotation Option	LM10Zi-MPHYbus D
MIPI M-PHY Decode Annotation and Physical Layer Test Option	LM10Zi-MPHYbus DP
I^2C Bus and Decode Option	LM10Zi-I2Cbus D
SPI Bus and Decode Option	LM10Zi-SPIbus D
LIN and Decode Option	LM10Zi-LINbus D
UART and RS-232 and Decode Option	LM10Zi-UART-RS232bus D
FlexRay and Decode Option	LM10Zi-FlexRaybus D
FlexRay, Decode, and Physical Layer Test Option	LM10Zi-FlexRaybus DP
CAN and Decode Option	LM10Zi-CANbus D
CAN, Decode and Measure/Graph Option	LM10Zi-CANbus DM
MIL-STD-1553 Decode Option	LM10Zi-1553 D
ARINC 429 Symbolic Decode Option	LM10Zi-ARINC429bus DSymbolic
PROTObus MAG Serial Debug Toolkit	LM10Zi-PROTObus MAG
Decode Annotation and Protocol Analyzer Synchronization Software Option	LM10Zi-ProtoSync
Decode Annotation and Protocol Analyzer Synchronization Software + Bit Tracer Option	LM10Zi-ProtoSync-BT
SENT Decode Option	LM10Zi-SENTbus D

ORDERING INFORMATION

General Purpose and Application Specific Software Options

Product Description	Product Code
Spectrum Analysis Option	LM10Zi-SPECTRUM
Digital Filter Software Package	LM10Zi-DFP2
Serial Data Mask Software Package	LM10Zi-SDM
Disk Drive Measurements Software Package	LM10Zi-DDM2
Disk Drive Analyzer Software Package	LM10Zi-DDA
Advanced Optical Recording Measurement Package	LM10Zi-AORM
EMC Pulse Parameter Software Package	LM10Zi-EMC
Clock Jitter Analysis with Four Views Software Package	LM10Zi-JITKIT

High Speed Output Accessories

Product Description	Product Code
High-speed PCIe Gen 1 x4 Digitizer Output	LSIB-2
PCI Express x1 Express Card Host Interface for Laptop Express Card Slot	LSIB-HOSTCARD
PCI Express x1 Host Interface Board for Desktop PC	LSIB-HOSTBOARD
PCI Express x4 3-meter Cable with x4 Cable Connectors Included	LSIB-CABLE-3M
PCI Express x4 7-meter Cable with x4 Cable Connectors Included	LSIB-CABLE-7M

Miscellaneous

Product Description	Product Code
MCM-Zi-A Rackmount Kit	MCM-Zi-RACKMOUNT
LabMaster 10 Zi-A Acquisition Module Rackmount Kit	LM10Zi-ACQMOD-RACKMOUNT
LabMaster MCM-Zi-A Softcase	MCM-Zi-SOFTCASE
LabMaster 10 Zi-A Acquisition Module Soft Carrying Case	LM10Zi-ACQMOD-SOFTCASE

Probes and Probe Accessories

Product Description	Product Code
WaveLink 13 GHz, 2.0 Vp-p Differential Probe System	D1305-A-PS
WaveLink 16 GHz, 2.0 Vp-p Differential Probe System	D1605-A-PS
WaveLink 20 GHz, 2.0Vp-p Differential Probe System	D2005-A-PS
WaveLink 25 GHz, 2.0 Vp-p Differential Probe System	D2505-A-PS
Optical-to-Electrical Converter, DC to 9.5 GHz, 785 to 1550 nm	OE695G
2.92mm to ProLink Adapter with probe power and communications pass through	L2.92A-PLINK
2.92mm to ProBus Adapter with probe power and communications pass through	L2.92A-PBUS
200 MHz, 3.5 pF, 1 MΩ Active Differential Probe	ZD200††
500 MHz, 1.0 pF, Active Differential Probe	ZD500††
1 GHz, 1.0 pF, Active Differential Probe	ZD1000††
1.5 GHz, 1.0 pF, Active Differential Probe	ZD1500††
2.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS2500††
4 GHz, 0.6 pF, 1 MΩ High Impedance Active Probe	ZS4000††
WaveLink 4 GHz, 2.5 Vp-p Differential Probe System	D410-PS††
WaveLink 4 GHz, 5 Vp-p Differential Probe System	D420-PS††
WaveLink 6 GHz, 2.5 Vp-p Differential Probe System	D610-PS**
WaveLink 6 GHz, 5 Vp-p Differential Probe System	D620-PS**
WaveLink 8 GHz 3.5Vp-p Differential Probe System	D830-PS**
WaveLink 10 GHz 3.5Vp-p Differential Probe System	D1030-PS**
WaveLink 13 GHz 3.5Vp-p Differential Probe System	D1330-PS**
WaveLink 6 GHz Differential Amplifier Module with Adjustable Tip	D600A-AT*
WaveLink 3GHz Differential Amplifier Module with Adjustable Tip	D300A-AT†
WaveLink ProLink Platform/Cable Assembly (4 – 6 GHz)	WL-PLink-CASE**
WaveLink ProBus Platform/Cable Assembly (4 GHz)	WL-PBus-CASE††
SMA/SMP Lead Set for Dxx30 Probes	Dxx30-SMA-SMP Leads

** For a complete probe, order a WL-PLink-CASE Platform/Cable Assembly with the Adjustable Tip Module.*
***Requires purchase and use of L2.92A-PLINK*
† For a complete probe, order a WL-PBUS-CASE Platform/Cable Assembly with the Adjustable Tip Module
†† Requires purchase and use of L2.92A-PBUS

A variety of other active voltage and current probes are also available. Consult Teledyne LeCroy for more information.

Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year.

This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

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Local sales offices are located throughout the world.
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