TELEDYNE LECROY
Everywhere**you**look™

WavePro 7 Zi-A Series
1.5 GHz – 6 GHz

The New Oscilloscope Experience

THE NEW OSCILLOSCOPE EXPERIENCE IS HERE

The Only Complete Debug Solution Up to 6 GHz

Combining excellent signal fidelity with an architecture that maximizes speed in every performance aspect, the new WavePro 7 Zi-A Series presents a totally new oscilloscope experience from 1.5 to 6 GHz bandwidths. Experience 50 Ω and 1 MΩ inputs for every channel and four inputs into high-speed front end amplifiers and analog to digital converters.

WavePro 7 Zi-A is standard with an Intel® Core™ i7-2600 Quad-core, 2.6 GHz (per core, up to 3.8 GHz in Turbo mode) CPU with 8 GB of RAM (upgradeable to 32 GB). The X-Stream™ II architecture maximizes speed in all aspects—10–100 times faster analysis processing on maximum record lengths, instantaneous instrument responsiveness, and 20 times faster off-line data transfer. Combined with Teledyne LeCroy's flexible and deep analysis toolbox, the WavePro 7 Zi-A Series provides superior performance for the debugging, validation, compliance testing, and analysis of electronic designs.

1. X-Stream II streaming architecture — 10–100 times faster than other oscilloscopes

2. Deepest toolbox with more measurements, more math, more power

3. Intel® Core™ i7-2600 Quad-core, 2.6 GHz (per core, up to 3.8 GHz in Turbo mode) CPU with 8 GB of RAM (upgradeable to 32 GB).

4. Exceptional instrument responsiveness, even at maximum acquisition memory (256 Mpts)

5. 325 MB/s data transfer rate from oscilloscope to PC with Teledyne LeCroy Serial Interface Bus (LSIB) option

6. 15.3" widescreen (16x9) high resolution WXGA color touch screen display

7. Protect your investment with bandwidth upgrades

8. Serial Data Analyzer and Disk Drive Analyzer models are tailored for advanced serial data analysis and for the most complete disk drive test solution

9. SDAIII "LinQ" options provide four simultaneous eye diagrams and jitter calculations for multi-lane or single-lane, multiple location serial data analysis

10. Largest selection of serial triggers and decoders — more than 25 —available to provide a total system view

11. WaveScan™ quickly and intuitively locates, analyzes and displays abnormal events even in long waveforms

12. 50 Ω and 1 MΩ inputs with both ProBus and ProLink probe interfaces on all models provide support for every probe manufactured by Teledyne LeCroy without requiring external adapters or probe amplifiers

13. ProBus and ProLink probe interfaces on 4–6 GHz models offer 8 inputs for multiplexing into four channels. Minimize reconnections.

# MOST COMPLETE DEBUG SOLUTION FROM 1.5–6 GHz
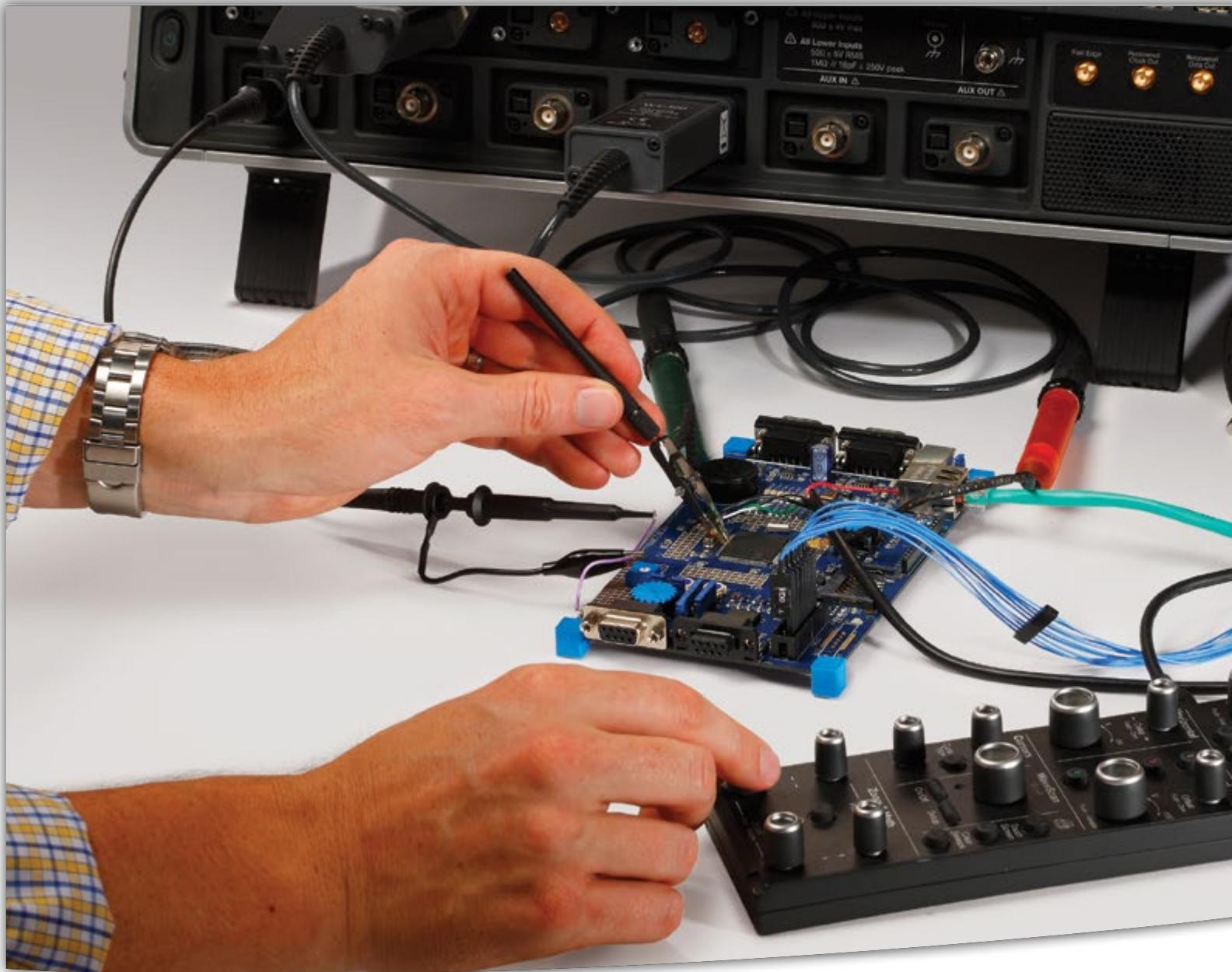
Freedom from Limitations

WavePro 7 Zi-A excels in the way it offers general purpose utility never before seen in oscilloscopes from 1.5 to 6 GHz. All WavePro 7 Zi-A oscilloscopes contain selectable 50 Ω and 1 MΩ input capability. The 4 and 6 GHz models include both ProBus and ProLink input types which means eight probes can be attached and then multiplexed from the front panel or by remote control. The result—it's easy to hook up a passive probe even on 4 or 6 GHz models—no more frustration and hassle of trying to find a 1 MΩ input adapter. Plus, any existing investment in Teledyne LeCroy probes, such as current probes, single-ended or differential active probes, or high voltage probes, is fully leveraged. Perfect.

A New Way to Control an Oscilloscope

WavePro's fast and responsive front panel and touch screen user interface are well integrated so you can easily choose and setup your vertical, horizontal trigger and measurements. Zoom and scroll through a long waveform signal, control the oscilloscope with the detachable front panel right next to the circuit being probed.

Quick Insight for Debug

Insight **is the power or act of seeing into a situation. Start up problems on a new design require a combination of problem recognition, precise triggering for fast isolation of rare events, and comparison tools that help correlate timing of problems. The ability to capture megapoints of waveform information and intuitively analyze it to find anomalies shortens the time to debug. WavePro's TriggerScan, WaveScan and deep measurement toolbox maximize quick insight.**
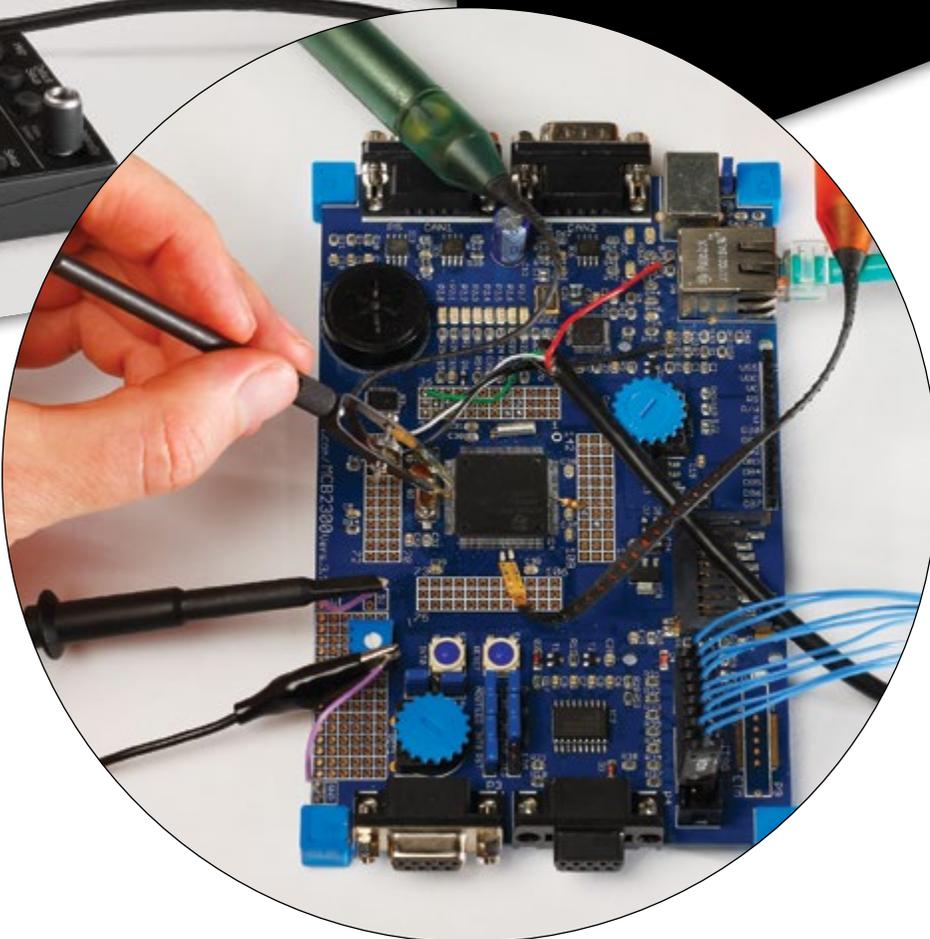
Single-ended active probes, current probes, high-voltage, mixed signals, and high frequency differential probes all connect to the WavePro 7 Zi-A oscilloscope and give you a total system view.

MOST COMPLETE DEBUG SOLUTION FROM 1.5–6 GHz

Complete System Debug

Understanding the relationships between different signals is vital to fast debug. Only WavePro 7 Zi-A combines the best of general purpose oscilloscopes (low-speed serial triggers and decoders, mixed signal capability, high impedance probing) to allow easy correlation between low-speed (serial data control words, power supply noise, or parallel data transmissions) and high speed events.
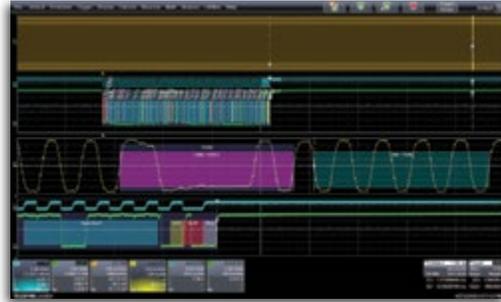
Capture 5 ms (100 Mpts) of low-speed and high-speed waveforms. Decode low and high speed serial data signals. Easily zoom, and validate timing relationships between signals.

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

Serial Decode—A Whole New Meaning to Insight

Over 25 different protocols are supported with serial decoders (many with hardware protocol triggers as well). Use ProtoSync 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

More Trigger Capability Isolates More Problems More Quickly

A powerful combination of high bandwidth Edge and 10 different SMART triggers, four-stage Cascade™ triggering, and TriggerScan™ are all standard and allow you to isolate the problem quickly and begin to focus on the cause. A high-speed serial trigger enables triggering on up to 3.125 Gb/s serial patterns of up to 80-bits in length. A full range of protocol serial triggers (I2C, SPI, UART, RS-232, Audiobus (I2S, LJ, RJ, TDM), CAN, LIN, FlexRay, MIL-STD-1553 and many others) are also available.
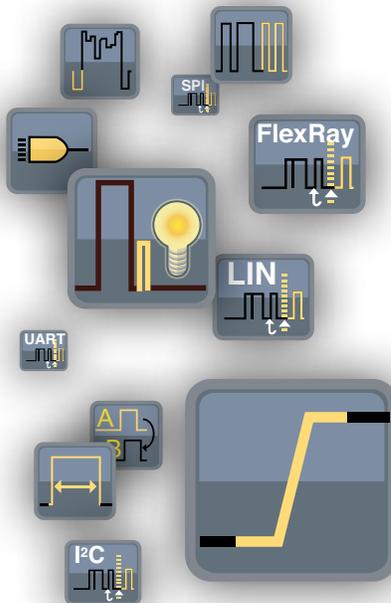
Search and Scan to Understand

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.

Freedom from Probing Limitations

High bandwidth differential probes (up to 6 GHz), single-ended active probes, current probes, high-voltage, and mixed signals all connect to the WavePro 7 Zi-A oscilloscope and give you a total system view. All WavePro 7 Zi-A oscilloscopes contain selectable 50 Ω and 1 MΩ input capability and can be used with any Teledyne LeCroy probe—passive or active—without requiring external adapters or power supplies.

Fully Integrated Mixed Signal Oscilloscope (4+36) Option

Add Mixed Signal Oscilloscope (MSO) operation using the MS Series mixed signal options to acquire up to 36 digital lines time-correlated with analog waveforms and completely integrated with the scope operation. In addition to acquiring digital lines, they are also helpful for monitoring low-speed signals, such as serial data clock, data, and chip select signals, thus preserving the analog channels for higher speed requirements.

Deep Insight for Analysis

Applying the WavePro 7 Zi-A Series' flexible and deep measurement and analysis toolbox to characterize and validate a design creates understanding. That is Deep Insight. An oscilloscope's operating performance comes from the design that integrates the operating system, the hardware processor specification and the waveform processing method. Each component is important to the overall architecture performance but only the X-Stream II waveform processing method unleashes amazing speed performance and no compromise in responsiveness, thus drastically reducing the time to generate Deep Insight.

Teledyne LeCroy — The Analysis Memory Leader

Teledyne LeCroy has found a way to make long acquisition memory seamless and pain free to use. The WavePro 7 Zi-A Series' proprietary X-Stream II architecture supports capturing, zooming, measuring and analyzing multiple waveforms at up to 256 Mpts deep. WavePro 7 Zi-A's proprietary architecture design is augmented with an Intel® Core™ i7-2600 Quad processor (12 GHz effective clock rate), high-speed serial data buses, Windows 7 64-bit OS and 8 GB of RAM. What you experience is processing speed 10–100x faster compared to other oscilloscopes in this class.

Instantaneous Responsiveness

With WavePro 7 Zi-A oscilloscopes you will experience remarkable responsiveness. Acquiring and manipulating the longest record lengths and performing the most complex WaveShape Analysis are all
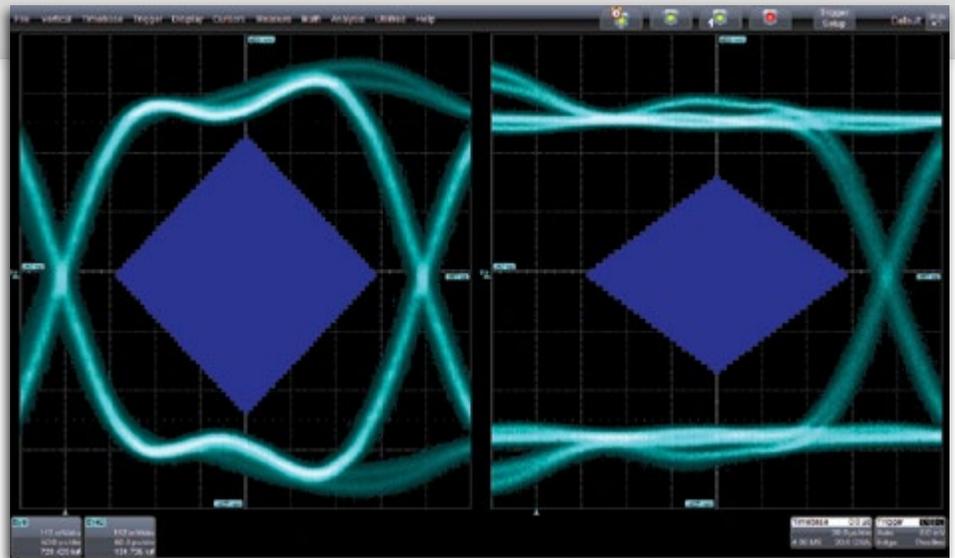
WavePro 7 Zi-A excels at performing complex calculations on long waveforms, enabling users to gain waveform insight with confidence. Here, a 40 Mpts PCIe Gen1 waveform acquisition is acquired and fully analyzed in a matter of seconds—nearly 100x faster than competitive oscilloscopes.

easily handled at the same time, unlike competitive oscilloscopes that become painfully slow to respond when long memory is applied. Bottom line: oscilloscopes no longer need to carry a penalty for operating with long memory.

Fast Off-line Data Transfer

When the application calls for post-processing data off-line, an optional Teledyne LeCroy Serial Interface Bus (LSIB) high-speed 325 MB/s option

provides data transfer 20–100x faster than any other test instrument. For remote control, WavePro 7 Zi-A is Class C compliant with the LXI standard, the latest industry standard for Ethernet remote control operation. WavePro 7 Zi-A supports standard LXI features such as a LAN interface, VXI11 Discovery, a web server and IVI-C & IVI-COM drivers.

X-Stream II Architecture

Optimized for Fast Throughput

X-Stream II architecture enables high throughput of data—even when the oscilloscope is performing multiple 100 Mpts (or larger) waveforms. X-Stream II uses variable waveform segment lengths to enable all processing intensive calculations to take place in fast CPU cache memory, thus improving calculation speed and efficiency. The result—10–100x faster processing compared to other oscilloscopes.

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Optimized for Long Memory

X-Stream II has no analysis memory length restrictions, regardless of analysis type, since the variable waveform segment length can always be limited to a size that can fit in CPU cache memory. Other oscilloscopes with conventional architectures cannot make this claim, and often have limitations on analysis memory of 5–20% the length of their acquisition memory under the best conditions.

Optimized for Responsiveness

By dynamically allocating buffers to maximize memory availability, the WavePro 7 Zi-A Series embodies the fastest front panel responsiveness. Oscilloscopes from other manufacturers can suffer from annoying delays during simple zoom operations, but not WavePro 7 Zi-A.

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DEEP INSIGHT CLARIFIES COMPLEX SIGNALS

## All Oscilloscope Tools are not Created Equal

WavePro 7 Zi-A 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 scope'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)
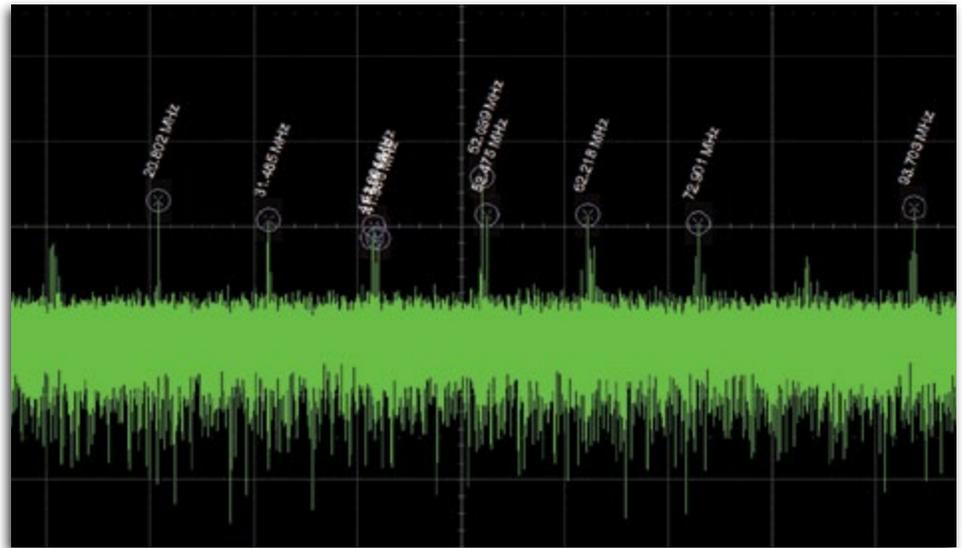
X-Stream II fast throughput streaming architecture makes difficult analysis and deep insight possible. Above, an FFT is applied to a 50 Mpts waveform to determine root cause failure. The high frequency resolution this provides enables deep insight into signal pathologies.
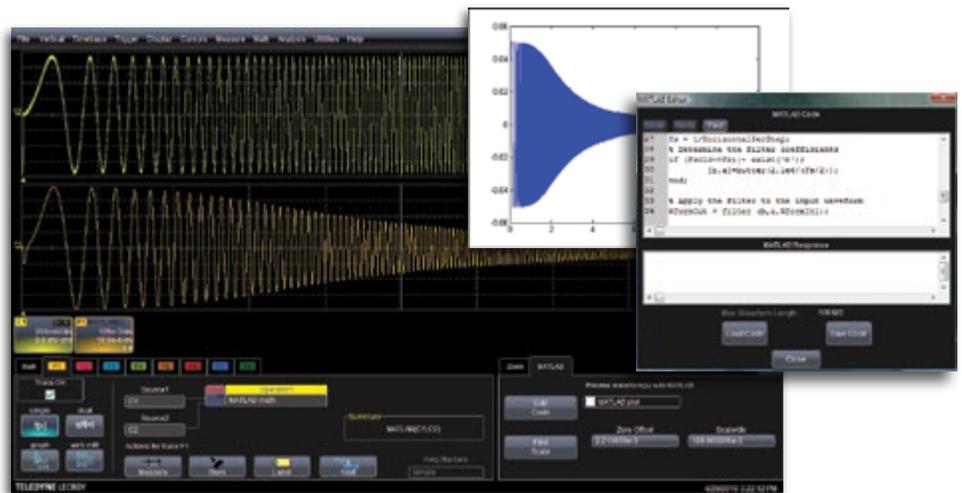
XDEV Customization software package being used to implement a 1 MHz Butterworth filter using MATLAB®.

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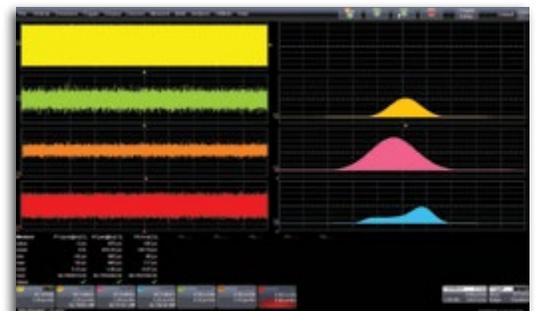
Capture a single clock channel (yellow) and display Track graphs and Histograms simultaneously of multiple jitter parameters.

PROBES

High-performance probes are an essential tool for accurate signal capture. Consequently Teledyne LeCroy offers an extensive range of probes to meet virtually every application need. Optimized for use with Teledyne LeCroy oscilloscopes, these probes set new standards for responsiveness and signal detection.

ZS Series High Impedance Active Probes ZS2500, ZS1500, ZS1000, ZS2500-QUADPAK, ZS1500-QUADPAK, ZS1000-QUADPAK		The ZS Series probes provide high impedance and an extensive set of probe tips and ground accessories to handle a wide range of probing scenarios. The high 1 MΩ input resistance and low 0.9 pF input capacitance mean this probe is ideal for all frequencies. The ZS Series probes provide full system bandwidth for all Teledyne LeCroy oscilloscopes having bandwidths of 1 GHz and lower.
Differential Probes (200 MHz – 1.5 GHz) ZD1500, ZD1000, ZD500, ZD200		High bandwidth, excellent common-mode rejection ratio (CMRR) and low noise make these active differential probes ideal for applications such as automotive development (e.g. FlexRay) and failure analysis, as well as wireless and data communication design. The ProBus interface allows sensitivity, offset and common-mode range to be displayed on the oscilloscope screen.
High Voltage Differential Probes HVD3102, HVD3106, HVD3106-6M, HVD3206, HVD3206-6M, HVD3605, AP031		HVD Series high voltage differential probes permit measurements on power electronics circuits with floating voltages without reference to the ground, allowing the oscilloscope to be safely grounded. Excellent CMRR is provided at high frequencies and is combined with low inherent noise, high offset voltage capabilities, and high DC gain accuracy to make them an ideal choice for probing high voltage and floating control signals in single and three-phase power electronics designs. .
High Voltage Passive Probes HVP120, PPE4KV, PPE5KV, PPE6KV		High voltage probes are suitable for a wide range of applications where high-voltage measurements must be made safely and accurately. There are several fixed-attenuation probes covering a range from 1 kV to 6 kV and varying transient overvoltage ratings. All of these high voltage probes feature a spring loaded probe tip and a variety of standard accessories to make probing high voltages safe and easy. Additionally, all of the high voltage probes have a probe sense pin to automatically configure the oscilloscope for use with the probe.
Current Probes CP031, CP031A, CP030, CP030A, CP150, CP500, DCS015		Available current probes reach bandwidths of 100 MHz, peak currents of 700 A and sensitivities of 10 mA/div. Use multiple current probes to make measurements on three-phase systems or a single current probe with a voltage probe to make instantaneous power measurements. Teledyne LeCroy current probes enable the design and testing of switching power supplies, motor drives, electric vehicles, and uninterruptible power supplies.
Optical Probes OE425, OE455, OE525, OE555, OE695G		Teledyne LeCroy's wide-band multi-mode optical-to-electrical converters are designed for measuring optical communications signals. Their broad wavelength range and multi-mode input optics make these devices ideal for applications including Ethernet, Fibre Channel, and ITU telecom standards. Available to support optical data rates up to 11.3 Gb/s with reference receivers, or slightly higher without reference receivers.

WAVELINK PROBES

D610/D620 and D410/D420

The D610/D620 and D410/D420 probes boast excellent noise performance that is essential for making precise jitter and other signal integrity measurements. The high DC and midband impedance make them ideal for many serial data and memory applications such as PCI Express, FireWire, and DDR. With ±4 volt offset capability and ±3 volt common mode control, the WaveLink probes are designed for multi-purpose applications for single-ended needs (such as DDR memory) and serial data applications (such as HDMI).

The WaveLink Differential Probe Series is a high bandwidth active differential probes series. These probes are suited for signal integrity measurements in high-speed digital systems.

D600A-AT/D400A-AT Browser

WaveLink browser solutions offer adjustable tip widths and varying form factors and a hand held x-y-z positioner for accurate probe placement.
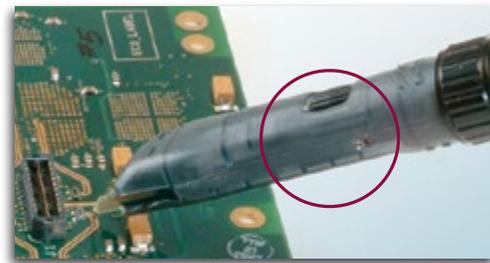
Five Different Tips for Interconnect Flexibility

A. Solder-In Lead (SI)

The Solder-In interconnect lead features the smallest physical tip size of any high bandwidth differential probe and the highest level of electrical performance.

B. Quick Connect (QC) (D6xx only)

The Quick Connect interconnect lead enables you to quickly move the probe between multiple test points on the test circuit.

C. Square Pin (SP)

Many applications, such as IC characterization boards, use standard 0.025" square pins for interconnect. The Square Pin interconnect lead directly mates with a pair of 0.025" (0.635 mm) square pins that are mounted on standard 0.100" (2.54 mm) centers.

D. Positioner Tip (PT)

The PT positioner tips provides spring loaded leads to allow for easy probing. The adjustable wheel allows for precise probing, allowing a spread up to 0.14".

E. High Temperature (HiTemp) Cables and Solder-In Lead

The 90 cm HiTemp cables and Solder-In lead is ideally suited for testing scenarios where the temperature can fluctuate from -40 °C to +105 °C.

APPLICATION SPECIFIC SOLUTIONS

In addition to the general purpose WaveShape Analysis tools, application specific solutions are available for Serial Data Compliance, Embedded Design, Digital Design, and Automotive. These packages extend the Teledyne LeCroy standard measurement and analysis capabilities and expand your oscilloscope's utility as your needs change.

Data Transfer Speeds up to 325 MB/s

Teledyne LeCroy's Serial Interface Bus (LSIB) option enables direct connection to the PCI Express® x4 high-speed data bus in the oscilloscope to enable data transfer rates up to 325 MB/s—20–100x faster than other methods. All that is required is installation of an optional LSIB card in the oscilloscope and the corresponding host board (card) for desktop (laptop) PC in the remote computer. Data transfer is easily enabled through a supplied application program interface (API).

Synchronize Two Oscilloscopes (Zi-8CH-SYNCH)

Quickly and easily combine two oscilloscope acquisition systems into one with captured waveforms on a single display for intuitive debug and analysis. Up to 8 channels at 6 GHz may be captured using the Zi-8CH-SYNCH and two 7 Zi-A scopes.
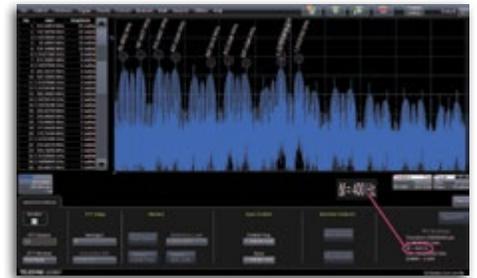
Spectrum Analyzer Analysis Package (WPZi-SPECTRUM)

SPECTRUM converts the controls of your oscilloscope to those of a spectrum analyzer. Adjust the frequency span, resolution and center frequency. Apply filtering to your signal and watch the frequency signature change in real time. A unique peak search labels spectral components and presents frequency and level in a table. Touch any line to move to that peak.
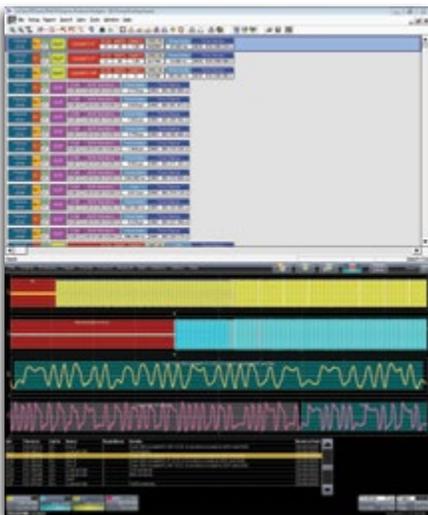
ProtoSync Solutions

ProtoSync links physical layer waveforms, data link layer decode annotation and table information, and full transaction layer protocol analysis together. By simply touching a decode table entry in the oscilloscope software or a packet in the protocol analysis software, all views are automatically synchronized and aligned for quick and easy debug.
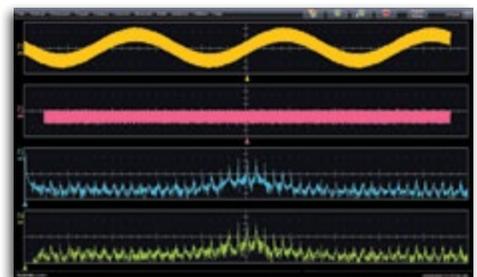
Digital Filter Software Package (WP7Zi-DFP2)

Create and apply a variety of FIR and IIR digital filters to your capture waveforms or processed traces.
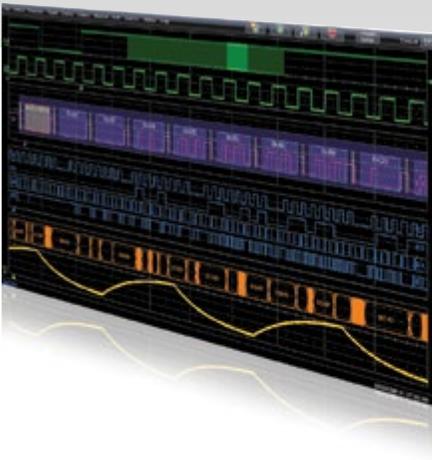
Mixed Signal Oscilloscope Option (MS-250/MS-500)

The Mixed Signal option allows the WavePro 7 Zi-A to convert to a mixed signal oscilloscope with up to 36 digital channels. Channels are sampled at 2 GS/s (500 MHz max. clock speed) up to 50 Mpts/Ch. Having up to 36 digital inputs time-synchronized with four analog channels extends the oscilloscope's use to provide a total system view.

Serial Data Trigger/Decode and PROTObus MAG Serial Debug Toolkit

More than 19 trigger and decode options provide powerful conditional serial data protocol triggering, intuitive color-coded decode overlays, and a table summary with search and zoom capabilities. Additionally, PROTObus MAG (measure, analysis, graph) Serial Debug Toolkit provides the ability to quickly validate and analyze serial data cause-effect relationships and plot digitally encoded data as an analog waveform.

Eye Doctor II and Virtual Probe—Advanced Signal Integrity Tools (WP7Zi-EYEDRII WPZi-VIRTUALPROBE)

Eye Doctor II and Virtual Probe Signal Integrity Tools provide the ability to add precision to signal integrity measurements by allowing subtraction of fixture effects and emulation of emphasis, serial data channels and provide for receiver equalization.

Learn More

teledynelecroy.com/dl/1023

teledynelecroy.com/vid/M0T6WEC0JYQ

teledynelecroy.com/dl/1216

teledynelecroy.com/dl/1136
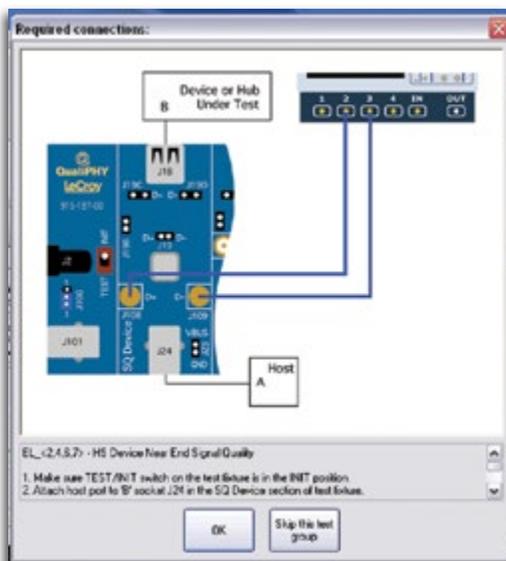
Serial Data Compliance Packages

QualiPHY serial data compliance packages provide easy to use step-by-step instructions for a broad set of serial data standards, such as USB 2.0, PCI Express, SATA, and DDR. With fast automated performance, illustrated instructions and comprehensive reporting capability, QualiPHY packages are the best solution for compliance testing.

For standards not supported with QualiPHY compliance packages, jitter and eye diagram test toolsets are generally included in the SDA 7 Zi-A models.

13

SDA 7 Zi-A SERIES

Key Features

- Teledyne LeCroy's unique summary view displays the Eye Pattern, TIE, Bathtub Curve and Jitter Histogram all on the screen at the same time

- De-embed cables allow all of the SDA tools to be used as if the cables were not in the system

- Create Eye Patterns utilizing the full memory for maximum statistical significance

- Display Eye Patterns up to 100 times faster than other solutions

- Trigger on 80-bit patterns at up to 3.125 Gb/s using the Serial Trigger

- Decode 8b/10b data on up to 4 lanes simultaneously

- Configure software PLL for any standard or custom requirement

- Serial data compliance testing
  – 10/100/1000 BaseT ENET
  – USB 2.0
  – MIPI D-PHY
  – DDR2 / DDR3
  – PCI Express
  – DisplayPort
  – SAS
  – HDMI
  – UWB
  – SATA

Versatile SDA III for Compliance and Debug

The Teledyne LeCroy SDA 7 Zi-A includes a debugging toolset (SDAIII) with insight into eye and jitter analysis. Armed with this insight, engineers can confidently drill down and identify the root cause. The Quick View of the SDAIII shows the eye diagram, TIE track, bathtub curve, jitter histogram, NQ-scale, and jitter spectrum. No other analyzer provides simultaneous interaction and real-time changes in all six measurements. Teledyne LeCroy's X-Stream II Architecture provides fast updates and the fastest eye interpretation. The fastest eye building and maximum unit intervals per second means finding solutions faster.

A high-speed serial trigger enables triggering on up to 3.125 Gb/s serial patterns (up to 80-bits in length), allowing up to two 8b/10b primitives to be triggered. With the most advanced long memory performance (256 Mpts/Ch and X-Stream II enabled responsiveness), eye and jitter analysis occurs rapidly.

Upgrade to SDAIII "LinQ" options to add capability for four simultaneous eye diagrams and jitter calculations for multi-lane or single-lane multi-location analysis, Crosstalk analysis and vertical noise measurements, and embedded EyeDrII and Virtual Probe signal integrity toolsets.
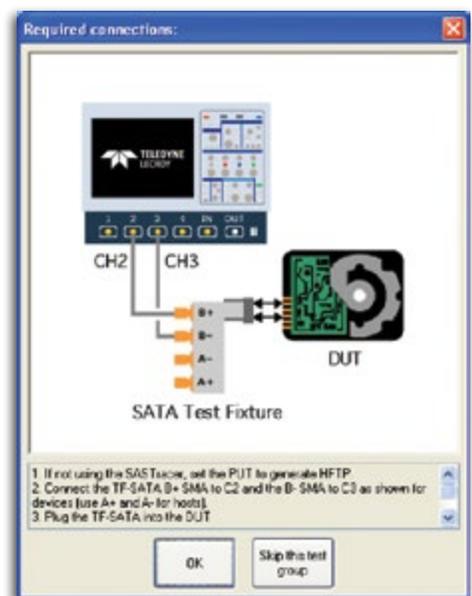
A TOTAL SOLUTION FOR SERIAL DATA ANALYSIS

Automated Compliance Testing

The QualiPHY compliance test suite provides step-by-step instructions for testing compliance on a wide array of serial data standards. The process is simplified with fast, automated test operations, illustrated instructions, connection diagrams, and stop-on-fail feature. Complete test reporting is also provided.

Whether debugging eye pattern or other compliance test failures, the SDA 7 Zi-A Series rapidly isolates the source of the problem in your design. Advanced usability like 8b/10b decode, mask violation locator, ISI plot, and equalization are easy to find. Provide cable characteristics and Cable De-embedding automatically adjusts for the cable effects. The result—true rise time and amplitudes in measurements. The SDAIII uses the same flexible math on math analysis, which is valuable when understanding design behavior during compliance failures.

Data Rate Configuration Chart

Standard	Bit Rate	Recommended Bandwidth	Recommended Oscilloscope
Ethernet	250 Mb/s	1 GHz	WavePro 715Zi-A or Above
USB	480 Mb/s	2 GHz	WavePro 725Zi-A or Above
Fibre Channel	531.25 Mb/s	1.5 GHz	SDA 725Zi-A or Above
IEEE 1394b FireWire	786.43 Mb/s	2 GHz	SDA 725Zi-A or Above
Rapid I/O LP-LVDS	1 Gb/s	2.5 GHz	SDA 725Zi-A or Above
Fibre Channel	1.0625 Gb/s	2.5 GHz	SDA 725Zi-A or Above
IOF	1.24416 Gb/s	3.5 GHz	SDA 735Zi-A or Above
Ethernet	1.25 Gb/s	3.5 GHz	SDA 735Zi-A or Above
Rapid I/O LP-LVDS	1.25 Gb/s	3.5 GHz	SDA 735Zi-A or Above
Rapid I/O LP-LVDS	1.5 Gb/s	4 GHz	SDA 740Zi-A or Above
MIPI D-PHY	800 Mb/s	4 GHz	SDA 740Zi-A or Above
SAS	1.5 Gb/s	4 GHz	SDA 740Zi-A or Above
SerialATA	1.5729 Gb/s	4 GHz	SDA 740Zi-A or Above
IEEE 1394b FireWire	1.65 Gb/s	4 GHz	SDA 740Zi-A or Above
HDMI 1.2a / DVI	2 Gb/s	6 GHz	SDA 760Zi-A or Above
Rapid I/O LP-LVDS	2.125 Gb/s	6 GHz	SDA 760Zi-A or Above
Fibre Channel	2.5 Gb/s	6 GHz	SDA 760Zi-A or Above
InfiniBand	2.5 Gb/s	6 GHz	SDA 760Zi-A or Above
PCI Express	2.5 Gb/s	6 GHz	SDA 760Zi-A or Above
Rapid I/O LP-LVDS	2.5 Gb/s	6 GHz	SDA 760Zi-A or Above

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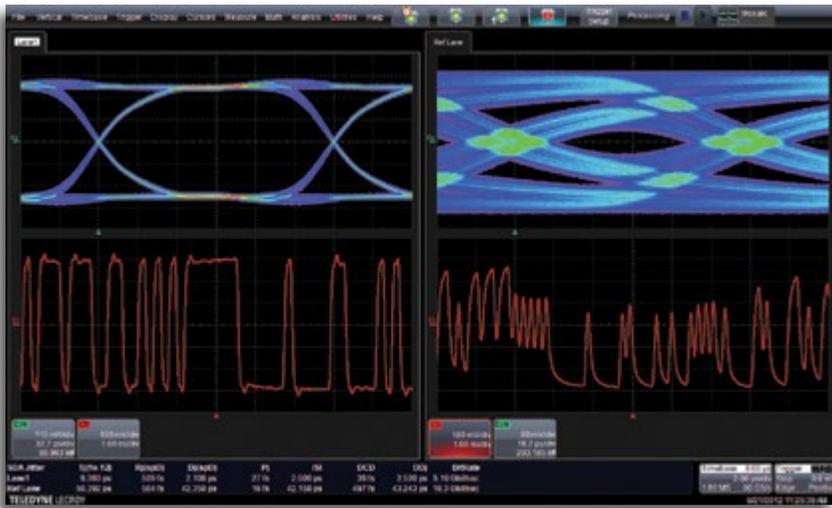
The Teledyne LeCroy SDAIII-CompleteLinQ Serial Data Analysis products contain multi-lane eye and jitter analysis, LaneScape™ comparison modes, vertical noise measurements, and crosstalk analysis tools. These capabilities provide the deepest insight into the behavior of multi- or single-lane serial data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

Eye with IsoBER

DDj Analysis with ISI Plot

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.

Rj+BUj Analysis

Tj
Total Jitter

Rj
Random Jitter

Dj
Deterministic Jitter

BUj
Bounded Uncorrelated Jitter

DDj
Data Dependent Jitter

Pj
Periodic Jitter

OBUj
Other Bounded Uncorrelated Jitter

DCD
Duty Cycle Distortion

ISI
Intersymbol Interference

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.

OPTIONAL SDA**III** UPGRADES

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).
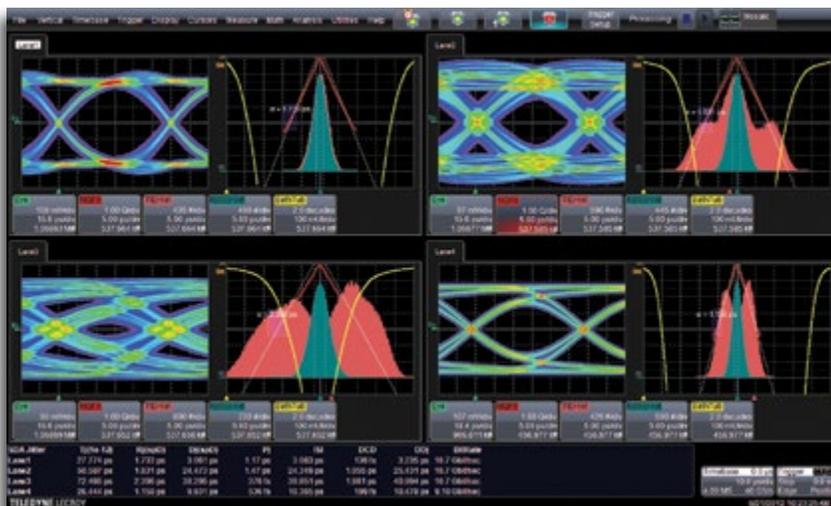
Vertical Noise and Crosstalk

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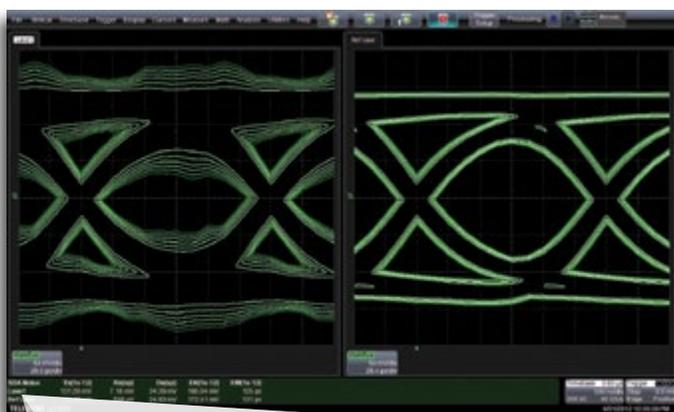
SDA Noise	Tn(1e-12)	Rn(sp)	Dn(sp)	EH(1e-12)	EW(1e-12)
Lane1	131.28 mV	7.18 mV	34.39 mV	105.04 mV	125 ps
Ref Lane	33.38 mV	646 µV	24.93 mV	172.41 mV	131 ps

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 SDA**III**-CompleteLinQ to equip your oscilloscope with all of Teledyne LeCroy's Serial Data Analysis and Signal Integrity tools.

Learn More:
teledynelecroy.com/SDA**III**

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

DDA 7 Zi-A SERIES

Key Features

- **3.5 or 6 GHz**

- **Zoom on multi-zoom on sectors**

- **One button access to read channel emulation and disk drive triggers**

- **Head equalization, channel Emulation, and SAM histograms**

- **Segmented memory for sector by sector parametric analysis**

- **Built-in PWxx, amplitude, pulse shape, and ACSN parametric measurements**

- **Customizable with MATLAB, Visual Basic, or Excel scripts**

- **325 MB/s data transfer rate from oscilloscope to PC for offline analysis (optional)**

- **SDA III tools integrated for analysis of SAS/SATA drives**

- **32 Mpts memory standard**

- **8 dual integrated inputs of 50 Ω and 1 MΩ with DDA 760Zi-A**

A Total Solution for Disk Drive Analysis

Maximum Performance

Teledyne LeCroy Disk Drive Analyzers (DDA) assist data storage design engineers by integrating tools that improve the time to market of new products and accelerate understanding and failure analysis on existing drives. Teledyne LeCroy continues that tradition with the DDA 7 Zi-A Series equipped with its powerful Disk Drive Analysis toolset. Capture, view, and analyze the wave shape of high-speed, complex drive signals with speed and integrity. Data Storage applications are memory intensive as capturing multiple sectors or a complete track of data can be important in troubleshooting a design or characterizing media. The X-Stream II architecture enables fast and accurate measurements and analysis of disk drive signals. Memory can be extended to 128 Mpts/Ch (256 Mpts/Ch on 2 Ch) using Option L.

DDA 7 Zi-A's offer the convenience of selectable 50 Ω or 1 MΩ inputs. The standard 32 Mpts of waveform memory and 40 GS/s capture on two channels, means multiple drive sectors can be acquired at once.

Long Memory and Flexibility in Finding Problems

Acquire a head signal and then QuickZoom it from the front panel. The DDA copies and expands the drive signal automatically. Simply scroll horizontally and vertically to examine any sector. Multiple zooms let you view up to eight separate areas of the head signal; each zoom comes in a distinct color. Disk drive parameters let you characterize the pulse width variation or signal-to-noise ratio across a region. Failure Analysis engineers can store and recall golden waveforms and panel setups to compare problem drives with the known good drives.

A TOTAL SOLUTION FOR DISK DRIVE ANALYSIS

Analog-to-digital converters running at speeds up to 40 GS/s ensure the right sensitivity to measure today's high-speed read channels. In every DDA, you can run your customer-developed scripts to view the captured signal with the filters matched to your channel and media. Custom user scripts can be created in MATLAB, Visual Basic, Excel or other formats.

Exceptional Trigger and Sequence Performance

The DDA's disk triggers allow you to set up a series of events in the signal that then cause a trigger. For example, qualify the signal on the index signal and then capture all the sectors of information on the track. As memory is increased in the DDA, more sectors can be captured, with up to 50 picosecond/ sample time resolution. Up to 15,000 sectors of data can be gathered with the DDA 7 Zi-A analyzers.

Cascade Triggering

Triggering allows up to two events to qualify a third event (arm on A event, then qualify on B event, then trigger on C event) for precise trigger control. For instance, this could be used to Arm when the Index signal goes high, qualify when the Read Gate signal goes high, then trigger on a Head signal.

Natural Graphical Interface

One press on the DDA menu takes you directly to the Disk Drive Analyzer features. The familiar controls on the front panel, coupled with a natural, context-sensitive graphical user-interface, react quickly to your commands. Functionality is exactly where you expect it to be.

The DDA 7 Zi-A provides one button access to all the tools needed to accurately debug and analyze disk drive operation.

The DDA 7 Zi Features:

- 28 Custom Parameters
- Specific Drive Triggers
  - Sector
  - Servo Gate
  - Read Gate Trigger
- Advanced Drive Analysis Tools
  - Head Filter Equalizer Emulation
  - Channel Emulation
  - SAM Histograms
  - Plot of SAM Values
  - Analog Compare

Simultaneously connecting low-speed signals, like index and servo gate, and high-speed signals, like read channels has never been easier. With integrated 50 Ω and 1 MΩ inputs on all models, there is no longer a need for expensive adapters.

SPECIFICATIONS

Vertical System

	WavePro 715Zi-A	WavePro 725Zi-A (SDA/DDA)	WavePro 735Zi-A (SDA, DDA)	WavePro 740Zi-A (SDA)	WavePro 760Zi-A (SDA, DDA)
Analog (ProLink Input) Bandwidth @ 50 Ω (-3 dB) (≥ 10 mV/div)	Not Applicable	Not Applicable	Not Applicable	4 GHz (≥ 10 mV/div)	6 GHz (≥ 10 mV/div)
Analog (ProBus Input) Bandwidth @ 50 Ω (-3 dB)	1.5 GHz (≥ 10 mV/div)	2.5 GHz (≥ 10 mV/div)	3.5 GHz (≥ 10 mV/div)	3.5 GHz (≥ 10 mV/div)	3.5 GHz (≥ 10 mV/div)
Analog (ProBus Input) Bandwidth @ 1 MΩ (-3 dB)	500 MHz (typical) >5mV/div				
Rise Time (10 – 90%, 50 Ω)	235 ps (typical, flatness mode)	150 ps (typical, flatness mode)	120 ps (typical, flatness mode)	105 ps (typical, flatness mode)	70 ps (typical, flatness mode)
Rise Time (Typical, 20 – 80%, 50 Ω)	176 ps (typical, flatness mode)	113 ps (typical, flatness mode)	90 ps (typical, flatness mode)	79 ps (typical, flatness mode)	53 ps (typical, flatness mode)
Input Channels	4				
Bandwidth Limiters	20 MHz, 200 MHz, 1 GHz		20 MHz, 200 MHz 1 GHz, 3 GHz	20 MHz, 200 MHz 1 GHz, 3 GHz	20 MHz, 200 MHz 1 GHz, 3 GHz, 4 GHz
Input Impedance	50 Ω ±2% or 1 MΩ || 16 pF, 10 MΩ || 11 pF with supplied probe				
Input Coupling	ProBus Inputs - 1 MΩ: AC, DC, GND; 50 Ω: DC, GND			ProLink Inputs - 50 Ω: DC, GND ProBus Inputs - 1 MΩ: AC, DC, GND; 50 Ω: DC, GND	
Maximum Input Voltage	50 Ω: ±5 V$_{rms}$ 1 MΩ: 250 V max. (peak AC: ≤ 10 kHz + DC)			50 Ω (ProBus): ±5 V$_{rms}$ 50 Ω (ProLink): ±4 V$_{peak}$ 1 MΩ (ProBus): 250 V max. (peak AC: ≤ 10 kHz + DC)	
Channel-Channel Isolation	DC to 2 GHz: 46 dB (>200:1) 2 to 4 GHz: 34 dB (>50:1) 4 to 6 GHz: 26 dB (>20:1) (For any two ProLink input channels, same v/div settings, typical)				
Vertical Resolution	8 bits; up to 11 bits with enhanced resolution (ERES)				
Sensitivity	50 Ω: 2 mV−1 V/div, fully variable (2−9.99 mV/div via zoom); 1 MΩ: 1 mV−10 V/div, fully variable				
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)	1.0 mV$_{rms}$ (typical, 20 GS/s)	1.2 mV$_{rms}$ (typical)	1.30 mV$_{rms}$ (typical)	1.35 mV$_{rms}$ (typical)	1.55 mV$_{rms}$ (typical)
Offset Range	**50 Ω (ProBus Input):** ±750 mV @ 10−170 mV/div ±4 V @ 172 mV/div−1 V/div **1 MΩ:** ±1 V @ 2−128 mV/div ±10 V @ 130 mV−1.28 V/div ±100 V @ 1.3 V−10 V/div			**50 Ω (ProLink Input):** ±750 mV @ 10−118 mV/div ±4 V @ 120 mV/div−1 V/div **50 Ω (ProBus Input):** ±750 mV @ 10−170 mV/div ±4 V @ 172 mV/div−1 V/div **1 MΩ:** ±1 V @ 2−128 mV/div ±10 V @ 130 mV−1.28 V/div ±100 V @ 1.3 V−10 V/div	
DC Vertical Offset Accuracy	±(1.5% of offset setting + 1.5% F.S. + 1 mV) (typical) ±(1.5% of offset setting + 2.5% F.S. + 2 mV) (test limit)				

Horizontal System

Timebases	Internal timebase common to 4 input channels; an external clock may be applied at the auxiliary input				
Time/Division Range	20 ps/div−3200 s/div, depending on memory length Real-Time Mode: 20 ps/div - 2000 s/div RIS mode: 20 ps/div - 10 ns/div, user selectable at ≤10ns/div Roll mode: 100 ms/div up to 3200 s/div, user selectable at ≥100 ms/div and ≤5 MS/s)				
Clock Accuracy	≤ 1 ppm + (aging of 0.5 ppm/yr from last calibration)				
Sample Clock Jitter	Up to 10 µs Acquired Time Range: 100 fs$_{rms}$ (Internal Timebase Reference) Up to 3.2ms Acquired Time Range: 150 fs$_{rms}$ (Internal Timebase Reference)				
Delta Time Measurement Accuracy	$$\sqrt{2} * \sqrt{\left(\frac{Noise}{SlewRate}\right)^2 + (Sample\ Clock\ Jitter)^2 + (clock\ accuracy * reading)}$$				
Jitter Measurement Floor	$$\sqrt{\left(\frac{Noise}{SlewRate}\right)^2 + (Sample\ Clock\ Jitter)^2}$$				
Jitter Between Channels	<1 ps$_{rms}$ (TIE, typical, measured at maximum bandwidth)	<700 fs$_{rms}$ (TIE, typical, measured at maximum bandwidth)	<560 fs$_{rms}$ (TIE, typical, measured at maximum bandwidth)	<500 fs$_{rms}$ (TIE, typical, measured at maximum bandwidth)	<450 fs$_{rms}$ (TIE, typical, measured at maximum bandwidth)
Trigger and Interpolator Jitter	3 ps$_{rms}$ (typical) <0.1 ps rms (typical, software assisted)	2 ps$_{rms}$, (typical) <0.1 ps rms (typical, software assisted)		1 ps$_{rms}$ (typical) <0.1 ps rms (typical, software assisted)	
Channel-Channel Deskew Range	±9 x time/div. setting, 100 ms max., each channel				
External Timebase Reference (Input)	10 MHz; 50 Ω impedance, applied at the rear input				
External Timebase Reference (Output)	10 MHz; 50 Ω impedance, output at the rear				
External Clock	30 MHz - 2 GHz, 50 Ω impedance, applied at the Auxiliary Input				

SPECIFICATIONS

	WavePro 715Zi-A	WavePro 725Zi-A (SDA/DDA)	WavePro 735Zi-A (SDA, DDA)	WavePro 740Zi-A (SDA)	WavePro 760Zi-A (SDA, DDA)
Acquistion System					
Single-Shot Sample Rate/Ch	20 GS/s on 2 Ch 10 GS/s on 4 Ch (Option WPZi-1.5GHZ-4X20GS doubles the sample rate)	40 GS/s on 2 Ch 20 GS/s on 4 Ch			
Random Interleaved Sampling (RIS)	200 GS/s for repetitive signals (20 ps /div. to 10 ns/div)				
Maximum Trigger Rate	1,000,000 waveforms/second (in Sequence Mode, up to 4 channels)				
Intersegment Time	1 µs				
Max. Acquisition Memory	256 Mpts/Ch (2 Ch operation)				
Standard Memory (4 Ch / 2 Ch / 1Ch) (Number of Segments)	20 M / 40 M / 40M (32 M / 64 M / 64 M) (4500) (15,000)				
Memory Options (4 Ch / 2 Ch / 1Ch) (Number of Segments)	S-32 Option: 32M / 64M / 64M (15,000) M-64 Option: 64M / 128M / 128M (15,000) L-128 Option: 128M / 256M / 256M (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				
Triggering System					
Modes	Normal, Auto, Single, and Stop				
Sources	Any input channel, Aux, Aux/10, or line; 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 or in roll mode				
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 (Ch 1−4) ProBus Inputs	2 div @ < 1.5 GHz 1.5 div @ < 750 MHz 1.0 div @ < 200 MHz (for DC, AC, LFRej coupling, ≥ 10 mV/div, 50 Ω)	2 div @ < 2.5 GHz 1.5 div @ < 1.25 GHz 1.0 div @ < 200 MHz (for DC, AC, LFRej coupling, ≥ 10 mV/div, 50 Ω)	2 div @ < 3.5 GHz 1.5 div @ < 1.75 GHz 1.0 div @ < 200 MHz for DC, AC, LFRej coupling, ≥ 10 mV/div, 50 Ω)		
Trigger Sensitivity with Edge Trigger (Ch 1−4) ProLink Inputs	Not Applicable			2 div @ < 4 GHz 1.5 div @ < 2 GHz 1.0 div @ < 200 MHz (for DC, AC, LFRej coupling, ≥ 10 mV/div, 50 Ω)	2 div @ < 6 GHz 1.5 div @ < 3 GHz 1.0 div @ < 200 MHz (for DC, AC, LFRej coupling, ≥ 10 mV/div, 50 Ω)
External Trigger Sensitivity, (Edge Trigger)	2 div @ < 1 GHz 1.5 div @ < 500 MHz 1.0 div @ < 200 MHz (for DC, AC, LFRej coupling)				
Max. Trigger Frequency, SMART Trigger™	1.5 GHz @ ≥ 10 mV/div (minimum triggerable width 500 ps)	2.0 GHz @ ≥ 10 mV/div (minimum triggerable width 300 ps)	2.0 GHz @ ≥ 10 mV/div (minimum triggerable width 250 ps)	2.0 GHz @ ≥ 10 mV/div (minimum triggerable width 200 ps)	
External Trigger Input Range	Aux (±0.4 V); Aux/10 (±4 V)				
Basic Triggers					
Edge	Triggers when signal meets slope (positive, negative, or either) and level condition.				
Window	Trigger when signal exits a window defined by adjustable thresholds				
TV-Composite Video	Triggers NTSC or PAL with selectable line and field; HDTV (720p, 1080i, 1080p) with selectable frame rate (50 or 60 Hz) and Line; or CUSTOM with selectable Fields (1−8), Lines (up to 2000), Frame Rates (25, 30, 50, or 60 Hz), Interlacing (1:1, 2:1, 4:1, 8:1), or Synch Pulse Slope (Positive or Negative)				
SMART Triggers					
State or Edge Qualified	Triggers on any input source only if a defined state or edge occurred on another input source Delay between sources is selectable by time or events				
Qualified First	In Sequence acquisition mode, triggers repeatedly on event B only if a defined pattern, state, or edge (event A) is satisfied in the first segment of the acquisition. Delay 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				

SPECIFICATIONS

	WavePro 715Zi-A	WavePro 725Zi-A (SDA/DDA)	WavePro 735Zi-A (SDA, DDA)	WavePro 740Zi-A (SDA)	WavePro 760Zi-A (SDA, DDA)

SMART Triggers with ExclusionTechnology

Glitch	Triggers on positive or negative glitches with widths selectable as low as 200 ps (depending on oscilloscope bandwidth) to 20 s, or on intermittent faults.
Width (Signal or Pattern)	Triggers on positive, negative or both widths with widths selectable as low as 200 ps (depending on oscilloscope bandwidth) 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.

High-speed Serial Protocol Triggering

	WavePro 715Zi-A	WavePro 725Zi-A / 735Zi-A		WavePro 740Zi-A / 760Zi-A	
Data Rates	Not Available	(Option WPZi-MSPT, standard with SDA 7 Zi-A) 100 Mb/s−1.25 Gb/s		(Option WPZi-HSPT, standard with SDA 7 Zi-A) 100 Mb/s−2.7 Gb/s, 3.0 Gb/s, 3.125 Gb/s	
Pattern Length	Not Available	80-bits, NRZ or 8b/10b			
Clock and Data Outputs	Not Available	400 mVp-p (Typical), AC coupled			
Clock Recovery Jitter	Not Available	2 ps$_{rms}$ + 0.3% Unit Interval rms for PRBS data patterns with 50% transition density			
Hardware Clock Recovery Loop BW	Not Available	PLL Loop BW = Fbaud/5500, 100 Mb/s to 2.488 Gb/s (Typical)			

Low Speed Serial Protocol Triggering (Optional)

Optionally Available	I2C, SPI (SPI, SSPI, SIOP), UART-RS232, CAN, LIN, FlexRay, MIL-STD-1553, AudioBus

Measurement Trigger

	Select from a large number of measurement parameters trigger on a measurement value with qualified limits. Can be used as only trigger or last event in a Cascade Trigger.

Color Waveform Display

Type	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 16 traces (up to 40 with some software options). Simultaneously display channel, zoom, memory and math traces.
Grid Styles	Auto, Single, Dual, Quad, Octal, X-Y, Single+X-Y, Dual+X-Y, Tandem, Quattro, Twelve, Sixteen, Twenty, Triple, Hex
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	LeCroy LSIB
Transfer Rate	up to 325 Mpt/s (Maximum)
Output Protocol	PCI Express, Gen 1 (4 lanes utilized for data transfer)
Control Protocol	TCP/IP
Command Set	Via Windows Automation, or via LeCroy Remote Command Set

SPECIFICATIONS

	WavePro 715Zi-A	WavePro 725Zi-A (SDA/DDA)	WavePro 735Zi-A (SDA, DDA)	WavePro 740Zi-A (SDA)	WavePro 760Zi-A (SDA, DDA)
Processor/CPU					
Type	Intel® Core™ i7-2600 Quad, 2.6 GHz (up to 3.8 GHz in Turbo mode) (or better)				
Processor Memory	8 GB standard for STD memory (20 Mpt), S-32 and M-64 memory options 16 GB standard for L-128 memory options Up to 32 GB optional				
Operating System	Microsoft Windows® 7 Professional Edition (64-bit)				
Real Time Clock	Date and time displayed with waveform and in hardcopy files SNTP support to synchronize to precision internal clocks				

Internal Waveform Memory

12 active waveform memory traces (M1–M12) store 16-bit/point full length waveforms Waveforms can be stored to any number of files limited only by the data storage media capacity

Setup Storage

Front Panel and Instrument Status	Store to the internal hard drive, over the 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 (v 1.2) Compliant
GPIB Port (Optional)	Supports IEEE – 488.2
LSIB Port (Optional)	Supports PCI Express Gen1 x4 protocol with Teledyne LeCroy supplied API
Ethernet Port	Supports 10/100/1000BaseT Ethernet interface (RJ45 port)
USB Ports	Minimum 6 total (Including 3 front panel) USB 2.0 ports support Windows compatible devices
External Monitor Port	15 pin D-Type WXGA compatible to support customer-supplied external monitor. Includes support for extended desktop operation with second monitor.
Peripheral Bus	Teledyne LeCroy LBUS standard

Measurement Trigger

Measurement Trigger Capability	Select from a large number of measurement parameters trigger on a measurement value with qualified limits. Can be used as only trigger or last event in a Cascade Trigger.

Power Requirements

Voltage	100–240 VAC ±10% at 45-66 Hz; 100-120 VAC ±10% at 380-420 Hz; Automatic AC Voltage Selection; Installation Category 300 V CAT II
Max. Power Consumption	800 W/ 800 VA

Environmental

Temperature (Operating)	+5 °C to +40 °C including CD-RW/DVD-ROM drive
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. (3,048 m) at or below +25 °C
Altitude (Non-Operating)	Up to 40,000 ft. (12,192 m)
Random Vibration (Operating)	0.5 g_{rms} overall level, 5 Hz to 500 Hz, 10 minutes in each of three orthogonal axes, 30 minutes total
Random Vibration (Non-Operating)	2.0 g_{rms} overall level, 5 Hz to 500 Hz, 10 minutes in each of three orthogonal axes, 30 minutes total
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)	14"H x 18.4"W x 11.4"D (355 x 467 x 289 mm)
Weight	40.5 lbs. (18.4 kg)
Shipping Weight	62 lbs. (28.2 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.

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	integral
average (summed)	interpolate (cubic, quadratic, sinx/x)
average (continuous)	invert (negate)
correlation (two waveforms)	log (base e)
derivative	log (base 10)
deskew (resample)	product (x)
difference (−)	ratio (/)
enhanced resolution (to 11-bits vertical)	reciprocal
envelope	rescale (with units)
exp (base e)	roof
exp (base 10)	sparse
fft (power spectrum, magnitude, phase, up to max Mpts)	square
	square root
floor	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	level @ x	rms
area	maximum	std. deviation
base	mean	top
cycles	median	width
data	minimum	median
delay	narrow band phase	phase
Δ delay	narrow band power	time @ minimum (min.)
duty cycle	number of points	time @ maximum (max.)
duration	+ overshoot	Δ time @ level
falltime (90−10%, 80−20%, @ level)	− overshoot	Δ time @ level from trigger
	peak-to-peak	x @ max.
frequency	period	x @ min.
first	risetime (10−90%, 20−80%, @ level)	
last		

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

− Cycle-Cycle Jitter	− Period @ level	− Setup
− N-Cycle	− Half Period	− Hold
− N-Cycle with start selection	− Width @ level	− Skew
− Frequency @ level	− Time Interval Error @ level	− Duty Cycle @ level
		− Duty Cycle Error

- Histograms expanded with 19 histogram parameters and up to 2 billion events
- 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 (WPZi-SDAIII)
(Included in WPZi-SDAIII option, Standard on SDAZi and DDAZi Models)

Total Jitter
A complete jitter measurement and analysis toolset with the SDAIII-Complete-LinQ 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 256 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	− Eye Width	− Mask hits
− One Level	− Eye Crossing	− Mask out
− Zero Level	− Avg. Power	− Bit Error Rate
− Eye Amplitude	− Extinction Ratio	− 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	- Rj+BUj Spectrum
- Periodic Jitter (Pj) Meas Param	- Rj+BUj Track
- Rj+BUj Histogram	- Pj Inverse FFT

Deterministic Jitter (Dj) Analysis
- Deterministic Jitter (Dj) Measurement Parameter

SPECIFICATIONS

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 (WPZi-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 (WPZi-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 (WPZi-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 (WPZi-CBL-DE-EMBED)
(Standard on SDAZi and DDAZi)

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 (WPZi-8B10B D)
(Standard on SDAZi and DDAZi))

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 (WPZi-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 (WPZi-DDM2)
(Standard on DDAZi)

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

ORDERING INFORMATION

Product Description	Product Code
WavePro 7 Zi-A Series Oscilloscopes	
1.5 GHz, 10 GS/s, 4 Ch, 20 Mpts/Ch (20 GS/s and 40 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	WavePro 715Zi-A
2.5 GHz, 20 GS/s, 4 Ch, 20 Mpts/Ch (40 GS/s and 40 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	WavePro 725Zi-A
3.5 GHz, 20 GS/s, 4 Ch, 20 Mpts/Ch (40 GS/s and 40 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	WavePro 735Zi-A
4 GHz, 20 GS/s, 4 Ch, 20 Mpts/Ch (40 GS/s and 40 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	WavePro 740Zi-A
6 GHz, 20 GS/s, 4 Ch, 20 Mpts/Ch (40 GS/s and 40 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	WavePro 760Zi-A
SDA Zi-A Series Serial Data Analyzers	
2.5 GHz, 20 GS/s, 4 Ch, 32 Mpts/Ch (40 GS/s and 64 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	SDA 725Zi-A
3.5 GHz, 20 GS/s, 4 Ch, 32 Mpts/Ch (40 GS/s and 64 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	SDA 735Zi-A
4 GHz, 20 GS/s, 4 Ch, 32 Mpts/Ch (40 GS/s and 64 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	SDA 740Zi-A
6 GHz, 20 GS/s, 4 Ch, 32 Mpts/Ch (40 GS/s and 64 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	SDA 760Zi-A
DDA 7 Zi-A Series Oscilloscopes	
3.5 GHz, 20 GS/s, 4 Ch, 32 Mpts/Ch (40 GS/s and 64 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	DDA 735Zi-A
6 GHz, 20 GS/s, 4 Ch, 32 Mpts/Ch (40 GS/s and 64 Mpts/Ch in interleaved mode) with 50 Ω and 1 MΩ Input	DDA 760Zi-A
Included with Standard Configuration	
÷10, 500 MHz Passive Probe (Qty. 4)	
ProLink to SMA Adapter: 4 each	LPA-SMA-A
Optical 3-button Wheel Mouse, USB 2.0	
Protective Front Cover	
Printed Quick Reference Guide	
Printed Getting Started Manual	
Product Manual in PDF Format on Scope Desktop	
Anti-virus Software (Trial Version)	
Microsoft Windows® 7 License	
Commercial NIST Traceable Calibration with Certificate	
Power Cable for the Destination Country	
3-year Warranty	
Memory and Sample Rate Options	
32 Mpts/Ch (64 Mpts/Ch Interleaved) Memory Option for WavePro 7 Zi-A	WPZi-S-32
64 Mpts/Ch (128 Mpts/Ch Interleaved) Memory Option for WavePro 7 Zi-A.	WPZi-M-64
64 Mpts/Ch (128 Mpts/Ch Interleaved) Memory Option for DDA 7 Zi-A.	DDAZi-M-64
(8 GB total) 64 Mpts/Ch (128 Mpts/Ch Interleaved) Memory Option for SDA7 Zi-A.	SDAZi-M-64
128 Mpts/Ch (256 Mpts/Ch Interleaved) Memory Option for WavePro 7 Zi-A.	WPZi-L-128
128 Mpts/Ch (256 Mpts/Ch Interleaved) Memory Option for DDA 7 Zi-A.	DDAZi-L-128
128 Mpts/Ch (256 Mpts/Ch Interleaved) Memory Option for SDA 7 Zi-A.	SDAZi-L-128
20 GS/s (40 GS/s Interleaved) Sampling Rate Option for 1.5 GHz WavePro 715 Zi-A	WPZi-1.5GHZ-4X20GS

Product Description	Product Code
CPU, Computer and Other Hardware Options	
Upgrade from 160 GB HDD to 500 GB Hard Drive	WPZi-500GB-HD
Additional 160 GB Hard Drive Windows® 7 OS, Teledyne LeCroy Oscilloscope Software and Critical Scope Operational File Duplicates	WPZi-160GB-RHD-02
Additional 500 GB Hard Drive Windows® 7 OS, Teledyne LeCroy Oscilloscope Software and Critical Scope Operational File Duplicates	WPZi-500GB-RHD-02
GPIB Option for Teledyne LeCroy Oscilloscope. Half-height Card	GPIB-2
Oscilloscope Synchronization Kit	Zi-8CH-SYNCH
8 GB to 16 GB CPU RAM Option	WPZi-8-UPG-16GBRAM
8 GB to 32 GB CPU RAM Option	WPZi-8-UPG-32GBRAM
Serial Data and Crosstalk Analysis	
Bundle - Multi-Lane SDA LinQ Framework, including Eye, Jitter, Noise, Crosstalk Measurements, with EyeDrII and VirtualProbe	WPZi-SDAIII-CompleteLinQ SDAZi-CompleteLinQ DDAZi-CompleteLinQ
Multi-Lane Serial Data Analysis LinQ Framework, Eye, Jitter, Noise and Crosstalk Measurements	WPZi-SDAIII-CrossLinQ SDAZi-CrossLinQ DDAZi-CrossLinQ
Multi-Lane Serial Data Analysis LinQ Framework, Eye and Jitter Measurements	WPZi-SDAIII-LinQ SDAZi-LinQ DDAZi-LinQ
Single-Lane Serial Data Analysis Framework, Eye, Jitter, Noise and Crosstalk Measurements	WPZi-SDAIII-Crosstalk SDAZi-Crosstalk DDAZi-Crosstalk
Single-Lane Serial Data Analysis Framework, Eye and Jitter Measurements	WPZi-SDAIII
PAM4 Signal Analysis	WPZi-PAM4
Signal Integrity Toolkits	
Advanced De-embedding, Emulation and Virtual Probing Toolkit	WPZi-VIRTUALPROBE
Signal Integrity Toolkit - Channel & Fixture De-embedding/Emulation, Tx/Rx Equalization	WPZi-EYEDRII
Bundle - EyeDrII and VirtualProbe Toolkits	WPZi-EYEDRII-VP
Cable De-embed Option	WPZi-CBL-DE-EMBED
DDR Debug Tookits	
DDR2 and LPDDR2 Debug Toolkit	WPZi--DDR2-TOOLKIT
DDR3, DDR3L, LPDDR3, DDR2, and LPDDR2 Debug Toolkit	WPZi-DDR3-TOOLKIT
DDR4, DDR3, DDR3L, LPDDR3, DDR2, and LPDDR2 Debug Toolkit	WPZi-DDR4-TOOLKIT
DDR3, DDR3L, LPDDR3, DDR2, and LPDDR2 Debug Toolkit Upgrade	WPZi-UPG-DDR3-TOOLKIT
DDR4, DDR3, DDR3L, LPDDR3, DDR2, and LPDDR2 Debug Toolkit Upgrade	WPZi-UPG-DDR4-TOOLKIT
Serial Data Compliance	
QualiPHY Enabled BroadR-Reach Software Option	QPHY-BroadR-Reach
QualiPHY Enabled DDR2 Software Option	QPHY-DDR2
QualiPHY Enabled DDR3 Software Option	QPHY-DDR3
QualiPHY Enabled Ethernet 10/100/1000BT Software Option	QPHY-ENET*
QualiPHY Enabled HDMI Software Option	QPHY-HDMI†
QualiPHY Enabled LPDDR2 Software Option	QPHY-LPDDR2
QualiPHY Enabled MIPI D-PHY Software Option	QPHY-MIPI-DPHY
QualiPHY Enabled MOST50 ePHY Software Option	QPHY-MOST50
QualiPHY Enabled MOST150 oPHY Software Option	QPHY-MOST150
QualiPHY Enabled PCIe Gen1 Software Option	QPHY-PCIe
QualiPHY Enabled USB 2.0 Software Option	QPHY-USB‡

*TF-ENET-B required. † TF-HDMI-3.3V-QUADPAK required. ‡ TF-USB-B required.

ORDERING INFORMATION

Product Description	Product Code
Serial Data Test Fixtures	
10/100/1000Base-T Ethernet Test Fixture	TF-ENET-B*
Telecom Adapter Kit 100 Ω Bal., 120 Ω Bal., 75 Ω Unbal.	TF-ET
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
USB 2.0 Compliance Test Fixture	TF-USB-B
2 x BNC to SMA Adapter	ENET-2ADA-BNCSMA
2 x 18 inch SMA to SMA Cable	ENET-2CAB-SMA018
2 x 36 inch SMA to SMA Cable	ENET-2CAB-SMA036
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

*Includes ENET-2CAB-SMA018 and ENET-2ADA-BNCSMA

Product Description	Product Code
Serial Data Triggers and Decoders	
MIL-STD-1553 Trigger and Decode Option	WPZi-1553 TD
MIL-STD-1553 Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-1553 TDME
8b10b Decode Option	WPZi-8B10B D
ARINC 429 Bus Symbolic Decode, Measure/Graph, and Eye Diagram Option	WPZi-ARINC429BUS DME SYMBOLIC
ARINC 429 Bus Symbolic Decode Option	WPZi-ARINCbus DSYMBOLIC
Audiobus Trigger and Decode for I2S, Option LJ, RJ, and TDM	WPZi-Audiobus TD
Audiobus Trigger, Decode, and Graph Option for I2S, LJ, RJ, and TDM	WPZi-Audiobus TDG
CANbus FD Trigger and Decode Option	WPZi-CAN FDbus TD
CAN FD Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-CAN FDBUS TDME
CAN FD Symbolic Trigger, Decode, and Measure/Graph, and Eye Diagram Option	WPZi-CAN FDBUS TDME SYMBOLIC
CANbus TD Trigger and Decode Option	WPZi-CANbus TD
CAN Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-CANBUS TDME
CAN Symbolic Trigger, Decode, and Measure/Graph, and Eye Diagram Option	WPZi-CANBUS TDME SYMBOLIC
DigRF 3G Decode Option	WPZi-DigRF3Gbus D
DigRF v4 Decode Option	WPZi-DigRFv4bus D
MIPI D-PHY Decode Option	WPZi-DPHYbus D
MIPI D-PHY Decode and Physical Layer Test Option	WPZi-DPHYbus DP
I2C, SPI, UART-RS232 Trigger and Decode Bundle	WPZi-EMB TD
I2C, SPI, UART-RS232 Trigger, Decode, Measure/Graph, and Eye Diagram Bundle	WPZi-EMB TDME
ENET Decode Option	WPZi-ENETbus D
Fibre Channel Decode Annotation Option	WPZi-FCbus D
FlexRay Trigger and Decode Option	WPZi-FlexRaybus TD
FlexRay Trigger, Decode, Measure/Graph and Physical Layer Option	WPZi-FLEXRAYBUS TDMP
100 Mb/s to 3.125 Gb/s High-speed Serial Pattern Trigger Option for 4–6 GHz Oscilloscopes (Standard on SDA 7 Zi-A and DDA 7 Zi-A)	WPZi-HSPT
I2C Bus Trigger and Decode Option	WPZi-I2Cbus TD

Product Description	Product Code
Serial Data Triggers and Decoders (cont'd)	
I2C Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-I2CBUS TDME
LIN Trigger and Decode Option	WPZi-LINbus TD
LIN Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-LINBUS TDME
Manchester Decode Option	WPZi-Manchesterbus D
MDIO Decode Option	WPZi-MDIObus D
MIPI M-PHY Decode Option	WPZi-MPHYbus D
MIPI M-PHY Decode and Physical Layer Test Option	WPZi-MPHYbus DP
MS-500-36 with I2C, SPI, UART and RS-232 Trigger and Decodes Bundle	WPZi-MSO-EMB TD
MS-500-36 with I2C, SPI, UART-RS-232 Trig, Decode, Measure/Graph and Eye Bundle	WPZi-MSO-EMB TDME
1.25 Gb/s Medium-speed Serial Pattern Trigger Option or 2.5–3.5 GHz Oscilloscopes (Standard on SDA 7 Zi-A and DDA 7 Zi-A)	WPZi-MSPT
PCI Express Gen1 Decode Option	WPZi-PCIebus D
PROTObus MAG Serial Debug Toolkit	WPZi-PROTObus MAG
Decode Annotation and Protocol Analyzer Synchronization Software Option	WPZi-ProtoSync
Decode Annotation and Protocol Analyzer+Bit Tracer SW Synchronization Option	WPZi-PROTOSYNC-BT
SAS Decode Annotation Option	WPZi-SASbus D
SATA Trigger Decode Annotation Option Supports SATA Gen1 and 2	WPZi-SATAbus TD
SENT Bus Decode Option	WPZi-SENTbus D
SpaceWire Decode Option	WPZi-SpaceWirebus D
SPI Bus Trigger and Decode Option†	WPZi-SPIbus TD
SPI Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-SPIBUS TDME
SPMI Decode Option	WPZi-SPMIbus D
UART and RS-232 Trigger and Decode Option†	WPZi-UART-RS232bus TD
UART-RS232 Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-UART-RS232BUS TDME
MIPI UniPro Protocol Decoder	WPZi-UNIPRObus D
USB2-HSIC Decode Option	WPZi-USB2-HSICbus D
USB 1.x/2.0 Trigger/Decode Option	WPZi-USB2bus TD
USB 2.0 Trigger, Decode, Measure/Graph, and Eye Diagram Option	WPZi-USB2BUS TDME
USB 3.0 Decode Annotation Option	WPZi-USB3bus D

Product Description	Product Code
High-speed Digitizer Output	
High-speed PCIe Gen1 x4 Digitizer Output	LSIB-1
PCI Express x1 Host Interface Board for Desktop PC	LSIB-HOSTBOARD
PCI Express x1 Express Card Host Interface for Laptop Express Card Slot	LSIB-HOSTCARD
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

Product Description	Product Code
Mixed Signal Testing Options	
12.5 GS/s High-speed Digital Analyzer with 18ch QuickLink leadset and LBUS connection	HDA125-18-LBUS
12.5 GS/s High-speed Digital Analyzer with 9ch QuickLink leadset and LBUS connection	HDA125-09-LBUS
500 MHz, 2 GS/s, 18 Ch, 50 Mpts/Ch Mixed Signal Oscilloscope Option	MS-500
250 MHz, 1 GS/s, 36 Ch, 25 Mpts/Ch (500 MHz, 18 Ch, 2 GS/s, 50 Mpts/Ch Interleaved) Mixed Signal Oscilloscope Option	MS-500-36
250 MHz, 1 GS/s, 18 Ch, 10 Mpts/Ch Mixed Signal Oscilloscope Option	MS-250

ORDERING INFORMATION

Product Description	Product Code
General Purpose and Application Specific Software Options	
VectorLinQ Advanced Vector Signal Analysis incl OFDM	WPZi-VECTORLINQ-ADV
VectorLinQ Vector Signal Analysis	WPZi-VECTORLINQ
Spectrum Analysis Option	WPZi-SPECTRUM
Digital Filter Software Package	WPZi-DFP2
Serial Data Mask Software Package	WPZi-SDM
Disk Drive Measurements Software Package	WPZi-DDM2
Disk Drive Analyzer Software Package	WPZi-DDA
Advanced Optical Recording Measurement Package	WPZi-AORM
Electrical Telecom Mask Test Software Package	WPZi-ET-PMT
EMC Pulse Parameter Software Package	WPZi-EMC
Power Analysis Option	WPZi-PWR
Clock Jitter Analysis with Four Views Software Package	WPZi-JITKIT

Product Description	Product Code
General Accessories	
Accessory for Zi Oscilloscopes to Enable TTL Level Output from the Aux Out Connector	TTL-AUX-OUT
Probe Deskew and Calibration Test Fixture	TF-DSQ
Hard Carrying Case	WPZi-HARDCASE
Soft Carrying Case	WPZi-SOFTCASE
Rackmount Accessory for Converting a Zi Series Oscilloscope to an 8U Rack-mounted Package	RACKMOUNT-1
Oscilloscope Cart with Additional Shelf and Drawer	OC1024-A

Product Description	Product Code
Probes and Probe Accessories	
High Voltage Fiber Optic Probe, 60 MHz Bandwidth.	HVFO103
Power/Voltage Rail Probe 4 GHz, 1.2x, ±30V offset, ±800mV dynamic range	RP4030
1.0 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1000
1.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1500
500 MHz, 1.0 pF Active Differential Probe, ±8 V	ZS2500
4.0 GHz, 0.6 pF, 1 MΩ High Impedance Active Probe	ZS4000
200 MHz, 3.5 pF, 1 MΩ Active Differential Probe, ±20 V	ZD200
500 MHz, 1.0 pF, Active Differential Probe	ZD500
1 GHz, 1.0 pF Active Differential Probe, ±8 V	ZD1000
1.5 GHz, 1.0 pF Active Differential Probe, ±8 V	ZD1500
1kV, 25 MHz High Voltage Differential Probe	HVD3102
1kV, 25 MHz High Voltage Differential Probe without tip Accessories	HVD3102-NOACC
1kV, 120 MHz High Voltage Differential Probe	HVD3106
1kV, 120 MHz High Voltage Differential Probe without tip Accessories	HVD3106-NOACC
1kV, 80 MHz High Voltage Differential Probe with 6m cable	HVD3106-6M
2kV, 120 MHz High Voltage Differential Probe	HVD3206
2kV, 80 MHz High Voltage Differential Probe with 6m cable	HVD3206-6M
6kV, 100 MHz High Voltage Differential Probe	HVD3605
WaveLink 4 GHz 2.5 Vp-p Differential Probe System	D410-A-PS
WaveLink 4 GHz 5 Vp-p Differential Probe System	D420-A-PS
WaveLink 6 GHz 2.5 Vp-p Differential Probe System	D610-A-PS
WaveLink 6 GHz 5 Vp-p Differential Probe System	D620-A-PS
WaveLink 6 GHz Differential Amplifier Module with Adjustable Tip	D600A-AT*
WaveLink 3 GHz Differential Amplifier Module with Adjustable Tip	D400A-AT†

Product Description	Product Code
Probes and Probe Accessories (cont'd)	
WaveLink ProLink Platform/Cable Assembly (4 – 6 GHz)	WL-PLink-CASE
WaveLink ProBus Platform/Cable Assembly (4 GHz)	WL-PBus-CASE
7.5 GHz Low Capacitance Passive Probe (÷10, 1 kΩ; ÷20, 500 Ω)	PP066
1 GHz, Active Differential Probe (÷1, ÷10, ÷20)	AP034
Optical-to-Electrical Converter, 500–870 nm ProLink BMA Connector	OE525
Optical-to-Electrical Converter, 950–1630 nm ProLink BMA Connector	OE555
Optical-to-Electrical Converter, DC to 9.5 GHz, 785 to 1550 nm	OE695G

* For a complete probe, order a WL-PLink-CASE Platform/Cable Assembly with the Adjustable Tip Module.

† For a complete probe, order a WL-PBUS-CASE Platform/Cable Assembly with the Adjustable Tip Module

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

TELEDYNE LECROY
Everywhere**you**look™

1-800-5-LeCroy
teledynelecroy.com

Local sales offices are located throughout the world. Visit our website to find the most convenient location.

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