

LeCroy

WAVESURFER® XS SERIES

**A Great Combination of
Performance, Features, and Value**
200 MHz–1 GHz



The Essential Tools for Efficient Validation and Debug

Anyone can appreciate a well designed product with all the right performance, features, and design elements. The WaveSurfer Xs oscilloscope is just such a product.

Validation and debug is fast and simple. The big display (but small footprint), simplified front panel, and graphical touch screen user interface will allow you to be efficient in a matter of minutes. And you'll love how it fits your budget.

Great Tools You've Always Wanted

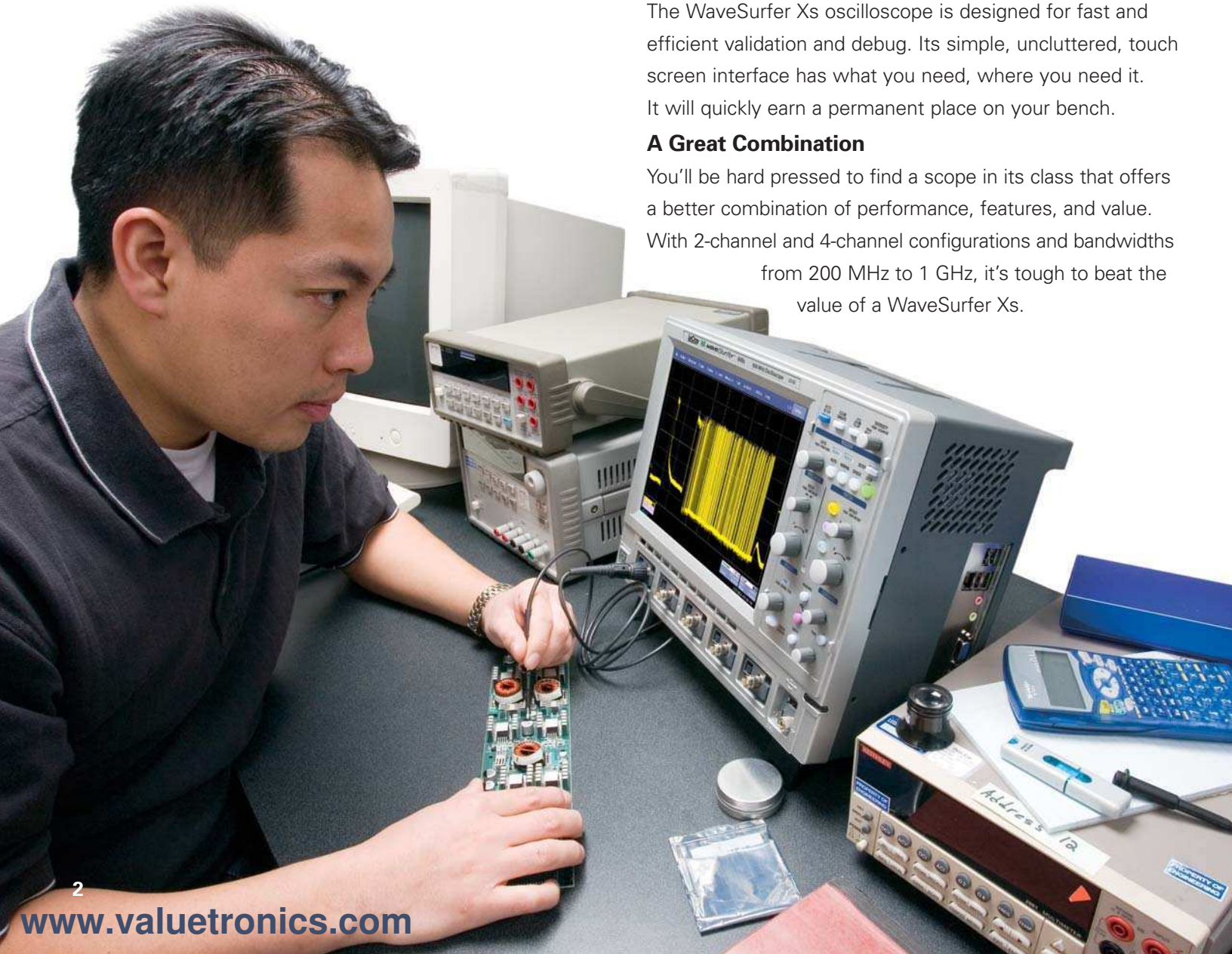
How about a fast viewing analog display mode (WaveStream™) that can be toggled ON or OFF? How about a capture and search tool (WaveScan™) that lets you search for events you can't trigger on? How about an I²C serial trigger that lets you trigger conditionally on data values, or serial decoders (SPI, I²C UART, RS-232, LIN, or CAN) that are intuitively overlaid on the waveform and make understanding serial data easy? How about fast, responsive long memory that works quickly with measurements, math, and decodes? Or a mixed signal option? WaveSurfer provides all this and more.

Perfectly Balanced

The WaveSurfer Xs oscilloscope is designed for fast and efficient validation and debug. Its simple, uncluttered, touch screen interface has what you need, where you need it. It will quickly earn a permanent place on your bench.

A Great Combination

You'll be hard pressed to find a scope in its class that offers a better combination of performance, features, and value. With 2-channel and 4-channel configurations and bandwidths from 200 MHz to 1 GHz, it's tough to beat the value of a WaveSurfer Xs.



What You Need and What You Want

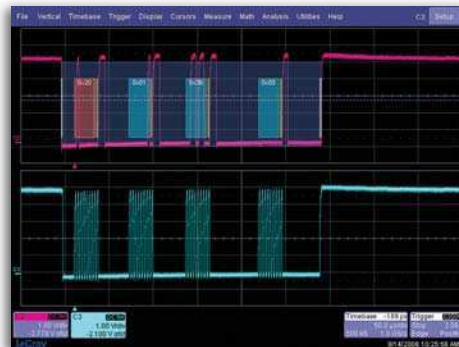
Many oscilloscopes look great on paper—WaveSurfer Xs delivers in the real world. Its capabilities meet your needs for capturing, viewing, and measuring waveforms, and also provide unexpected capabilities for faster debug. WaveSurfer Xs—the new standard to judge other oscilloscopes by.

Powerful Basic and Advanced Triggering

A multitude of powerful and flexible triggers are provided to meet any need. Use an advanced SMART Trigger™ to isolate a specific event of interest, and narrow the long capture around that event. Trigger on what you expect (widths, glitches, video, logic patterns, etc.) and also trigger on unusual signals (dropouts, intervals, runts, slew rates). LeCroy's exclusion triggering can exclude normal signals and capture only the abnormal ones, speeding up the debug of your circuits and systems. Trigger on signals down to 1 ns in width (500 ps for width and glitch trigger). Use an "A" condition to qualify a "B" trigger. Digital triggering is provided with the MS Series Mixed Signal Oscilloscope option. (Some advanced triggering capability is optional).

Long Capture Time

2.5 Mpts/Ch of fast acquisition memory standard (10 Mpts/Ch optional) provides long capture time—up to 400 ms at full sample rate, and longer times at lower sample rates. This greatly assists in debugging common circuit problems such as clock/data issues and timing errors. Use the touch screen to quickly "draw a box" around the area of interest and zoom all channels to the desired area. Then, adjust zoom position and ratio from the front panel or the graphical touch screen UI. WaveSurfer Xs long memory is also thoughtfully designed to respond quickly even when measurements, math, or serial decoders are being used.



WaveStream™ Fast Viewing Mode

WaveStream provides a vibrant, intensity graded (256 levels) display with a fast update to closely simulate the look and feel of an analog oscilloscope. Turn WaveStream ON or OFF, and adjust intensity, using the front panel knob. Use it only when you want to.

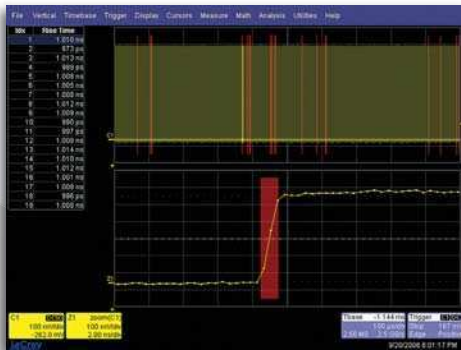


A Great Combination of Performance, Features, and Value



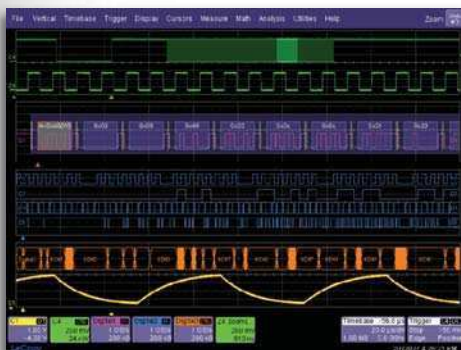
WaveScan™ Advanced Search

Searching for data is very helpful, but wouldn't it be better to Search for something you can't trigger on? WaveScan allows searching in a single acquisition using more than 20 different modes. Or, set up a Scan condition and scan for an event over hours or days, and perform some action when it is found.



Mixed Signal Oscilloscope Option

Add high-performance mixed signal capability to a WaveSurfer Xs. Capture digital signals up to 500 MHz with up to 50 Mpts/Ch memory, 2 GS/s, and 18 or 36 channels.



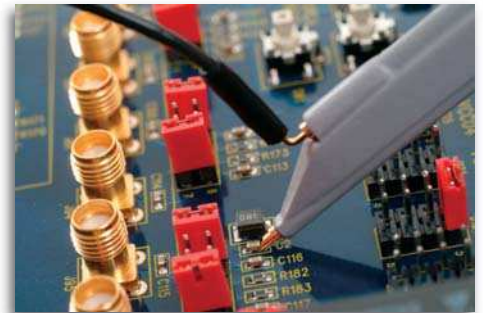
I²C, SPI, UART, RS-232, LIN, and CAN Trigger & Decode (optional)

Complete I²C, SPI, UART, RS-232, LIN, and CAN serial triggering, including powerful conditional data triggering, allows quick and easy isolation of specific events on your embedded controller. Trigger on DATA in specific locations of long I²C EEPROM reads, or trigger on sensor values outside of a certain range. Intuitive, color-coded decode overlay helps you understand your serial data signals quickly. Search for data patterns, or view the protocol data in a table. Export table data to Excel. (Capabilities are optional).



ZS Series High Impedance Active Probes (Accessories)

LeCroy's new ZS Series of high impedance active probes provide full bandwidth at the probe tip, and the high impedance (0.9 pF, 1 MΩ) you want.



A variety of standard and available probe tip and grounding accessories are offered to meet any requirement. What's more, ZS Series probes are available for a very affordable price. Use the ZS1000 with 200 and 600 MHz WaveSurfers and the ZS1500 with 1 GHz WaveSurfers to give full system bandwidth at the probe tip.

An Easy Fit to your Work

The new WaveSurfer Xs oscilloscope makes everyday testing simpler and easier. The intuitive GUI readily accomplishes routine testing with its uncomplicated operation and fast response to commands. The simple interface is designed so that all the common measurements and functions are usually just one touch away. Now you can do more in less time.

1. Bright 10.4" Display

You'll never use a small display oscilloscope again. A fantastic viewing angle makes it easy to view.

2. Only 15 cm (6") Deep

The most space-efficient oscilloscope for your bench from 200 MHz to 1 GHz.

3. Dedicated Cursor Knobs

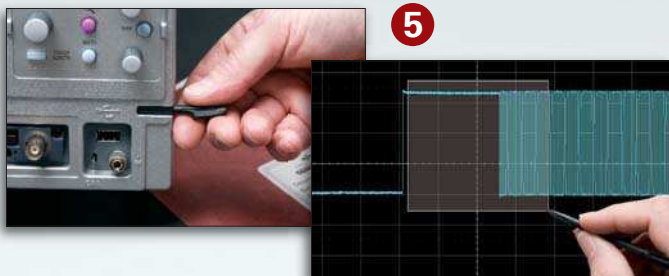
Select type of cursor, position them on your signal, and read values without ever opening a menu.

4. Zoom Control Knobs

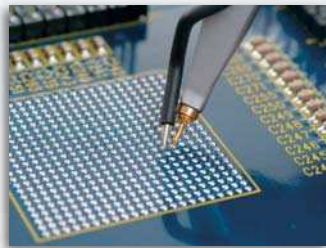
Navigate zoom or math traces with the multiplexed horizontal knobs.

5. Touch Screen with Built-in Stylus

The most time-efficient user interface is even easier to use with a built-in stylus.



6. High Impedance Active Probes



1 and 1.5 GHz active probes with 0.9 pF, 1 MΩ input impedance and an extensive probe tip and ground accessory selection.

7. LeCroy WaveStream Fast Viewing Mode

Provides a lively, analog-like feel similar to a phosphor trace. Adjust "trace" intensity with the front panel control, or toggle between LeCroy WaveStream and real-time modes.



8. LeCroy WaveScan Advanced Search & Analysis

Use more than 20 modes to capture and search, or "scan" for anomalous events over thousands or millions of acquisitions.

9. Serial Triggering & Decoding

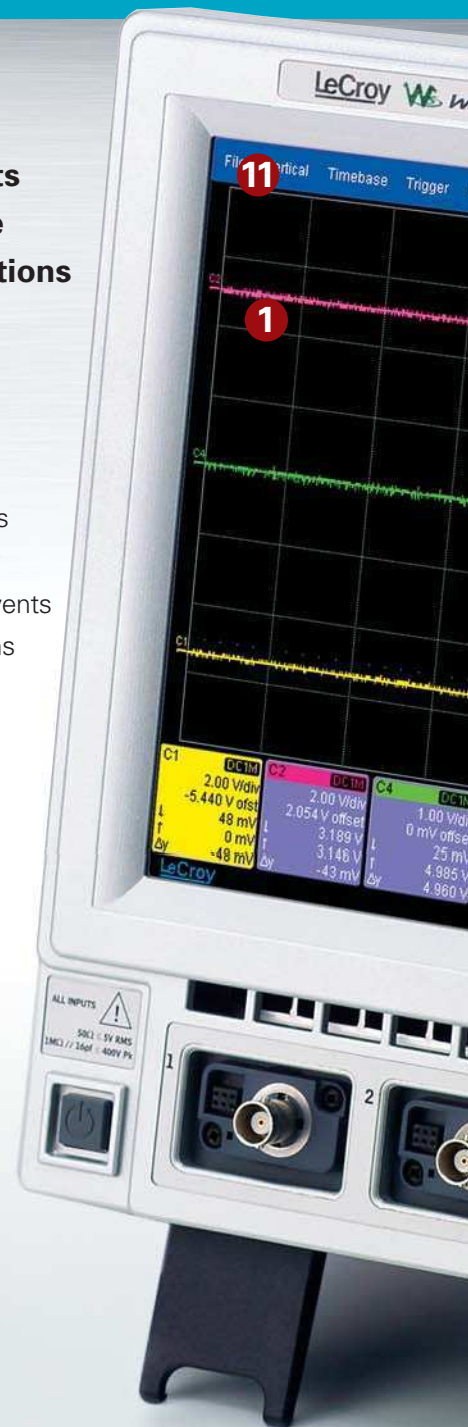
I²C, SPI, UART, RS-232, LIN, and CAN serial triggers and decoders, now available for WaveSurfer Xs.

10. "Push" Knobs

Trigger level, delay, and offset knobs all provide shortcuts to common actions when pushed.

11. Local Language User Interface

Select from 10 language preferences. Add a front panel overlay with your local language.





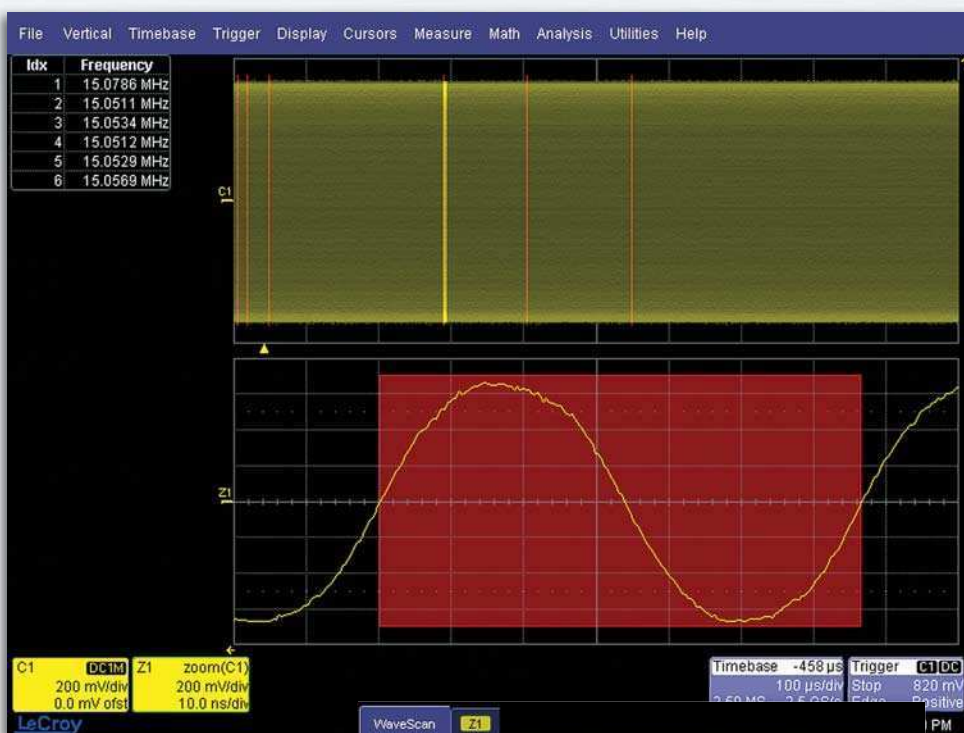
Communicate all the ways you want

Document your work and share it effectively by:

- Saving to on-board hard drive
- Saving to network drive
- E-mailing to team members
- Sending to a printer
- Utilizing front mounted USB port
- Main port is standard 10/100Base-T Ethernet

LeCroy WaveScan Advanced Search

WaveScan provides powerful isolation capabilities that hardware triggers can't provide. WaveScan provides the ability to locate unusual events in a single capture (i.e., capture and search), or "scan" for an event in many acquisitions over a long period of time. Select from more than 20 search modes (frequency, rise time, runt, duty cycle, etc.), apply a search condition, and begin scanning.



Since the scanning "modes" are not simply copies of the hardware triggers, the utility and capability is much higher.

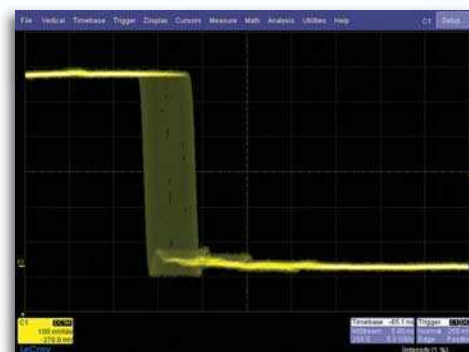
For instance, there is no "frequency" trigger in any oscilloscope, yet WaveScan allows for "frequency" to be quickly "scanned." This allows the user to accumulate a data set of unusual events that are separated by hours or days, enabling faster debugging. When used in multiple acquisitions, WaveScan



builds on the traditional LeCroy strength of fast processing of data. A LeCroy X-Stream oscilloscope will quickly scan millions of events looking for unusual occurrences, and do it much faster and more efficiently than other oscilloscopes can.

WaveStream Fast Viewing Mode

WaveStream provides a vibrant, intensity graded (256 levels) display with a fast update rate to closely simulate the look and feel of an analog oscilloscope. WaveStream is most helpful in viewing signals that have signal jitter or signal anomalies, or for applying a visual check before creating an advanced trigger or WaveScan setup to locate an unusual event.



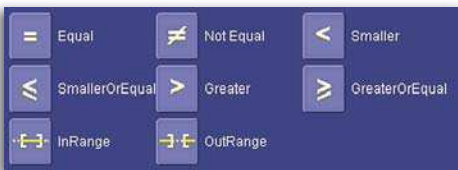
Since the sampling rate in WaveStream mode can be as high as 5 GS/s (up to 2.5x that of other oscilloscopes), it is an excellent runt or glitch finder.

Timing jitter is often visually assessed to understand approximate behavior. WaveStream makes it easy to understand jitter on edges or in eye diagrams. WaveStream also excels in allowing you to relate composite (WaveStream) to single-event (real-time sampled) behaviors. Just capture in WaveStream mode, toggle to view or zoom a single trace, then toggle back to WaveStream mode.

I²C, SPI, UART, RS-232, CAN, and LIN Serial Trigger and Decode

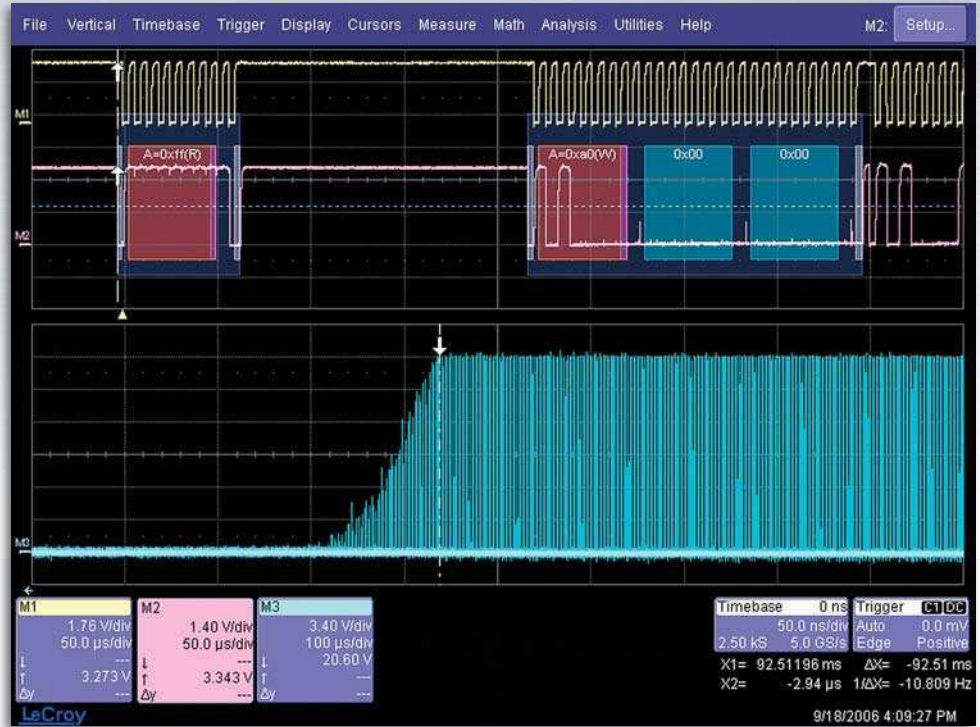
Complete I²C, SPI, UART, RS-232, CAN, and LIN Serial Triggering

Quickly and easily isolate specific serial data events on your embedded controller for better understanding and faster debug. Set up trigger conditions in binary, or hexadecimal formats. Use the EXT input for the clock signal and keep an additional analog oscilloscope channel open for other uses. Trigger on DATA in specific locations of long I²C EEPROM reads. Get complete control of your debug process and finish faster.



Powerful Conditional Data Triggering Isolates Problems

Use a conditional I²C, UART, or LIN DATA trigger to select a range of DATA values to trigger on, not just a single DATA value. Oftentimes, I²C utilizes DATA bytes to specify sub-addresses for accessing memory locations in EEPROMs. Conditional DATA trigger allows triggering on a range of DATA bytes that correspond to reads or writes to specific sub-address memory



blocks in the EEPROM. It can also aid in monitoring DATA outputs from sensors, such as analog-to-digital converters, and triggering when DATA is outside a safe operating range. In both cases, verifying proper operation becomes a simple task.

Intuitive, Color-Coded Decode Overlay

Advanced software algorithms deconstruct the waveform into binary, hex, or ASCII protocol information, then overlay the decoded data on the waveform. Various sections of the protocol are color-coded to make it easy to understand. The decode operation is fast—even with long acquisitions.

Table Summary and Search/Zoom

Turn your oscilloscope into a protocol analyzer with the Table display of protocol information. Customize the table, or export Table data to an Excel file. Touch a message in the table and automatically zoom for detail. Search for specific address or data values in the acquisition.

Idx	Time	Addr	Length	Address	R/W	Length	Data
8	240.494 ms	7	0x21	1	2	0x00	00 00
9	360.555 ms	7	0x21	0	1	0x08	
10	360.698 ms	7	0x21	1	2	0x49	00 00
11	481.865 ms	7	0x21	0	1	0x0a	
12	482.007 ms	7	0x21	1	2	0x00	00 00
13	606.294 ms	7	0x20	0	3	0x01	36 00
14	721.235 ms	7	0x20	0	1	0x00	
15	721.377 ms	7	0x20	1	2	0x12	36 00
16	841.266 ms	7	0x20	0	1	0x02	

Get Your Answers Fast

Keep your testing efficient with a thoughtfully designed user interface that provides the busy engineer with a GUI that is smooth, transparent, and easy to use.

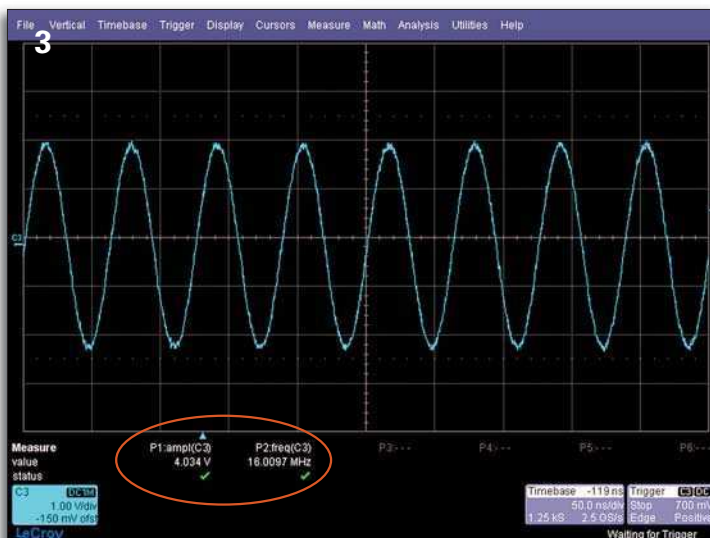


One-touch Access to 23 Measurements

Twenty three basic measurements have been built in to give you quick answers. Use the front panel Measure button; then, with one touch, quickly select your cursors from the graphical user interface.



1. Access the measure dialog box from the front panel.
2. Select your measurement (and source, as necessary).
3. Measurements appear automatically below the grid and never obscure your signals.



Quickly Accessed Cursor Controls

Dedicated front panel cursor knobs select and position your cursors quickly—there is no need to open a menu.



Simple Zooming

Zooming is so easy with this scope—simply draw a box around the area to be zoomed (or use the front panel quick zoom button). Then, use the horizontal knobs to adjust the zoom ratio and position.



WaveSurfer Xs Probes, Accessories, and Options

LeCroy offers an extensive range of probes, accessories, and options for WaveSurfer Xs. Leverage your investment with these items.

ZS Series High Impedance Active Probes

Leading Features:

- 1 GHz (ZS1000) and 1.5 GHz (ZS1500) bandwidths
- High Impedance (0.9 pF, 1 M Ω)
- Extensive standard and available probe tip and ground connection accessories
- ± 12 Vdc offset (ZS1500)
- LeCroy ProBus system



ADP305, ADP300

Leading Features:

- 20 MHz and 100 MHz bandwidth
- 1,000 V_{rms} common mode voltage
- 1,400 V_{peak} differential voltage
- EN 61010 CAT III
- 80 dB CMRR at 50/60 Hz
- LeCroy ProBus system



PPE1.2KV, PPE2KV, PPE4KV, PPE5KV, PPE6KV, PPE20KV

Leading Features:

- Suitable for safe, accurate high-voltage measurements
- 1.2 kV to 20 kV
- Works with any 1 M Ω input oscilloscope



CP030, CP031

Leading Features:

- 30 A_{rms} continuous current (50 A_{peak})
- 50 or 100 MHz bandwidth
- Small form factor accommodates large conductors with small jaw size
- LeCroy ProBus system



AP031

Leading Features:

- Lowest priced differential probe
- 15 MHz bandwidth
- 700 V maximum input voltage
- Works with any 1 M Ω input oscilloscope



AP033, AP034

Leading Features:

- 500 MHz and 1 GHz bandwidth
- 10,000:1 CMRR
- Wide dynamic range, low noise
- LeCroy ProBus system



Advanced Trigger Option

Adds Runt, Slew Rate, Interval, Dropout, and Qualified/State triggers to the standard triggers.

Extended Math Option

Adds 12 additional math functions, chaining of two math functions, rescaling with unit selection, and 1 Mpts FFTs.

I²C, SPI, UART, RS-232, LIN, and CAN Trigger & Decode Options

Powerful serial triggering, including conditional data triggering, intuitive, color-coded decode overlay, search, and table display.

MS Series Mixed Signal Oscilloscope Options

Add high-performance mixed signal capability to a WaveSurfer Xs. Capture digital signals up to 500 MHz with up to 50 Mpts/Ch memory, 2 GS/s and 18 or 36 channels.



Specifications

	WaveSurfer 24Xs	WaveSurfer 44Xs	WaveSurfer 42Xs	WaveSurfer 64Xs	WaveSurfer 62Xs	WaveSurfer 104Xs
Bandwidth (@ 50 Ω)	200 MHz	400 MHz		600 MHz		1 GHz
Rise Time	1.75 ns	875 ps		625 ps		400 ps
Input Channels	4	4	2	4	2	4
Display	10.4" Color flat-panel TFT-LCD, 800 x 600 SVGA, touch screen					
Sample Rate (single-shot)	2.5 GS/s					2.5 GS/s (5 GS/s interleaved)
Sample Rate (RIS mode)	50 GS/s					
Standard Record Length	2.5 Mpts/Ch (all channels)					
Standard Capture Time	up to 1 ms at full sample rate on all four channels					
Vertical Resolution	8 bits					
Vertical Sensitivity (V/div)	2 mV/div–10 V/div (1 M Ω); 2 mV/div–1 V/div (50 Ω)					
Vertical (DC Gain) Accuracy	$\pm 1.0\%$ of full scale (typical); $\pm 1.5\%$ of full scale ≥ 10 mV/div (warranted)					
BW Limit	20 MHz		20 MHz, 200 MHz			
Maximum Input Voltage	50 Ω : 5 V _{rms} , 1 M Ω : 400 V max. (DC + Peak AC ≤ 5 kHz)					50 Ω : 5 V _{rms} 1 M Ω : 250 V max. (DC + Peak AC ≤ 10 kHz)
Input Coupling	AC, DC, GND (DC and GND for 50 Ω)					
Input Impedance	1 M Ω 16 pF, or 50 Ω					1 M Ω 20 pF, or 50 Ω
Probing System	BNC or ProBus					
Probes	One PP009 (5 mm) per channel (standard)					One PP011 (5 mm) per channel (standard)
Timebase Range	200 ps/div–1000 s/div (roll mode from 500 ms/div–1000 s/div)					
Timebase Accuracy	≤ 5 ppm @ 25 $^{\circ}$ C (typical) (≤ 10 ppm @ 5–40 $^{\circ}$ C)					
Trigger Modes	Normal, Auto, Single, and Stop					
Trigger Sources	Any input channel, External, Ext/10, or line; slope and level unique to each source (except for line trigger)					
Trigger Coupling	DC, AC, HFRej, LFRrej					
Pre-trigger Delay	0–100% of full scale					
Post-trigger Delay	0–10,000 divisions					
Trigger Hold-off	1 ns to 20 s or 1 to 1,000,000,000 events					
Internal Trigger Level Range	± 4.1 div from center					
External Trigger Range	EXT/10 ± 4 V; EXT ± 400 mV					

Triggering

Standard	Edge, Glitch, Width, Logic (Pattern), TV-Composite Video
Advanced (WS Xs-ADVTRIG)	Runt, Slew Rate, Interval (Signal or Pattern), Dropout, Qualified (State or Edge)

Measure, Zoom, and Math Tools

Standard Parameter Measurements	Up to 6 of the following parameters can be calculated at one time on any waveform: Amplitude, Area, Base (Low), Delay, Duty, Fall Time (90%-10%), Fall Time (80%-20%), Frequency, Maximum, Mean, Minimum, Overshoot+, Overshoot-, Period, Peak-Peak, Phase, Rise Time (10%-90%), Rise Time (20%-80%), RMS, Skew, Standard Deviation, Top (High), Width+, Width-. Measurements can be gated.
Zooming	Use front panel QuickZoom button, or use touch screen or mouse to draw a box around the zoom area.
Standard Math	Operators include Sum, Difference, Product, Ratio, and FFT (up to 25 kpts with power spectrum output and rectangular, VonHann, and FlatTop windows). 1 math function may be defined at a time.
Extended Math (WSXs-MATHSURF Option)	Adds the following additional math functions: Absolute Value, Averaging (summed and continuous), Derivative, Envelope, Enhanced Resolution (to 11 bits), Floor, Integral, Invert, Reciprocal, Roof, Square, and Square Root. Also adds chaining of two math functions and rescaling to different units, and 1 Mpts FFTs.

Ordering Information

Product Description Product Code

WaveSurfer Xs Digital Oscilloscopes

1 GHz, 2.5 GS/s, 4 Ch, 2.5 Mpts/Ch (5 GS/s interleaved) with 10.4" Color Touch Screen Display	WaveSurfer 104Xs
600 MHz, 2.5 GS/s, 4 Ch, 2.5 Mpts/Ch with 10.4" Color Touch Screen Display	WaveSurfer 64Xs
600 MHz, 2.5 GS/s, 2 Ch, 2.5 Mpts/Ch with 10.4" Color Touch Screen Display	WaveSurfer 62Xs
400 MHz, 2.5 GS/s, 4 Ch, 2.5 Mpts/Ch with 10.4" Color Touch Screen Display	WaveSurfer 44Xs
400 MHz, 2.5 GS/s, 2 Ch, 2.5 Mpts/Ch with 10.4" Color Touch Screen Display	WaveSurfer 42Xs
200 MHz, 2.5 GS/s, 4 Ch, 2.5 Mpts/Ch with 10.4" Color Touch Screen Display	WaveSurfer 24Xs

Included with Standard Configuration

÷10, 500 MHz, 10MΩ Passive Probe (Total of 1 Per Channel)
Getting Started Manual and Quick Reference Guide
CD-ROMs Containing Utility Software
Standard Ports: 10/100Base-T Ethernet, USB 2.0 (5), SVGA Video out, Audio in/out, RS-232
Protective Front Cover
Standard Commercial Calibration and Performance Certificate
3-year Warranty

Memory Option

10 Mpts/Ch Memory Option (for 4 Ch WaveSurfer Xs)	WSXs-VL
10 Mpts/Ch Memory Option (for 2 Ch WaveSurfer Xs)	WSXs-VL2

General Accessories

Keyboard Accessory	WSXs-KYBD
Optical Mouse Accessory	WSXs-MOUSE
External GPIB Accessory	WS-GPIB
Hard Carrying Case	WSXs-HARDCASE
Soft Carrying Case	WSXs-SOFTCASE
Rack Mount Accessory	WSXs-RACK
Accessory Pouch	WSXs-POUCH

Mounting Accessory

Clamp Mounting Stand	WSXs-MS-CLAMP
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Local Language Overlays

German Front Panel Overlay	WSXs-FP-GERMAN
French Front Panel Overlay	WSXs-FP-FRENCH
Italian Front Panel Overlay	WSXs-FP-ITALIAN
Spanish Front Panel Overlay	WSXs-FP-SPANISH
Japanese Front Panel Overlay	WSXs-FP-JAPANESE
Korean Front Panel Overlay	WSXs-FP-KOREAN
Chinese (Tr) Front Panel Overlay	WSXs-FP-CHNES-TR
Chinese (Simp) Front Panel Overlay	WSXs-FP-CHNES-SI
Russian Front Panel Overlay	WSXs-FP-RUSSIAN

Product Description Product Code

Software Options

Advanced Trigger Software Package	WSXs-ADVTRIG
Extended Math Software Package	WSXs-MATHSURF
Electrical Telecom Mask Test Software Package	WSXs-ET-PMT
Windows Lockout Software Option	WSXs-LOCKOUT
HDTV Trigger for 1080i, 1080p and 720p Formats	WSXs-HDTV-TRIG

Serial Data Options

I ² C Trigger and Decode Option	WSXs-I2Cbus TD
UART and RS-232 Trigger and Decode Option	WSXs-UART-RS232bus TD
SPI Trigger and Decode Option	WSXs-SPIbus TD
LIN Trigger and Decode Option	WSXs-LINbus TD
CAN Trigger and Decode Option	CANbus TD

Mixed Signal Oscilloscope Options

500 MHz, 18 Ch, 2 GS/s, 50 Mpts/Ch Mixed Signal Oscilloscope Option	MS-500
250 MHz, 36 Ch, 1 GS/s, 25 Mpts/Ch (500 MHz, 18 Ch, 2 GS/s, 50 Mpts/Ch Interleaved) Mixed Signal Oscilloscope Option	MS-500-36
250 MHz, 18 Ch, 1 GS/s, 10 Mpts/Ch Mixed Signal Oscilloscope Option	MS-250

Probes and Amplifiers*

Set of 4 ZS1500, 1.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1500-QUADPAK
Set of 4 ZS1000, 1 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1000-QUADPAK
1 GHz Active Differential Probe (÷1, ÷10, ÷20)	AP034
500 MHz Active Differential Probe (x10, ÷1, ÷10, ÷100)	AP033
30 A; 100 MHz Current Probe – AC/DC; 30 A _{rms} ; 50 A _{peak} Pulse	CP031
30 A; 50 MHz Current Probe – AC/DC; 30 A _{rms} ; 50 A _{peak} Pulse	CP030
30 A; 50 MHz Current Probe – AC/DC; 30 A _{rms} ; 50 A _{peak} Pulse	AP015
150 A; 10 MHz Current Probe – AC/DC; 150 A _{rms} ; 500 A _{peak} Pulse	CP150
500 A; 2 MHz Current Probe – AC/DC; 500 A _{rms} ; 700 A _{peak} Pulse	CP500
1,400 V, 100 MHz High-Voltage Differential Probe	ADP305
1,400 V, 20 MHz High-Voltage Differential Probe	ADP300
1 Ch, 100 MHz Differential Amplifier	DA1855A

*A wide variety of other passive, active, and differential probes are also available. Consult LeCroy for more information.

Customer Service

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

LeCroy

1-800-5-LeCroy
www.lecroy.com

**Local sales offices are located throughout the world.
To find the most convenient one visit www.lecroy.com**

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WSXsDSrevD_W1_08June07

www.valuetronics.com