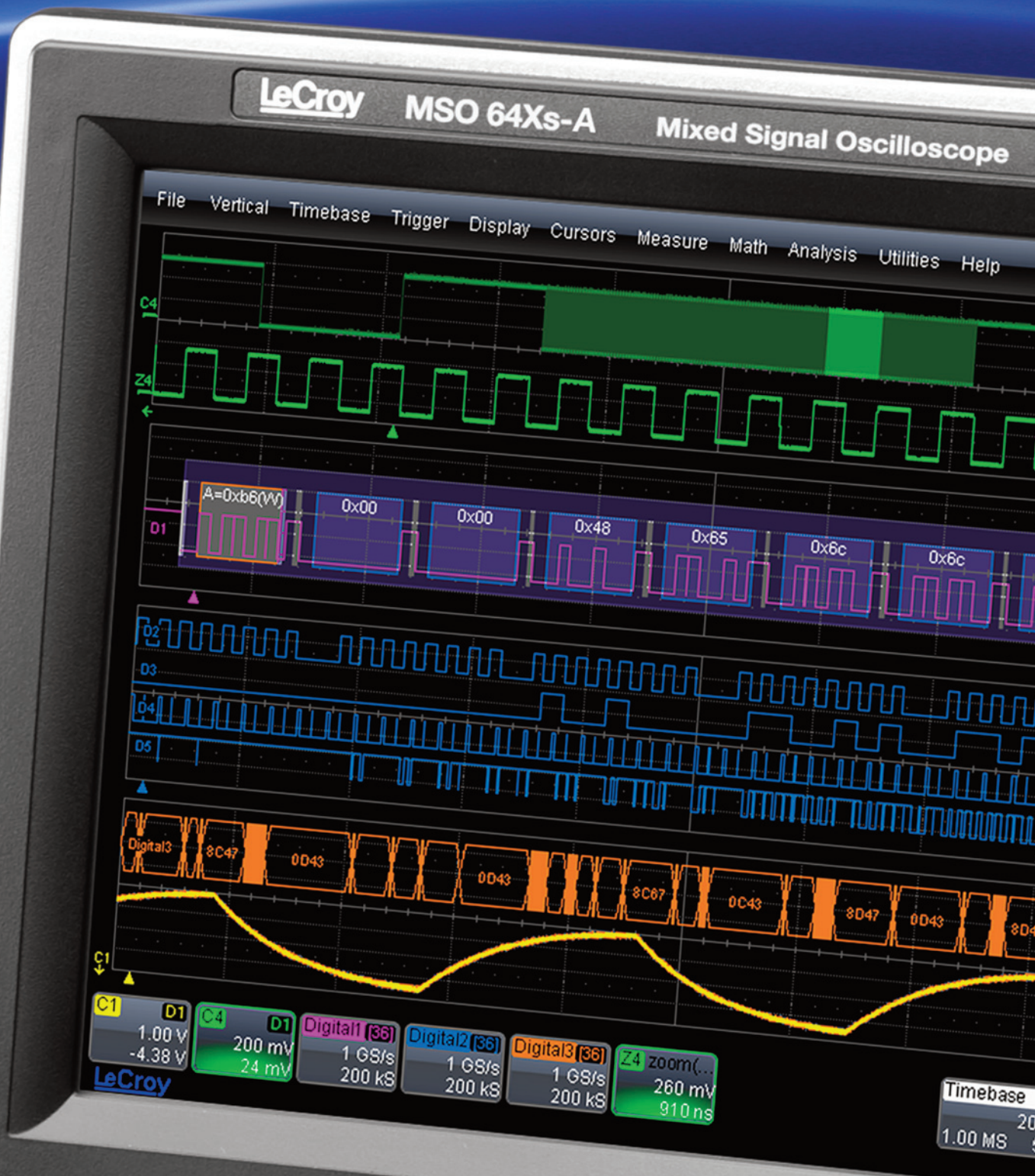# LeCroy

MSO Xs-A
Mixed Signal Oscilloscopes

400 MHz – 1 GHz

**Engineered for Embedded
System Design and Debug**

THE RIGHT TOOLS FOR EMBEDDED SYSTEM

Key Features

- **400 MHz, 600 MHz and 1 GHz bandwidths**

- **4 analog and 18 digital channels**

- **2.5 GS/s sample rates per channel, 5 GS/s with MSO 104Xs-A**

- **10 Mpts/Ch memory on all channels, all the time**

- **Fast Processing of long memory and math**

- **Responsive User Interface**

- **WaveStream™ Fast Viewing Mode**

- **WaveScan™ – Advanced Search and Find**

- **Excellent triggering including HDTV Trigger**

- **10.4" touch screen display**

- **LXI Compliant**

- **SMART Triggers™ capabilities for combining parallel and serial triggering**

Successful design and debug of an embedded system requires monitoring a wide range of analog, digital and serial data signals. The MSO Xs-A with its long memory, fast processing, advanced measurements and touch screen is the right tool to view these signals and ensure proper bus traffic and timing between events.

Its small form factor pack a powerful processor that can handle the long 10 Mpts of memory on each of the 4 analog and 18 digital channels faster than any competing products and without any compromise of memory length or sample rate. The touch screen interface is the ultimate in ease of use and with features like WaveStream™ fast viewing mode and WaveScan™ Search and Find you can be confident that you will be able to quickly debug and solve every problem in your embedded system. Beyond the advanced measurement and triggering the MSO Xs-A offers a wide range of available serial data trigger and decode tools for I^2C, SPI, UART, Audiobus (I^2S, LJ, RJ, TDM), MIL-STD-1553, CAN and LIN. With analog bandwidths from 400 MHz to 1 GHz and max digital input frequencies up to 250 MHz the MSO Xs-A is the ideal mixed signal oscilloscope for everyday design and debug.


Speed and Responsiveness

The MSO Xs-A was designed to shorten debug time through faster hardware and more sophisticated software. The hardware allows for fast processing of long memory even when looking at all 22 inputs with math, measurements and serial decoders. The software is designed to respond immediately to the user's input even while processing data eliminating any lag or delay.
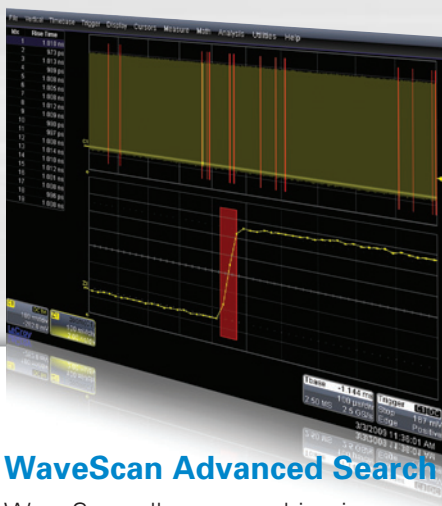
WaveScan Advanced Search

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. Search for events on any analog or digital channel or search for a pattern across multiple digital channels.
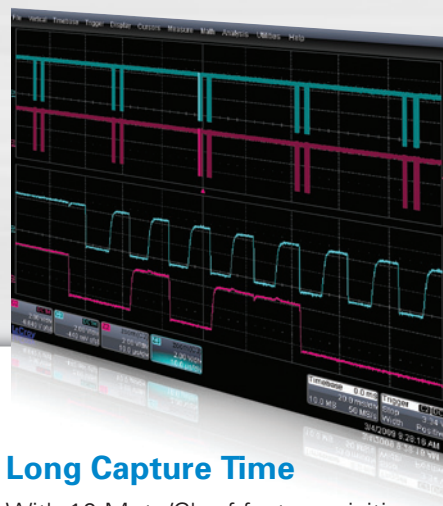

Long Capture Time

With 10 Mpts/Ch of fast acquisition memory standard the MSO Xs-A provides long capture time at full sample rate, and allows for very long captures at lower sample rates letting you capture long stretches of serial bus traffic. The MSO Xs-A long memory is also thoughtfully designed to respond quickly, even when measurements, math, or serial decoders are being used.
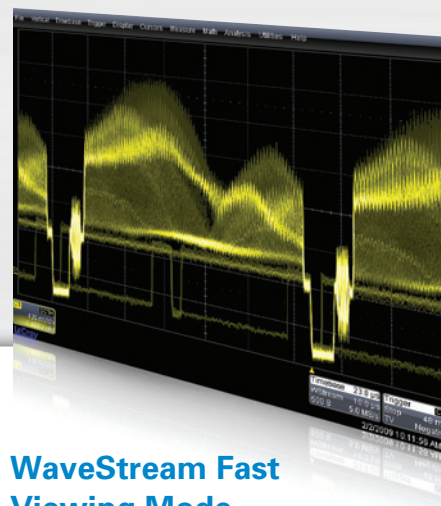

WaveStream Fast Viewing Mode

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.
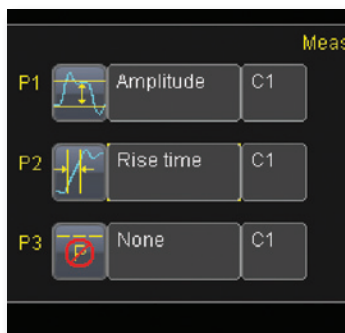

Touch Screen Simplicity

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. Use the touch screen to quickly access all triggers, math functions and measurement parameters or to "draw a box" around the area of interest and zoom all channels to the desired area.
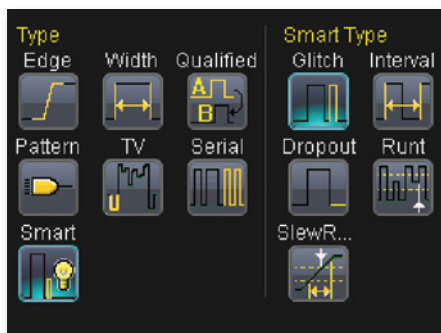
Advanced Mixed Signal Triggering

Powerful triggering allows for analog and digital cross-pattern triggering of up to 4 analog and 18 digital channels as well as Qualified AB event triggering to arm a trigger on a certain event and trigger on a parallel or serial pattern that follows.
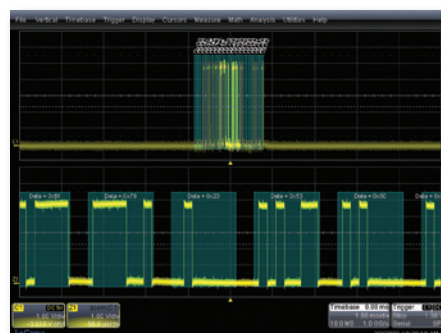
Serial Data Trigger and Decode

Quickly and easily locate and isolate specific data on I^{2}C, SPI, UART, Audiobus (I^{2}S, LJ, RJ, TDM), MIL-STD-1553, CAN or LIN busses with the optional trigger and decode capabilities. Data is sown with a color-coded overlay directly on top of the physical layer waveform.

THE INTUITIVE, POWERFUL, FLEXIBLE MSO

The MSO Xs-A mixed signal oscilloscope makes everyday embedded system testing simpler and easier. The intuitive user interface and streamlined front panel make it easy to turn on and start making measurements. The interface is designed so that all triggering, decoding, measurements and functions are just one touch away

1. Digital Channel Capture

Capture 18 digital lines at 1 GS/s with 10 Mpts memory on each channel

2. Digital Waveform Views

View all lines individually or group them and view as a parallel bus

3. Analog Signal Capture

Capture and view analog channels width bandwidths up to 1 GHz, sample rate up to 5 GS/s and 10 Mpts on each channel

4. Serial Data Decode

View decoded bus information from I^2C, SPI, UART, Audiobus (I^2S, LJ, RJ, TDM), MIL-STD-1553, CAN and LIN on analog or digital channels with serial data trigger and decode options

5. Local Language User Interface

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

6. Bright 10.4" Touch Screen Display

Easily operate the MSO by accessing all functionality with a touch of the screen

7. Push Knobs

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

8. 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

9. Dedicated Cursor Knobs

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

Document and Share:

- Save to on-board hard drive
- Save to network drive
- E-mail to team members
- Send to a printer
- Utilize front mounted USB port

THE COMPLETE MIXED SIGNAL TOOLSET

Analog, Digital and Cross-pattern Triggering

The MSO Xs-A has an extensive set of triggering capabilities aimed at capturing a wide range of analog and digital signals. These triggers can be as simple as an edge trigger on an analog or digital channel or as complicated as a cross-pattern trigger which incorporates up to 4 analog and 18 digital channels. Powerful Qualified AB event triggering allows the trigger to be armed on one event and triggered on another.
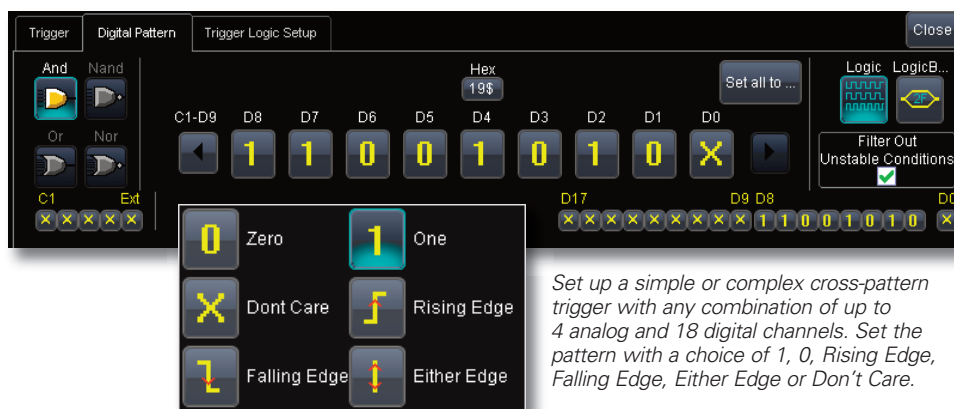
Set up a simple or complex cross-pattern trigger with any combination of up to 4 analog and 18 digital channels. Set the pattern with a choice of 1, 0, Rising Edge, Falling Edge, Either Edge or Don't Care.
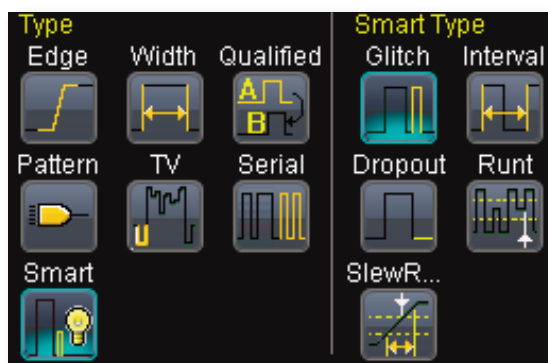

The advanced triggering of the MSO Xs-A goes well beyond the basic edge trigger and digital pattern trigger that many MSOs offer. Advanced triggers like runt and dropout and slew rate help find abnormal signals. The Qualified AB trigger can be used to connect multiple trigger events together.

Easy-to-use Measurement Tools

Cursor and measurement parameters are important for measuring and understanding both analog and digital waveforms. The MSO Xs-A cursors will read out hexadecimal bus values and analog channel voltages simultaneously. Automated measurement parameters will make measurements on both analog and digital channels with statistics to help you understand how they change over time.

Cursor measurements are displayed directly in the channel and group descriptor boxes which are always visible on screen.
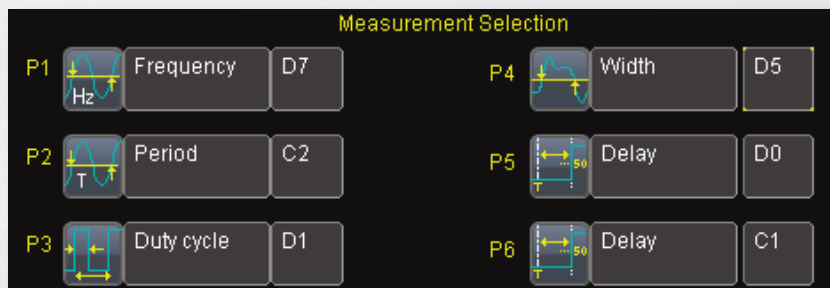

Use up to 6 measurements simultaneously and make measurements on analog, digital or a combination of both. Measurements are quickly set up using the touch screen menus.
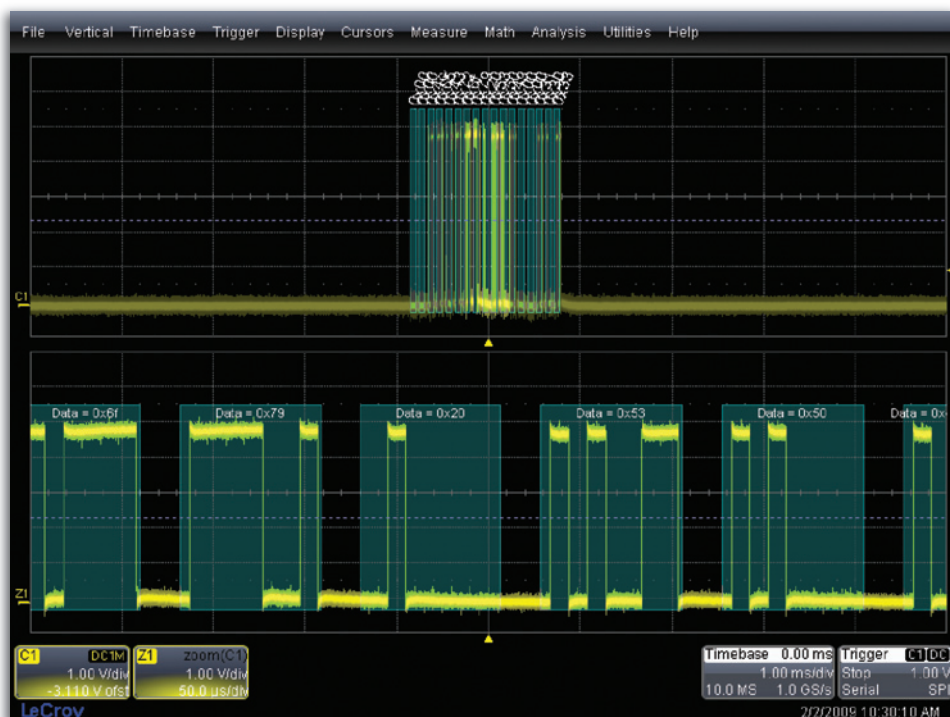
Complete I²C, SPI, UART, RS-232, Audiobus (I²S, LJ, RJ, TDM), MIL-STD-1553, CAN and LIN Serial Triggering

Quickly and easily isolate specific serial data events on your embedded controller for better understanding and faster debug. Set up trigger conditions in binary and hexadecimal formats. Use the digital channels to capture serial data busses keeping the analog oscilloscope channels 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.
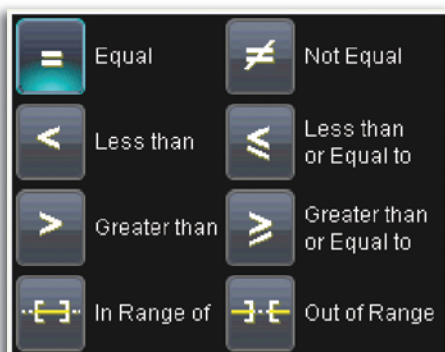
Powerful Conditional Data Triggering

Completely isolate specific message events for better understanding and debug. Use a conditional trigger to select a range of values to trigger on, not just a single value. For example, 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.

7

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 to find events on any analog or digital channel or search for a pattern across multiple digital channels.
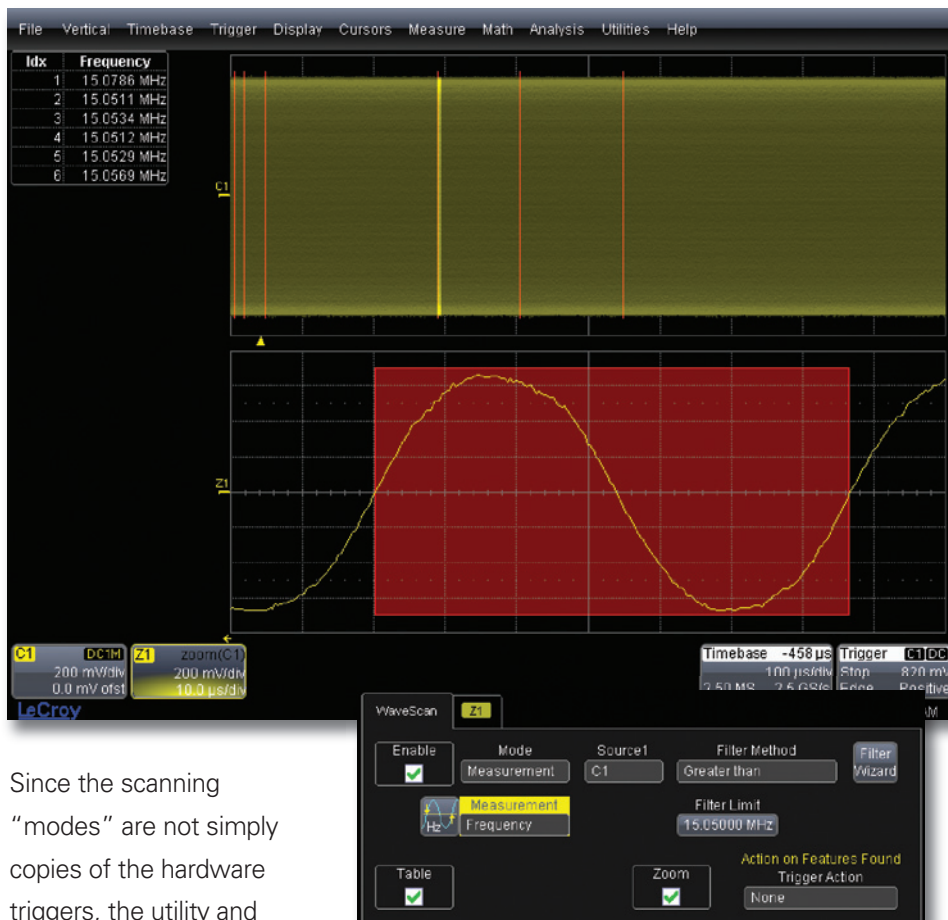

Since the scanning "modes" are not simply copies of the hardware triggers, the utility and capability is much higher. For instance, there is no "frequency" trigger in any oscilloscope, yet WaveScan allows for "frequency" to be quickly "scanned." This allows the user to accumulate a data set of unusual 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.
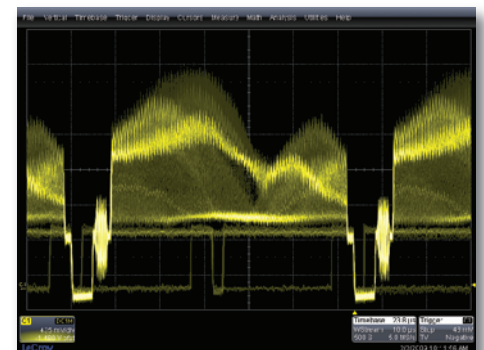
Since the sampling rate in WaveStream mode can be as high as 5 GS/s (up to 2.5x that of other oscilloscopes), it is an excellent runt or glitch finder. Timing jitter is often visually assessed to understand approximate behavior. WaveStream makes it easy to understand jitter on edges or in eye diagrams. 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.

PROBES, ACCESSORIES, AND OPTIONS

LeCroy offers an extensive range of probes, accessories, and options for the MSO Xs-A. 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 MΩ)
- 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 MΩ 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 MΩ input oscilloscope

AP033, AP034

Leading Features:

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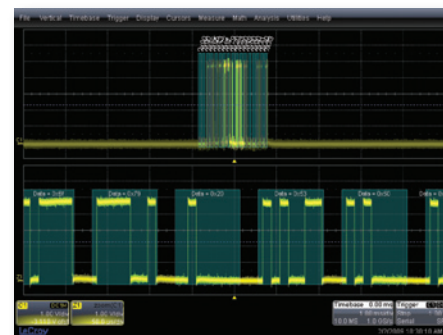
Extended Math Option

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

I^2C, SPI, UART, RS-232, Audiobus (I^2S, LJ, RJ, TDM), MIL-STD-1553, CAN and LIN Trigger and Decode Options

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

MSO Xs-A SPECIFICATIONS

Analog Channels	MSO 44Xs-A	MSO 64Xs-A	MSO 104Xs-A
Bandwidth (@ 50 Ω)	400 MHz	600 MHz	1 GHz
Rise Time	875 ps	500 ps	300 ps
Input Channels	4		
Display	10.4" Color flat-panel TFT-LCD, 800 x 600 SVGA, touch screen		
Sample Rate (single-shot)	2.5 GS/s		5 GS/s
Sample Rate (RIS mode)	50 GS/s		
Standard Record Length	10 Mpts/Ch (all channels)		
Standard Capture Time	Up to 2 ms at full sample rate on all four channels		
Vertical Resolution	8-bits		
Vertical Sensitivity (V/div)	2 mV/div–10 V/div (1 MΩ); 2 mV/div–1 V/div (50 Ω)		
Vertical (DC Gain) Accuracy	±1.0% of full scale (typical); ±1.5% of full scale ≥ 10 mV/div (warranted)		
BW Limit	20 MHz, 200 MHz		
Maximum Input Voltage	50 Ω: 5 V_{rms}, 1 MΩ: 400 V max. (DC + Peak AC ≤ 5 kHz)		50 Ω: 5 V_{rms} 1 MΩ: 250 V max. (DC + Peak AC ≤ 10 kHz)
Input Coupling	AC, DC, GND (DC and GND for 50 Ω)		
Input Impedance	1 MΩ || 16 pF, or 50 Ω		1 MΩ || 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)

Digital Channels

Number of Channels	18
Maximimum Input Frequency	250 MHz
Sample Rate (per Ch)	1 GS/s
Record Length (per Ch)	10 Mpts
Threshold Groupings	D0–D8, D9–D17
Threshold Levels	TTL, ECL, CMOS (2.5 V, 3.3 V, 5 V), PECL, LVDS or User Defined
Input Impedance	100 kΩ || 5.0 pF
Maximum Input Voltage	± 30 V non-destruct

Horizontal and Trigger

Timebase Range	200 ps/div–1000 s/div (roll mode from 500 ms/div–1000 s/div)
Timebase Accuracy	≤ 5 ppm @ 25 °C (typical) (≤ 10 ppm @ 5–40 °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, LFRej
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 ±4V; EXT ±400 mV

MSO Xs-A SPECIFICATIONS

Trigger Types	MSO 44Xs-A	MSO 64Xs-A	MSO 104Xs-A
Standard	Edge, Glitch, Width, Logic (Pattern), TV (NTSC, PAL, SECAM, HDTV – 720p, 1080i, 1080p), 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.

Physical (MS-250)

Dimensions (HWD)	1.5" x 4.25" x 8.375" (3.8 x 10.8 x 21.2 cm)
Weight	1.7 lbs. (.775 kg)
Leadset Length	16" (40.65 cm)

Physical (Base Oscilloscope)

Dimensions (HWD)	10.25" x 13.4" x 6" (26 cm x 34 cm x 15 cm) Excluding accessories and projections
Net Weight	16.0 lbs. (7.26 kg.)

Option

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, Rescale (change scale and units), Roof, Square, and Square Root. Also adds chaining of two math functions and 1 Mpt FFTs.

ORDERING INFORMATION

Product Description	Product Code
MSO Xs-A Mixed Signal Oscilloscopes	
1 GHz, 5 GS/s, 4 + 18 Ch, 10 Mpts/Ch MSO with 10.4" Color Touch Screen Display	MSO 104Xs-A
600 MHz, 2.5 GS/s, 4 + 18 Ch, 10 Mpts/Ch MSO with 10.4" Color Touch Screen Display	MSO 64Xs-A
400 MHz, 2.5 GS/s, 4 + 18 Ch, 10 Mpts/Ch MSO with 10.4" Color Touch Screen Display	MSO 44Xs-A

Included with Standard Configuration	
MS-250 Mixed Signal Oscilloscope Option	
Advanced Triggering with LeCroy SMART Triggers	
÷10, 500 MHz, 10 MΩ Passive Probe (Total of 1 Per Channel)	
Getting Started Manual and Quick Reference Guide	
Standard Ports: 10/100Base-T Ethernet, USB 2.0 (5), SVGA Video out, Audio in/out, RS-232	
Protective Front Cover	
Anti-virus Software (Trial Version)	
Standard Commercial Calibration and Performance Certificate	
3-year Warranty	

Mixed Signal Accessories	
Large Gripper Probe Set for 0.10" (2.54 mm) Pin Pitch, Includes 10 Color-coded Probes	PK400-1
Medium Gripper Probe Set for 0.04" (1.0 mm) Pin Pitch, Includes 10 Color-coded Probes	PK400-2
Small Gripper Probe Set for 0.008" (0.2 mm) Pin Pitch, Includes 10 Color-coded Probes	PK400-3
18-pin 3M Interface Cable (Mates with 3M Part Number 2520-6002)	MSO-3M

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

Local Language Overlays	
German Front Panel Overlay	WSXs-A-FP-GERMAN
French Front Panel Overlay	WSXs-A-FP-FRENCH
Italian Front Panel Overlay	WSXs-A-FP-ITALIAN
Spanish Front Panel Overlay	WSXs-A-FP-SPANISH
Japanese Front Panel Overlay	WSXs-A-FP-JAPANESE
Korean Front Panel Overlay	WSXs-A-FP-KOREAN

Product Description	Product Code
Local Language Overlays	
Chinese (Tr) Front Panel Overlay	WSXs-A-FP-CHNES-TR
Chinese (Simp) Front Panel Overlay	WSXs-A-FP-CHNES-SI
Russian Front Panel Overlay	WSXs-A-FP-RUSSIAN

Software Options	
Extended Math Software Package	WSXs-MATHSURF
Electrical Telecom Mask Test Software Package	WSXs-ET-PMT
Windows Lockout Software Option	WSXs-LOCKOUT

Serial Data Options	
I²C 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	WSXs-CANbus TD
Audiobus Trigger and Decode Option for I²S, LJ, RJ and TDM	WSXs-Audiobus TD
MIL-STD-1553 Trigger and Decode Option	WSXs-1553 TD

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 with Precision Voltage Source	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. Visit our website to find the most convenient location.

MSOXs-ADS-21Jul10
PDF

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное   производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru	moschip.ru_6
moschip.ru_4	moschip.ru_9