

WaveSurfer® MXs-B and MSO MXs-B Oscilloscopes

200 MHz - 1 GHz



ESSENTIAL TOOLS FOR VALIDATION AND DEBUG

WaveSurfer® MXs-B

- 200 MHz, 400 MHz, 600 MHz and 1 GHz Bandwidths
- Up to 10 GS/s Sample Rate
- 16 Mpts/Ch Memory,
 32 Mpts Interleaved
- Fast Processing of Long Memory and Math
- Responsive User Interface
- WaveStream[™] Fast Viewing Mode
- WaveScan[™] Advanced
 Search and Find
- LabNotebook Documentation and Report Generation
- 10.4" Touch Screen Display
- LXI Compliant

MSO MXs-B

All the great features of the WaveSurfer MXs-B plus:

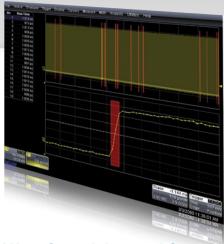
- 18 Digital Channels
- Max. Digital Signal Speed of 250 MHz
- Analog and Digital Cross Pattern Triggering

The WaveSurfer® MXs-B and MSO MXs-B oscilloscopes pack high performance hardware, powerful waveform processing and advanced math, measurement and debug tools into a compact form factor with a large touch screen display and intuitive user interface.

With up to 10 GS/s sample rate and 32 Mpts of memory WaveSurfer can capture large amounts of data at very high sample rates. Other oscilloscopes offer long memory but they bog down trying to process or display it. WaveSurfer handles large amounts of data quickly providing fast processing of long memory even when using math and measurement functions. The software responds immediately to the user inputs even while processing data.

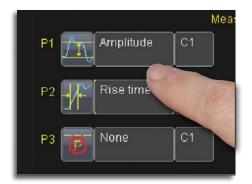
System debug often requires more than analog channels. The MSO MXs-B delivers 18 digital channels which can capture digital signals of up to 250 MHz.





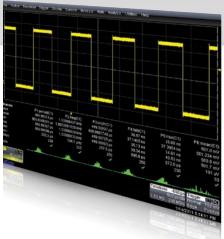
WaveScan Advanced Search

WaveScan allows searching in a single acquisition using more than 20 different criteria. Or, set up a Scan condition and scan for an event over hours or even days. When using an MSO model WaveScan will search digital lines for parallel bus patterns.



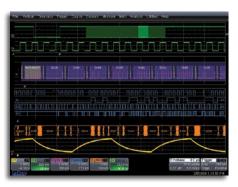
Touch Screen Simplicity

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.



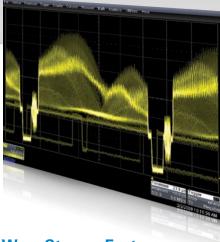
Advanced Math and Measure

With 18 math functions including averaging, enhanced resolution and FFT plus 23 measurement parameters WaveSurfer can measure and analyze every aspect of a waveform. Beyond just measuring waveforms, WaveSurfer provides statistics and histicons to show how waveforms change over time.



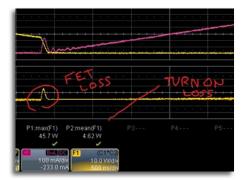
Embedded Controller Design and Debug

Save time when working with embedded controllers by adding high-performance mixed signal capability with the MSO MXs-B.
Capture digital signals up to 250 MHz with up to 10 Mpts/Ch memory, 1 GS/s and 18 channels. Quickly and easily isolate specific serial data events with optional I²C, SPI, UART, RS-232, USB 1.0/1.1/2.0, USB 2.0-HSIC, Audio (I²S, LJ, RJ, TDM), MIL-STD-1553, ARINC 429, MIPI D-PHY, DigRF, CAN, LIN and FlexRay™ trigger and decode options.



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.



LabNotebook Documentation and Report Generation Tool

LabNotebook provides a report generation tool to save and document all your work. Saving all displayed waveforms, settings, and screen images is all done through LabNotebook, eliminating the need to navigate multiple menus to save all these files independently.

INTUITIVE USER INTERFACE TO FIND PROBLEMS FASTER

The WaveSurfer MXs-B and MSO MXs-B oscilloscopes makes everyday testing simpler and easier. The intuitive user interface and streamlined front panel make it easy to turn on the oscilloscope and start making measurements. The interface is designed so that all the common measurements and functions are just one touch away.

1. Only 15 cm (6") Deep

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

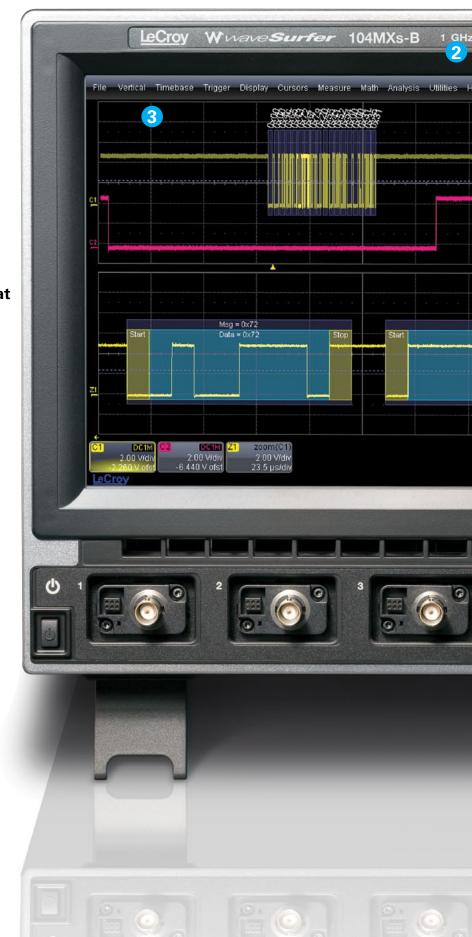
2. Local Language User Interface

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

3. Bright 10.4" Display

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







4. "Push" Knobs

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

5. Zoom Control Knobs

Navigate zoom or math traces with the multiplexed horizontal knobs.

6. 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.

7. Dedicated Cursor Knobs

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

8. Touch Screen with Built-in Stylus

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

Document and Share:

- Quickly save all files with LabNotebook
- Create custom reports with LabNotebook
- Save to internal hard drive or network drive
- Print to a USB printer
- Save to USB memory stick
- Connect with LAN or GPIB
- View data on a PC with free WaveStudio utility

IDENTIFY AND ISOLATE PROBLEMS FASTER



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.

Advanced Waveform Capture with Sequence Mode

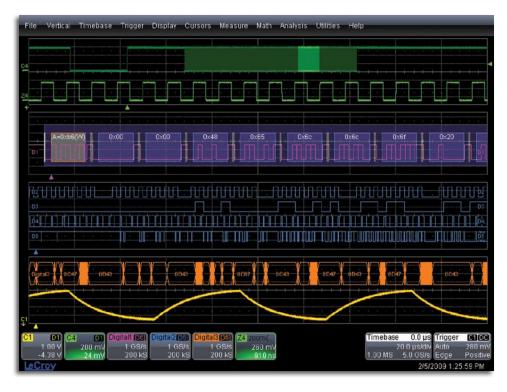
Use Sequence mode to store up to 5,000 triggered events as "segments" into memory. This can be ideal when capturing many fast pulses in quick succession or when capturing events separated by long time periods. Sequence mode provides timestamps for each acquisition and minimizes dead-time between triggers to less than 1 µs. Combine Sequence mode with advanced triggers to isolate rare events over time and analyze afterwards.

WaveStream Fast Viewing Mode

WaveStream provides a vibrant, intensity graded (256 levels) display with fast update rate to simulate the look and feel of an analog oscilloscope. WaveStream is helpful for seeing jitter or identifying unusual events. With sampling rate as high as 10 GS/s WaveStream is an excellent runt or glitch finder.



EMBEDDED SYSTEM DESIGN AND DEBUG

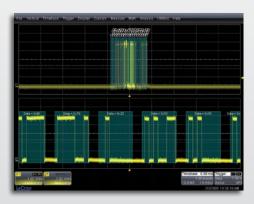


High-performance MSO

The MSO MXs-B models provide an easy way to capture and display analog and digital signals side by side. With the ability to capture 250 MHz signals at 1 GS/s sample rate on 18 lines simultaneously the MSO MXs-B delivers performance that other MSOs cannot. Memory and sample rate are never shared with analog channels and no special modes are required to get full performance. The MSO MXs-B deliver uncompromised performance in all situations.

Serial Data Trigger and Decode

Debugging serial data busses can be confusing and time consuming. The serial data trigger and decode options for WaveSurfer MXs-B and MSO MXs-B provide time saving tools for serial bus debug and validation.



The serial data trigger will quickly isolate events on a bus eliminating the need to set manual triggers and hoping to catch the right information. Trigger conditions can be entered in binary or hexadecimal formats and conditional trigger capabilities even allow triggering on a range of different events.

Protocol decoding is shown directly on the waveform with an intuitive, color-coded overlay and presented in binary, hex or ASCII. Decoding on the WaveSurfer is fast even with long memory and zooming in to the waveform shows precise byte by byte decoding.

To further simplify the debug process all decoded data can be displayed in a table below the waveform grid. Selecting an entry in the table with the touch screen will display just that event. Additionally, built-in search functionality will find specific decoded values.

Supported Serial Data Protocols

- I²C, SPI, UART
- CAN, LIN, FlexRay™
- USB 1.0/1.1/2.0, USB 2.0-HSIC
- Audio (l²S, LJ, RJ, TDM)
- MIL-STD-1553, ARINC 429
- MIPI D-PHY, DigRF 3G, DigRF v4

LABNOTEBOOK™

A UNIQUE TOOL FOR DOCUMENTATION AND REPORT GENERATION

The LabNotebook feature of WaveSurfer MXs-B and MSO MXs-B provides a report generation tool to save and document all your work. Saving all displayed waveforms, relevant settings, and screen images is all done through LabNotebook, eliminating the need to navigate multiple menus to save all these files independently.

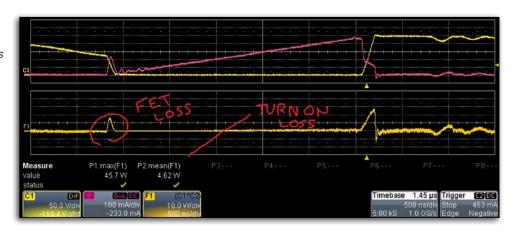


Easy report generation helps you share your findings and communicate important results.

LabNotebook adds a simple way to report your work and save all essential waveforms, settings, and screen images. Quickly save all the necessary files with LabNotebook in a single button press.

Recall your settings from any report by using the Flashback capability.

The touch screen and stylus allow for easy annotation of the screen. LabNotebookallows you to add freehand text and graphics in multiple colors along with printed text and arrows to help identify important parts of your waveforms and measurements. Annotated screen captures can be included in custom reports.



BROAD RANGE OF PROBING SOLUTIONS

WaveSurfer MXs-B and MSO MXs-B support a broad range of probes for a variety of applications.

ZS Series High Impedance Active Probes

- 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



High-Voltage Passive Probes

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



Current Probes

- Range of probes from 30 A_{rms} (50 A_{peak}) to 500 A_{rms} (700 A_{peak})
- 2 MHz to 100 MHz bandwidths
- Small form factor accommodates large conductors with small jaw size
- LeCroy ProBus system

ZD Series Differential Probes

- 200 MHz, 500 MHz, 1 GHz and 1.5 GHz bandwidths
- Wide range of probing accessories
- LeCroy ProBus system



High-Voltage Differential Probes

- 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



AP031

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



SPECIFICATIONS

Analog Channels – Vertical	WaveSurfer 24MXs-B	WaveSurfer 44MXs-B MSO 44MXs-B	WaveSurfer 42MXs-B	WaveSurfer 64MXs-B MSO 64MXs-B	WaveSurfer 62MXs-B	WaveSurfer 104MXs-B MSO 104MXs-B
Bandwidth (@ 50 Ω)	200 MHz	400 MHz	400 MHz	600 MHz	600 MHz	1 GHz
Rise Time	1.75 ns	875 ps	875 ps	525 ps	525 ps	350 ps
Input Channels	4	4	2	4	2	4
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)		(typical); ±1.5% of fu		(warranted)		
Accuracy		.,,	·			
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 Vrms 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 5					
Analog Channels – Acquisition Sample Rate (Single shot)	2.5 GS/s	5	GS/s	,	5 GS/s 10 GS/s Interleaved	A)
(Single-shot)	F0.00/-				10 GS/s interleaved	(ג
Sample Rate (Repetitive)	50 GS/s					
Record Length		annels), 32 Mpts (inte				
Capture Time		ll sample rate on all fo				
Acquisition Modes		S (Random Interleave ents with 1µs intersec		Stream (Fast Viewing	Mode), Sequence (Segmented Memory
Time Base Range	200 ps/div-1000 s	/div (roll mode from 5	600 ms/div–1000 s/d	liv)		
Time Base Accuracy	≤ 5 ppm @ 25 °C (typical) (≤ 10 ppm @ 5	5–40 °C)			
Digital Channels - Vertical		10 (D0 D17)		10 (D0 D17)		40 (00 047)
Input Channels		18 (D0–D17)		18 (D0–D17)		18 (D0–D17)
Input Impedance		100 kΩ 5.0 pF		100 kΩ 5.0 pF		100 kΩ 5.0 pF
Maximum Input Voltage		±30 V non-destruct		±30 V non-destruct		±30 V non-destruct
Threshold Groupings		D0-D8, D9-D17		D0-D8, D9-D17		D0-D8, D9-D17
Threshold Selections		TTL, ECL, CMOS, PECL, LVDS, User Defined		TTL, ECL, CMOS, PECL, LVDS, User Defined		TTL, ECL, CMOS, PECL, LVDS, User Defined
Digital Channels - Acquisition						
Sample Rate		1 GS/s		1 GS/s		1 GS/s
Record Length		10 Mpts/Ch		10 Mpts/Ch		10 Mpts/Ch
Minimum Detectable Pulse Width		2 ns		2 ns		2 ns
Maximum Input Frequency		250 MHz		250 MHz		250 MHz

SPECIFICATIONS

T . 0.4	WaveSurfer 24MXs-B	WaveSurfer 44MXs-B	WaveSurfer 42MXs-B	WaveSurfer 64MXs-B	WaveSurfer 62MXs-B	WaveSurfer 104MXs-B
Trigger System		MSO 44MXs-B		MSO 64MXs-B		MSO 104MXs-B
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, LF					
Pre-trigger Delay	0–100% of full sca					
Post-trigger Delay	0–10,000 divisions					
Trigger Hold-off		1,000,000,000 events	S			
Internal Trigger Level Range	±4.1 div from cent	er				
External Trigger Range	EXT/10 ±4V; EXT =					
Trigger Types	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)					
Probes						
Standard Probes		One	PP009 (5 mm) per (channel		One PP011 (5 mm)
Probing System	BNC and LeCroy F	roBus for Active voltage	ge, current and diffe	erential probes		
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Measure, Zoom, and	d Math Tools					
Measurement	Up to 6 of the follo	owing parameters car	n be calculated at or	ne time on any wavefo	rm: Amplitude, Are	ea, Base (Low), Delay
Parameters	Period, Peak-Peak	.,	0%–90%), Rise Tir	ency, Maximum, Mean ne (20%–80%), RMS,		
Zooming				mouse to draw a box	around the zoom a	ırea.
Math Functions	Use front panel QuickZoom button, or use touch screen or mouse to draw a box around the zoom area. Functions include Sum, Difference, Product, Ratio, Absolute Value, Averaging (summed and continuous), Derivative, Envelope, Enhanced Resolution (to 11-bits), Floor, Integral, Invert, Reciprocal, Rescale (change scale and units), Roof, Square, Square Root and FFT (up to 1 Mpts with power spectrum output and rectangular, VonHann, and FlatTop windows). 1 math function may be defined at a time, 2 functions may be chained together.					
Display System						
Display Type	Color, 10.4" TFT-L	CD Touch Screen				
Display Resolution	SVGA: 800 x 600 p	pixels				
Connectivity						
Ethernet Port	10/100/1000Base-	T Ethernet interface (R	RJ-45 connector)			
USB Ports	(5) USB Ports					
GPIB Port (Optional)	Supports IEEE – 48	88.2				
External Monitor Port	Standard 15-pin D-Type SVGA-compatible DB-15 connector					
Remote Control	Via Windows Auto	mation, or via LeCroy	Remote Command	Set		
Network Communication	VXI-11 or VICP, LX	I Class C Compliant				
Standard						
Physical						
Dimensions (HWD)	260 mm x 340 mn	n x 152 mm Excluding	accessories and pro	ojections (10.25" x 13.4	√ × 6")	
Net Weight	7.26 kg. (16.0 lbs.)					

ORDERING INFORMATION

Product Description Product Code

WaveSurfer MXs-B Oscilloscopes

Traveourier mixts B Oscilloscopes	
200 MHz, 2.5 GS/s, 4 Ch, 16 Mpts/Ch DSO with 10.4" Color Touch Screen Display.	WaveSurfer 24MXs-B
32 Mpts Interleaved	
400 MHz, 5 GS/s, 2 Ch, 16 Mpts/Ch DSO	WaveSurfer 42MXs-B
with 10.4" Color Touch Screen Display.	
32 Mpts Interleaved	
400 MHz, 5 GS/s, 4 Ch, 16 Mpts/Ch DSO	WaveSurfer 44MXs-B
with 10.4" Color Touch Screen Display.	
32 Mpts Interleaved	
600 MHz,5 GS/s, 2 Ch, 16 Mpts/Ch DSO	WaveSurfer 62MXs-B
with 10.4" Color Touch Screen Display.	
10 GS/s, 32 Mpts Interleaved	
600 MHz,5 GS/s, 4 Ch, 16 Mpts/Ch DSO	WaveSurfer 64MXs-B
with 10.4" Color Touch Screen Display.	
10 GS/s, 32 Mpts Interleaved	
1 GHz, 5 GS/s, 4 Ch, 16 Mpts/Ch DSO	WaveSurfer 104MXs-B
with 10.4" Color Touch Screen Display.	
10 GS/s, 32 Mpts Interleaved	

MSO MXs-B Mixed Signal Oscilloscopes

400 MHz, 5 GS/s, 4+18 Ch, 16 Mpts/Ch MSO with	MSO 44MXs-B
10.4" Color Touch Screen Display. 32 Mpts Interleaved	
600 MHz, 5 GS/s, 4+18 Ch, 16 Mpts/Ch MSO	MSO 64MXs-B
with 10.4" Color Touch Screen Display.	
10 GS/s, 32 Mpts Interleaved	
1 GHz, 5 GS/s, 4+18 Ch, 16 Mpts/Ch MSO	MSO 104MXs-B
with 10.4" Color Touch Screen Display.	
10 GS/s, 32 Mpts Interleaved	

Included with Standard Configuration (WaveSurfer MXs-B and MSO MXs-B)

÷10, 500 MHz, 10 M Passive Probe (Total of 1 Per Channel), Getting Started Manual and Quick Reference Guide, Standard Ports: Ethernet, USB 2.0 (5), SVGA Video Out, Audio In/Out, Protective Front Cover, Anti-virus Software (Trial Version), Standard Commercial Calibration and Performance Certificate, 3-year Warranty

Included with MSO MXs-B

MS-250 Mixed Signal Oscilloscope Module, 18 Channel Digital Lead Set, LeCroy Bus and USB2.0 Cables (1.3 m), Ground Extenders (Qty. 20), Flexible Ground Leads (Qty. 5), Carrying Case, Operator's Manual and Quick Reference Guide

General Accessories

WSXs-KYBD
WSXs-MOUSE
USB2-GPIB
WSXs-HARDCASE
WSXs-SOFTCASE
WSXs-RACK
WSXs-POUCH

Mounting Accessory

WSXs-MS-CLAMP Clamp Mounting Stand

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
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

Product Description

Serial Data Options	
I ² C, SPI and UART Trigger and Decode Opti	on WSXs-EMB
I ² C Bus Trigger and Decode Option	WSXs-I2Cbus TD
UART and RS-232 Trigger and Decode Option	on WSXs-UART-RS232bus TD
CAN, LIN and FlexRay Trigger and Decode (Option WSXs-AUTO
SPI Bus Trigger and Decode Option	WSXs-SPIbus TD
LIN Trigger and Decode Option	WSXs-LINbus TD
CAN TD Trigger and Decode Option	WSXs-CANbus TD
FlexRay Trigger and Decode Option	WSXs-FlexRaybus TD
MIL-STD-1553 Trigger and Decode Option	WSXs-1553 TD
ARINC 429 Symbolic Decode Option	WSXs-ARINC429bus DSymbolic
USB 2.0 Decode Option	WSXs-USB2bus D
USB2-HSIC Decode Option	WSXs-USB2-HSICbus D
D-PHY Decode Option	WSXs-DPHYbus D
DigRF 3G Decode Option	WSXs-DigRF3Gbus D
DigRF v4 Decode Option	WSXs-DigRFv4bus D
Audiobus Trigger and Decode Option for I ² S, LJ, RJ, and TDM	WSXs-Audiobus TD

Product Code

Mixed Signal Solutions

3	
500 MHz, 18 Channels, 2 GS/s, 50 Mpts/ch Mixed	MS-500
Signal Oscilloscope Option	
250 MHz,36 Ch,1 GS/s,25 Mpts/ch (500MHz,18 Ch,2 GS/s,	MS-500-36
50 Mpts/ch Interleaved) Mixed Signal Option	
250 MHz, 18 Channels, 1 GS/s, 10 Mpts/ch Mixed Signal	MS-250
Oscilloscope Option (included in all WaveRunner MSO models)	

MSO MXs-B Accessories

PK400-1
PK400-2
PK400-3
MSO-3M
MSO-Mictor

Probes and Amplifiers*

	S1500-QUADPAK
High Impedance Active Probe	
Set of 4 ZS1000, 1 GHz, 0.9 pF, 1 M	S1000-QUADPAK
High Impedance Active Probe	
200 MHz, 3.5 pF, 1 M Active Differential Probe	ZD200
500 MHz, 1.0 pF, 1 M Active Differential Probe	ZD500
1 GHz, 1.0 pF, 1 M Active Differential Probe	ZD1000
1.5 GHz, 1.0 pF, 1 M Active Differential Probe	ZD1500
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} Pr	ulse CP030
30 A; 50 MHz Current Probe – AC/DC; 30 A _{rms} ; 50 A _{peak} Pr	ulse AP015
150 A; 10 MHz Current Probe - AC/DC; 150 A _{rms} ; 500 A _{pea}	ak 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
with Precision Voltage Source	

^{*}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





1-800-5-LeCroy

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