LeCroy

WaveSurfer® MXs-B and MSO MXs-B Oscilloscopes

200 MHz – 1 GHz

Engineered for Efficient Design and Debug

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

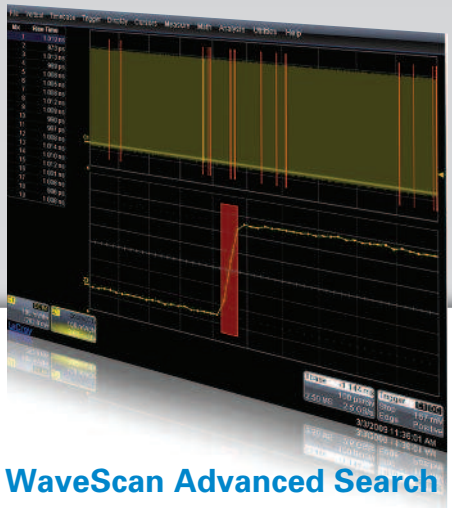
All the great features of the WaveSurfer MXs-B plus:

- 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.

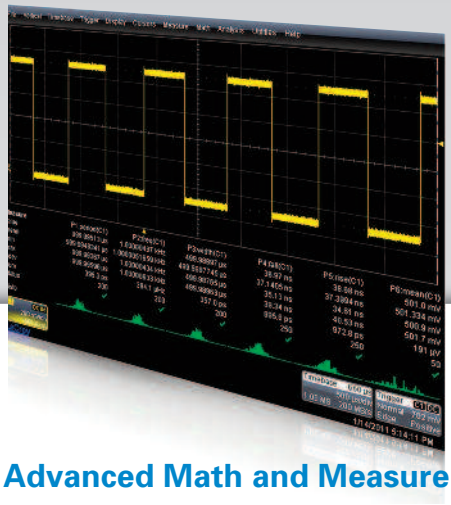
With up to 10 GS/s sample rate and 32 Mpts of memory WaveSurfer can capture large amounts of data at very high sample rates. Other oscilloscopes offer long memory but they bog down trying to process or display it. WaveSurfer handles large amounts of data quickly providing fast processing of long memory 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. The MSO MXs-B offer analog and digital cross-triggering plus measurement tools to help debug digital busses. LeCroy's WaveScan™ search and find tool will scan both analog and digital channels for anamolies plus scan multiple digital lines for a parallel bus pattern.



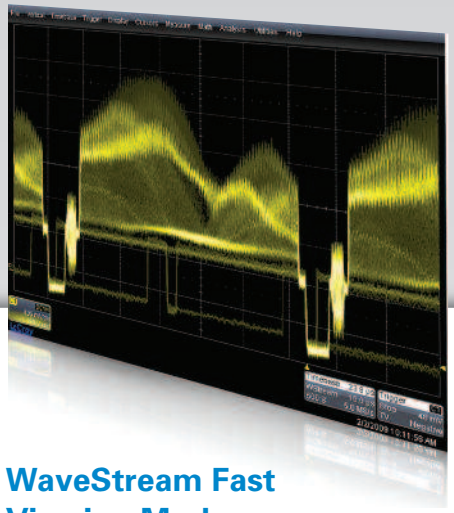
WaveScan Advanced Search

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.



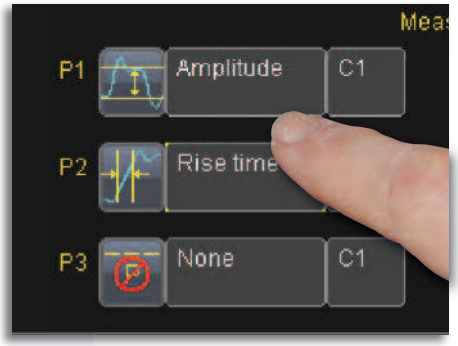
Advanced Math and Measure

With 18 math functions including averaging, enhanced rsolution 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.



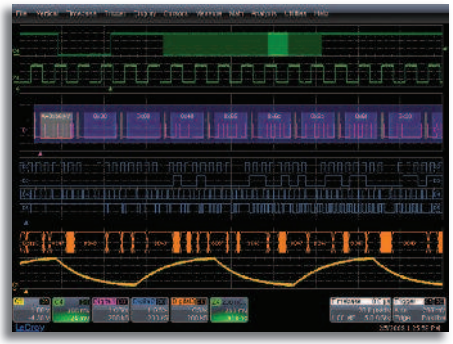
WaveStream Fast Viewing Mode

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.



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 I^2C, SPI, UART, RS-232, USB 1.0/1.1/2.0, USB 2.0-HSIC, Audio (I^2S, LJ, RJ, TDM), MIL-STD-1553, ARINC 429, MIPI D-PHY, DigRF, CAN, LIN and FlexRay™ trigger and decode options.

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.

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 MΩ)
- Extensive standard and available probe tip and ground connection accessories
- ±12 Vdc offset (ZS1500)
- 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 Passive Probes

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

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

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

AP031

- Lowest priced differential probe
- 15 MHz bandwidth
- 700 V maximum input voltage
- Works with any 1 MΩ 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) Accuracy	±1.0% of full scale (typical); ±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 MΩ: 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 50 Ω,					

Analog Channels – Acquisition						
Sample Rate (Single-shot)	2.5 GS/s	5 GS/s		5 GS/s (10 GS/s Interleaved)		
Sample Rate (Repetitive)	50 GS/s					
Record Length	16 Mpts/Ch (all channels), 32 Mpts (interleaved)					
Capture Time	Up to 2.5 ms at full sample rate on all four channels					
Acquisition Modes	Real Time, Roll, RIS (Random Interleaved Sampling), WaveStream (Fast Viewing Mode), Sequence (Segmented Memory up to 5,000 segments)					
Time Base Range	200 ps/div–1000 s/div (roll mode from 500 ms/div–1000 s/div)					
Time Base Accuracy	≤ 5 ppm @ 25 °C (typical) (≤ 10 ppm @ 5–40 °C)					

Digital Channels – Vertical						
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

Trigger System	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
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					
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) per channel
Probing System	BNC and LeCroy ProBus for Active voltage, current and differential probes					

Measure, Zoom, and Math Tools	
Measurement Parameters	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.
Math Functions	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-LCD Touch Screen
Display Resolution	SVGA: 800 x 600 pixels

Connectivity	
Ethernet Port	10/100/1000Base-T Ethernet interface (RJ-45 connector)
USB Ports	(5) USB Ports
GPIB Port (Optional)	Supports IEEE – 488.2
External Monitor Port	Standard 15-pin D-Type SVGA-compatible DB-15 connector
Remote Control	Via Windows Automation, or via LeCroy Remote Command Set
Network Communication Standard	VXI-11 or VICP, LXI Class C Compliant

Physical	
Dimensions (HWD)	260 mm x 340 mm x 152 mm Excluding accessories and projections (10.25" x 13.4" x 6")
Net Weight	7.26 kg. (16.0 lbs.)

ORDERING INFORMATION

Product Description	Product Code
WaveSurfer MXs-B Oscilloscopes	
200 MHz, 2.5 GS/s, 4 Ch, 16 Mpts/Ch DSO with 10.4" Color Touch Screen Display. 32 Mpts Interleaved	WaveSurfer 24MXs-B
400 MHz, 5 GS/s, 2 Ch, 16 Mpts/Ch DSO with 10.4" Color Touch Screen Display. 32 Mpts Interleaved	WaveSurfer 42MXs-B
400 MHz, 5 GS/s, 4 Ch, 16 Mpts/Ch DSO with 10.4" Color Touch Screen Display. 32 Mpts Interleaved	WaveSurfer 44MXs-B
600 MHz,5 GS/s, 2 Ch, 16 Mpts/Ch DSO with 10.4" Color Touch Screen Display. 10 GS/s, 32 Mpts Interleaved	WaveSurfer 62MXs-B
600 MHz,5 GS/s, 4 Ch, 16 Mpts/Ch DSO with 10.4" Color Touch Screen Display. 10 GS/s, 32 Mpts Interleaved	WaveSurfer 64MXs-B
1 GHz, 5 GS/s, 4 Ch, 16 Mpts/Ch DSO with 10.4" Color Touch Screen Display. 10 GS/s, 32 Mpts Interleaved	WaveSurfer 104MXs-B
MSO MXs-B Mixed Signal Oscilloscopes	
400 MHz, 5 GS/s, 4+18 Ch, 16 Mpts/Ch MSO with 10.4" Color Touch Screen Display. 32 Mpts Interleaved	MSO 44MXs-B
600 MHz, 5 GS/s, 4+18 Ch, 16 Mpts/Ch MSO with 10.4" Color Touch Screen Display. 10 GS/s, 32 Mpts Interleaved	MSO 64MXs-B
1 GHz, 5 GS/s, 4+18 Ch, 16 Mpts/Ch MSO with 10.4" Color Touch Screen Display. 10 GS/s, 32 Mpts Interleaved	MSO 104MXs-B

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

÷10, 500 MHz, 10 MΩ 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

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
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	Product Code
Serial Data Options	
I^2C, SPI and UART Trigger and Decode Option	WSXs-EMB
I^2C Bus Trigger and Decode Option	WSXs-I2Cbus TD
UART and RS-232 Trigger and Decode Option	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^2S, LJ, RJ, and TDM	WSXs-Audiobus TD
Mixed Signal Solutions	
500 MHz, 18 Channels, 2 GS/s, 50 Mpts/ch Mixed Signal Oscilloscope Option	MS-500
250 MHz,36 Ch,1 GS/s,25 Mpts/ch (500MHz,18 Ch,2 GS/s, 50 Mpts/ch Interleaved) Mixed Signal Option	MS-500-36
250 MHz, 18 Channels, 1 GS/s, 10 Mpts/ch Mixed Signal Oscilloscope Option (included in all WaveRunner MSO models)	MS-250
MSO MXs-B Accessories	
Large Gripper Probe Set for 0.10 Inch (2.54 mm) Pin Pitch. Includes 10 Probes with Color-coded Leads	PK400-1
Medium Gripper Probe Set for 0.04 Inch (1.0 mm) Pin Pitch. Includes 10 Probes with Color-coded Leads	PK400-2
Small Gripper Probe Set for 0.008 Inch (0.2 mm) Pin Pitch. Includes 10 Probes with Color-coded Leads	PK400-3
18-pin 3M Interface Cable MSO-3M (Mates with 3M Part Number 2520-6002)	MSO-3M
36 Channel Mictor Connector (Includes 1 MSO-MICTOR-SHROUD)	MSO-Mictor
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
200 MHz, 3.5 pF, 1 MΩ Active Differential Probe	ZD200
500 MHz, 1.0 pF, 1 MΩ Active Differential Probe	ZD500
1 GHz, 1.0 pF, 1 MΩ Active Differential Probe	ZD1000
1.5 GHz, 1.0 pF, 1 MΩ 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} 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.

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