LeCroy

WavePro® 7000A Series Oscilloscopes

Fast, Accurate WaveShape Analysis in an Easy-to-use Oscilloscope

High-end Performance Priced to Offer Outstanding Value

The WavePro 7000A Series oscilloscope offers the sophisticated analysis capability of a top line oscilloscope with the all-round utility of a general purpose instrument. In 1 GHz to 3 GHz bandwidth applications, the WavePro delivers fast, accurate measurements associated more often with high-end lab oscilloscopes. Common Jitter and Timing measurements for clock and timing analysis enhance its capabilities. Wrap this performance in a very attractive price, and the LeCroy WavePro oscilloscope is the ideal solution for your test needs.

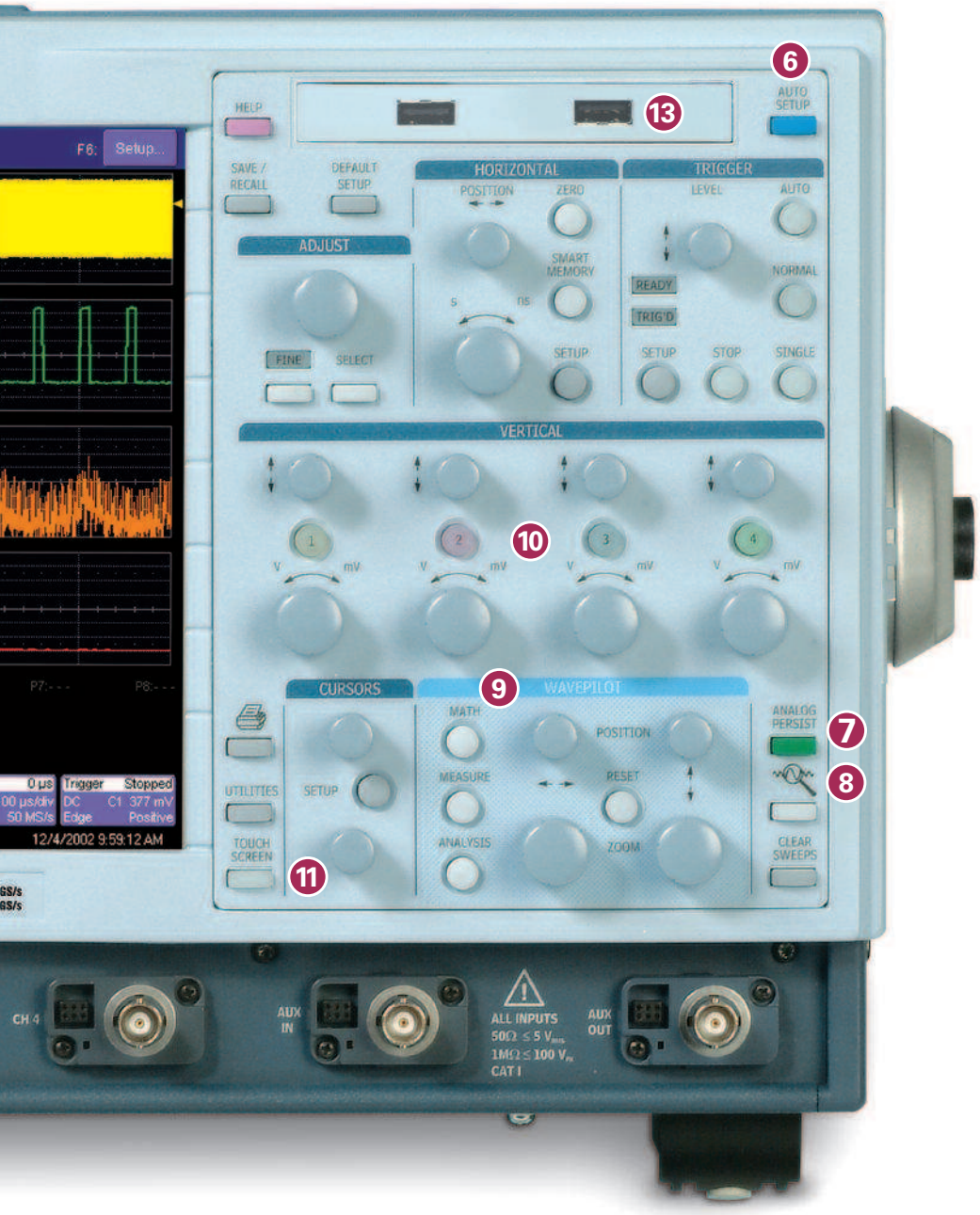
Performance Highlights:

- 10 GS/s single-shot sample rate on all channels (20 GS/s maximum) to capture signal details
- Up to 3 GHz with 50 Ω and 1 MΩ inputs
- Acquisition of up to 100 million data points to maintain high sampling rates and complex signals
- Over 80 jitter and timing measurements are standard
- 1 ps jitter noise floor
- Unique processing chain that enables the addition of customized measurements in the processing stream

1. **Deep Memory** – Offers 10 Mpts per channel standard memory. Options extend all the way up to 100 Mpts.
2. **Display** – Large 10.4" SVGA touch screen. View waveform details and measurement results without crowding.
3. **Accessories** – Passive, active, differential, and current probes as well as O/E converters can be connected to a WavePro oscilloscope.

4. **High Impedance Input** – All WavePro channels can be used at either 50 Ω or 1 MΩ, both selectable on the screen.

5. **X-Stream Technology** – Proprietary technology that enables data processing that is 80–150 times faster than other oscilloscopes.



6. **Auto Setup** – One button automatically calls up a signal on the display.

7. **Analog Persistence** – Switches between analog view and digital view so you can fully explore the signal's modulation.

8. **QuickZoom** – Automatically displays 10x magnified traces of all signals on multi-grids.

9. **Wavepilot** – Controls give easy access to powerful signal analysis capabilities so you can gain insight and trace problems directly to their source.

10. **Dedicated Vertical Controls** – Each channel has its own volts per division (V/div) and offset control knobs. You can control any channel by turning the knobs, eliminating the need to multiplex a single control across all four channels.

11. **Dedicated Cursor Controls** – Allows instant adjustment — even after you leave the cursor setup menu.

12. **Touch Screen (standard)** – Can be used with or without a mouse.

13. **Front access USB 2.0** – Provides convenient access for transferring waveform or setup data to flash memory keys, without the need to reach behind the oscilloscope.

Unleash the Breakthrough Power of X-Stream Technology

X-Stream Technology is an extremely fast streaming architecture that enables high throughput of data—even when the WavePro oscilloscope is performing complex measurements. It does so by eliminating the trade-offs between long memory lengths and quick processing.

It is 80–150 times faster in presenting waveform and math calculations than competitive oscilloscopes. It enables the engineer to insert third party tools into the processing stream, see real-time results on screen without the need to leave the lab and return to your desk PC. Any modifications to the test circuit requiring remeasurement can be done right then, while the set up is still in place.

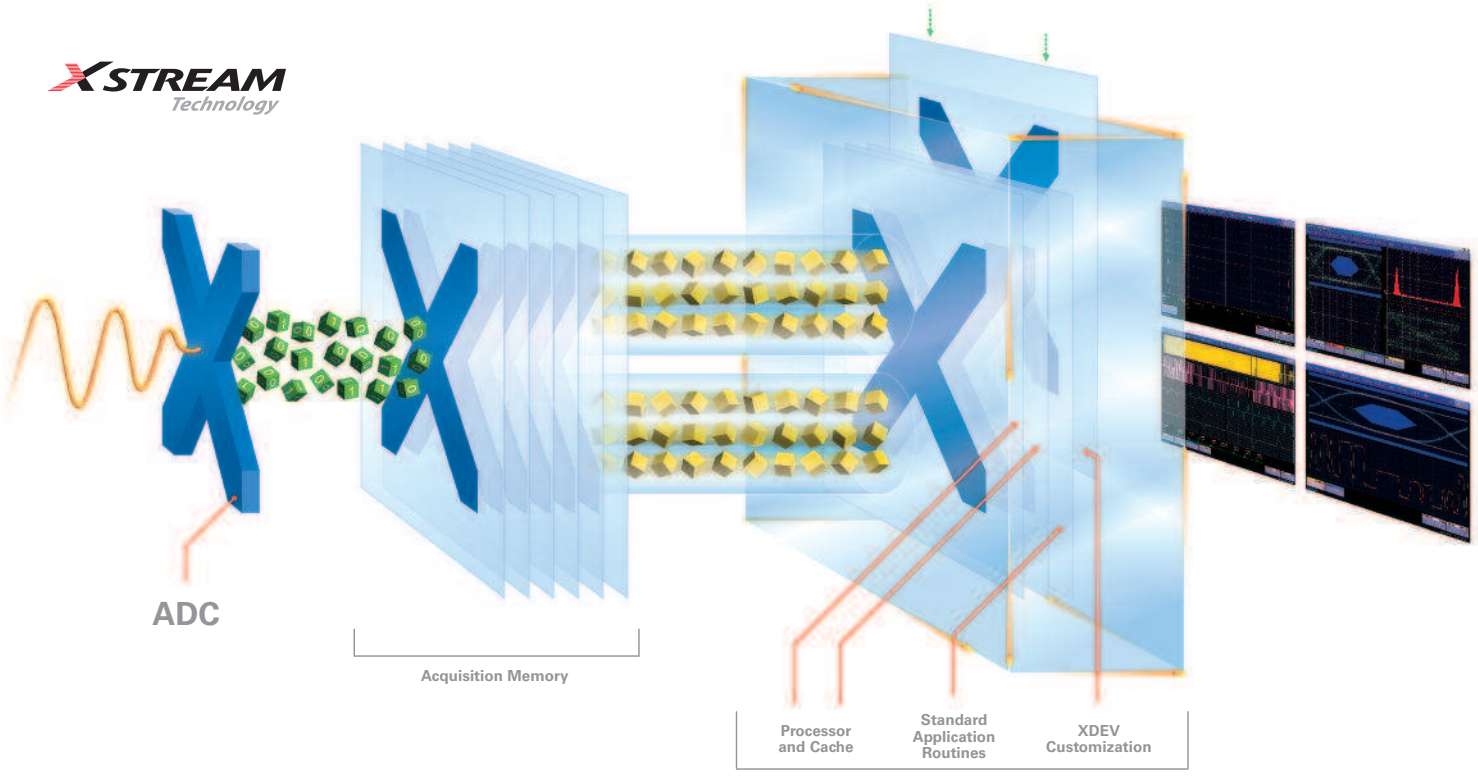
First-in-class Performance

LeCroy's proprietary CMOS memory accepts 10 GB/s of data in real time from each SiGe ADC, packetizes it, and speeds the data through dual high-speed pipelines to the CPU. Once in the CPU, LeCroy's proprietary software algorithms "capture" each packet, and perform many of the required calculations in the CPU's L1 cache memory.

With X-Stream Technology you can:

- Capture and analyze long records faster than ever before
- Utilize advanced tools for detailed analysis
- Customize your measurement capability

This process eliminates the "fetching" of data and math instructions from RAM to minimize calculation time. It also allows user-created functions and measurements to be inserted using our Advanced Customization software package (XDEV) option.

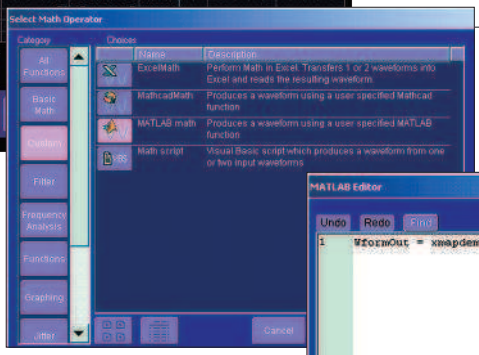


Customize the User Interface to Meet Specific Needs

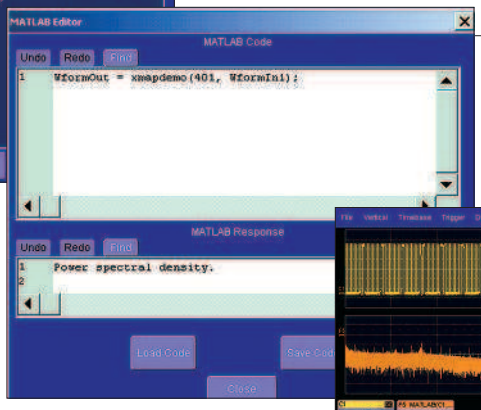
X-Stream Technology enables the insertion of user's custom analysis routines directly into the processing chain of the WavePro oscilloscope. Easily write a Visual Basic script, MATLAB,® Mathcad,® or Excel function and seamlessly integrate it into the oscilloscope's processing chain without running "off line," establish a remote communication between the oscilloscope and another program, create a new reference waveform, or transfer large data files between the oscilloscope and another program.

- Port tools such as filters from your simulation environment into the oscilloscope to compare simulated signals with actual circuit performance. Validate if circuit performance matches the model, and reduce characterization time.
- Build your own user interface. Add push buttons, frames, custom controls.

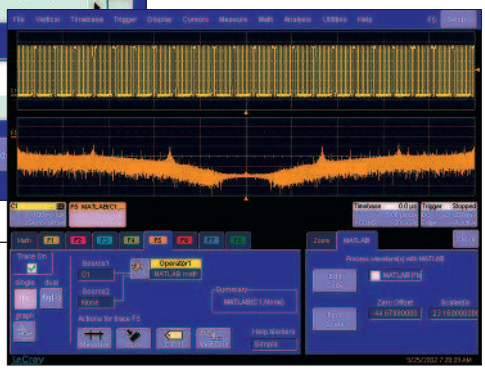
Insert proprietary calculations into the processing stream. *See your parameter or math function updates live on every trigger. You can use all the oscilloscope tools on your custom measurement, including cursors, parameters, persistence display, FFT, or any other oscilloscope capability.*



First, source a customized algorithm.



Then load it.



Now display the calculated results.

One-touch Control Equals Frictionless Testing

Operation of the WavePro oscilloscope is easy and intuitive. The descriptor fields show the oscilloscope settings and status. Touch the screen once to open a setup dialog and change settings. Touch "Measure" and "Horizontal" descriptors to see multiple common timing parameters. Math, histograms, statistics, and other analysis tools are all within two touches.

One-touch Equals Higher Productivity

Adjust the timebase, voltage, and cursors from the front panel knobs or use the most advanced touch screen user interface in oscilloscopes today. Getting to parameter measurements is fast and graphical. It's highly intuitive and adaptable to a busy engineer's working style.

Large Display for Sharp Trace Images

All WavePro 7000A oscilloscopes models have a 10.4" SVGA touch screen display with a waveform viewing area, (standard).

Powerful Zoom Functions

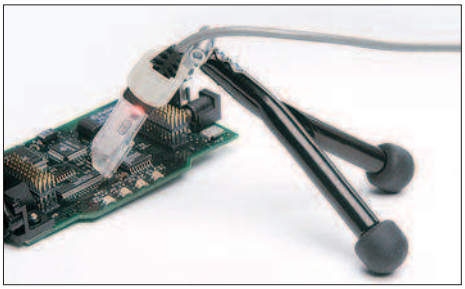
WavePro oscilloscopes have the ability to create up to eight unique zoom or math traces, each analyzing a different segment of the waveform. Calculations can be performed on the zoomed areas. A Multi-Zoom feature allows you to view time-correlated events, and Auto-Scroll is available to roll through the waveform.

More Data—More Insights

Another unique viewing capability is Histicons—small histogram views that provide a visual indication of parameter distributions. Up to eight Histicons and their accompanying statistics can be displayed simultaneously without adversely affecting the processing time.

Probes

The LeCroy HFP Series of Active Voltage Probes have a versatile, small, and lightweight design with high bandwidth from 1 GHz to 2.5 GHz. The HFP Series include five interchangeable styles of tips to make probing easier than ever. In addition to a traditional straight probe tip, a sharp tip allows easier access to tightly-packed test points and circuit vias.



HFP Probe

A Comprehensive Suite of Analysis Options

The WavePro 7000A Series takes WaveShape Analysis options to a new level. The following software packages dramatically expand the capabilities of WavePro oscilloscopes and enable engineers to trouble-shoot circuits in more productive ways.

Advanced Math Software Package (XMATH)

It provides more than 30 math functions and 40 parameter measurements.

Advanced Customization Software Package (XDEV)

This package allows you to create your own scripts for measurement parameters or math functions using third-party software packages such as Excel, MATLAB, and Mathcad.

Jitter and Timing Analysis Software Package (JTA2)

This package shows modulation effects and intermittent signal jitter to track timing changes, and to debug in the time, frequency, and statistical domains. Views like Jitter Track and Jitter Histogram let you see system variability in ways that you have never imagined.

Master Analysis Software Package (XMAP)

It provides maximum capability and flexibility, and includes all the functionality present in XMATH, XDEV, and JTA2.

Digital Filter Software Package (DFP2)

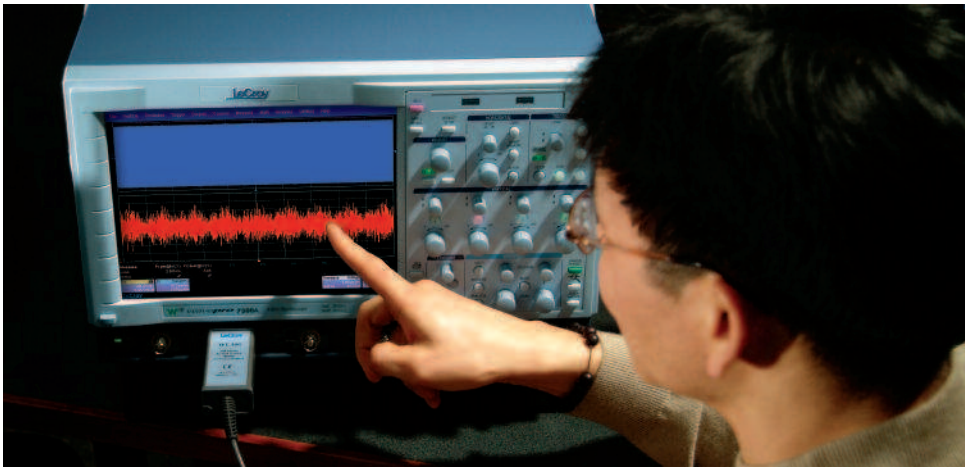
It lets you add any of a set of linear-phase Finite Impulse Response (FIR) filters. It enhances your ability to examine important signal components by filtering out undesired spectral components such as noise. Use the standard filters or create your own.

The Disk Drive Measurements Software Package (DDM2)

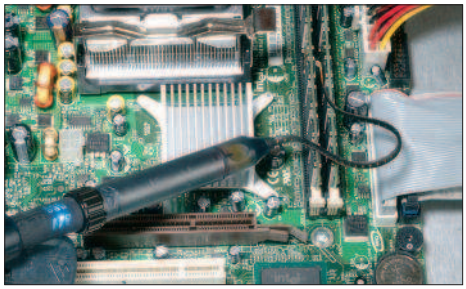
This package adds dozens of new disk drive measurements. DDM2, combined with WavePro sequence triggering and SMART Triggers™, offers the perfect solution for failure analysis when testing disk drives.

Advanced Optical Recording Measurement Software Package (AORM)

It provides 8 timing and 9 amplitude analysis parameters for characterizing CD/DVD and experimental optical storage systems.



For differential measurements, the WaveLink® Series of high bandwidth probes combine with WavePro to complete the measurement system. Best-in-class circuit loading characteristics and exceptional frequency response flatness accuracy maintain signal fidelity through the entire measurement system. AutoColorID lights in the probe handle show the channel trace color to quickly identify which probe is driving which channel. Visit www.lecroy.com for more information.



WaveLink D600ST

Specifications

Vertical System	WavePro 7300A	WavePro 7200A	WavePro 7100A	WavePro 7300A XXL	WavePro 7200A XXL	WavePro 7100A XXL
Analog Bandwidth (-3 dB, 50 Ω ≥ 10 mV/div)	3 GHz	2 GHz	1 GHz	3 GHz	2 GHz	1 GHz
Rise Time (Typical)	150 ps	225 ps	400 ps	150 ps	225 ps	400 ps
Input Channels	4					
Bandwidth Limiters	25 MHz; 200 MHz					
Input Impedance	50 Ω or 1 MΩ ‖ 15 pF; 10 MΩ ‖ 11 pF with PP005A Probe					
Input Coupling	1 MΩ: AC, DC, GND; 50 Ω: DC					
Maximum Input Voltage	50 Ω: 5 V_{rms}, 1 MΩ: 100 V max. (peak AC: ≤ 5 kHz + DC)					
Channel-Channel Isolation	250:1 at same V/div setting, 40:1 at 3 GHz					
Vertical Resolution	8 bits; up to 11 bits with enhanced resolution (ERES)					
Sensitivity	50 Ω: 2 mV–1 V/div, fully variable; 1 MΩ: 2 mV–2 V/div, fully variable					
DC Gain Accuracy	±1.5% of full scale; (±1% typical)					
Offset Range	50 Ω: ±700 mV @ 2–4.95 mV/div ±1.5 V @ 5–100 mV/div ±10 V @ 0.102-1 V/div 1 MΩ: ±700 mV @ 2–4.95 mV/div ±1.5 V @ 5–100 mV/div ±20 V @ 0.102–2 V/div					
Offset Accuracy	±(1.5% of full scale + 0.5% of offset value + 2 mV)					

Horizontal System

Timebase	Internal timebase common to 4 input channels; an external clock may be applied at the auxiliary input
Time/Division Range	200 ps/div–10 s/div; RIS mode: to 20 ps/div; Roll mode: up to 1000 s/div
Clock Accuracy	≤ 10 ppm
Time Interval Accuracy	≤ 0.06 / SR + (10 ppm * Reading) (rms)
Sample Rate and Delay Time Accuracy	±5 ppm ≤ 10 s interval
Jitter Noise Floor	1 ps rms @ 100 mV/div (typical)
Trigger and Interpolator Jitter	2.5 ps rms (typical)
Channel-Channel Deskew Range	±9 x time/div. setting, 100 ms max., each channel
External Clock	30 MHz–1 GHz; 50 Ω impedance; applied at the auxiliary input

Acquisition System

Single-Shot Sample Rate/Ch	10 GS/s	
2 Channel Max.	20 GS/s	
Random Interleaved Sampling (RIS)	200 GS/s for repetitive signals: to 20 ps/div, Upper time/div limit function of sample rate and memory length settings	
Maximum Trigger Rate	150,000 waveforms/second (in Sequence Mode, up to 4 channels)	
Intersegment Time	≤ 6 µs	
Maximum Acquisition Points/Ch	(4 Ch / 2 Ch)	Max. Segments (Sequence Mode)
Standard	10M / 20M	5000
VL – Memory Option	16M / 32M	10,000
XL – Memory Option	24M / 48M	20,000
XLL versions	50M / 100M	25,000

Acquisition Processing

Averaging	Summed or continuous averaging up 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, External, Ext X10, Ext/10, or line; slope and level unique to each source (except line trigger)
Coupling	DC

Specifications

Triggering System (continued)

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	2 ns to 20 s or from 1 to 99,999,999 events
Internal Trigger Range	±5 div from center

	WavePro 7300A	WavePro 7200A	WavePro 7100A	WavePro 7300A XXL	WavePro 7200A XXL	WavePro 7100A XXL
Trigger Sensitivity (edge) (Ch 1-4 and External)	2 div < 3 GHz 1 div < 2 GHz	2 div < 2 GHz 1 div < 1.8 GHz	2 div < 1 GHz 1 div < 750 MHz	2 div < 3 GHz 1 div < 2 GHz	2 div < 2 GHz 1 div < 1.8 GHz	2 div < 1 GHz 1 div < 750 MHz
Max. Trigger Frequency, SMART Trigger	750 MHz					

Basic Triggers

Edge	Triggers when signal meets slope (positive or negative) and level condition.

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.
Dropout	Triggers if signal drops out for longer than selected time between 2 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.

SMART Triggers with Exclusion Technology

Glitch and Pulse Width	Triggers on positive or negative glitches with widths selectable from 600 ps to 20 s or on intermittent faults (subject to bandwidth limit of oscilloscope)
Signal or Pattern Interval	Triggers on intervals selectable between 2 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 2 ns to 20 s, or 1 to 99,999,999 events.
Exclusion Triggering	Trigger on intermittent faults by specifying the normal width or period.

Automatic Setup

Auto Setup	Automatically sets timebase, trigger, and sensitivity to display a wide range of repetitive signals.
Vertical Find Scale	Automatically sets the vertical sensitivity and offset for the selected channels to display a waveform with maximum dynamic range.

Probes

Probes	(4) PP005A ÷10, 10 MΩ passive probes
Probe System: Probus	Automatically detects and supports a variety of compatible probes
Scale Factors	Automatically or manually selected depending on probe used

Color Waveform Display

Type	Color 10.4" flat-panel TFT-LCD with high resolution touch screen
Resolution	SVGA; 800 x 600 pixels
Number of Traces	Display a maximum of 8 traces. Simultaneously display channel, zoom, memory, and math traces
Grid Styles	Auto, Single, Dual, Quad, Octal, XY, Single + XY, Dual + XY
Waveform Styles	Sample dots joined or dots only

Analog Persistence Display

Analog and Color-Graded Persistence	Variable saturation levels; stores each trace's persistence data in memory.
Persistence Selections	Select analog, color, or three-dimensional
Trace Selection	Activate persistence on all or any combination of traces
Persistence Aging Time	Select from 500 ms to infinity
Sweeps Displayed	All accumulated, or all accumulated with last trace highlighted

Zoom Expansion Traces

	Display up to 4 Zoom and 4 Math/Zoom traces; 8 Math/Zoom traces available with XMAP (Master Analysis software package) or XMATH (Advanced Math software package)

Specifications

CPU

Processor	Processor Intel® Pentium® 4 @ 2.54 GHz (or better) with Microsoft Windows® XP Professional
Processing Memory	Up to 2 Gbytes
Realtime Clock	Dates, hours, minutes, seconds displayed with waveform SNTP support to synchronize to precision internet clocks

Internal Waveform Memory

	M1, M2, M3, M4 Internal Waveform Memory (store full-length waveforms with 16 bits/data point) or store to any number of files limited only by data storage media

Setup Storage

Front Panel and Instrument Status	Store to the internal hard drive, over a network or to a USB-connected peripheral device

Interface

Remote Control	Via Windows Automation, or via LeCroy Remote Command Set
GPIB Port (Optional)	Supports IEEE – 488.2
Ethernet Port	10/100Base-T Ethernet interface
USB Ports	USB 2.0 ports support Windows compatible devices
External Monitor Port Standard	15-pin D-Type SVGA-compatible
Parallel Port	1 standard

Auxiliary Input

Signal Types	Selected from External Trigger or External Clock input on front panel
Coupling	50 Ω: DC; 1 MΩ: AC, DC, GND
Max. Input Voltage	50 Ω: 5 V_{rms}; 1 MΩ 250 V (Peak AC < 10 kHz + DC)

Auxiliary Output

Signal Types	Select from calibrator, control signals or Off
Calibrator Signal	5 Hz–5 MHz square wave or DC level; 0.0 to 5.0 V into 50 Ω (0–1 V into 1 MΩ) or TTL volts (selectable)
Control Signals	Trigger enabled, trigger out, pass/fail status

General

Auto Calibration	Ensures specified DC and timing accuracy is maintained for 1 year minimum
Power Requirements	100–120 VAC at 50/60/400 Hz; 200–240 VAC at 50/60 Hz; Automatic AC Voltage selection Max. power consumption: 650 W/650 VA

Environmental

Temperature (Operating)	+5 ˚C to +40 ˚C including CD-ROM drives
Temperature (Non-Operating)	-20 ˚C to +60 ˚C
Humidity (Operating)	5% to 80% relative humidity (non-condensing) up to +30 ˚C Upper limit derates to 25% 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. (3048 m) at or below +25 ˚C
Altitude (Non-Operating)	up to 40,000 ft. (12,192 m)
Random Vibration (Operating)	0.31 g_{rms} 5 Hz to 500 Hz, 15 minutes in each of three orthogonal axes
Random Vibration (Non-Operating)	2.4 g_{rms} 5 Hz to 500 Hz, 15 minutes in each of three orthogonal axes
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)	264 mm x 397 mm x 491 mm; 10.4" x 15.6" x 19.3" (height excludes feet)
Weight	18 kg; 39 lbs.
Shipping Weight	24 kg; 53 lbs.

Certifications

	CE Compliant, UL and cUL listed; conforms to EN 61326-1, EN 61010-1, UL 3111-1, and CSA C22.2 No. 1010.1

Warranty and Service

	3-year warranty; calibration recommended annually Optional service programs include extended warranty, upgrades, and calibration services

Standard

Math Tools

Display up to four math function traces (F1–F4). 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
average (summed)
average (continuous)
derivative
deskew (resample)
difference (–)
enhanced resolution (to 11 bits vertical)
envelope
exp (base e)
exp (base 10)
fft (power spectrum, magnitude, phase, up to 25 kpts)
floor
histogram of 1000 events
integral
invert (negate)
log (base e)
log (base 10)
product (x)
ratio (/)
reciprocal
rescale (with units)
roof
(sinx)/x
square
square root
sum (+)
trend (datalog) of 1000 events
zoom (identity)

Measure Tools

Display any 8 parameters together with statistics, including their average, high, low, and standard deviations. Histicons provide a fast, dynamic view of parameters and wave shape characteristics.

amplitude
area
base
cycles
data
delay
Δ delay
duty cycle
duration
falltime (90–10%, 80–20%, @ level)
frequency
first
last
level @ x
maximum
mean
median
minimum
number of points
+overshoot
–overshoot
peak-to-peak
period
risetime (10–90%, 20–80%, @ level)
rms
std. deviation
top
width
median
phase
time @ minimum (min.)
time @ maximum (max.)
Δ time @ level
Δ time @ level from trigger
x@ max.
x@ min.

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.

Jitter and Timing

Parametric Measurements:

- period@level
- width@level
- duty@level
- frequency@level
- TIE@level
- edge@level

Statistical Analysis:

- Jitter Track
- Jitter Trend (1000 pts)
- Histograms (1000 pts)

Software Options

Advanced Math and WaveShape Analysis

Master Analysis Software Package (XMAP)

This package provides maximum capability and flexibility, and includes all the functionality present in XMATH, XDEV, and JTA2.

Advanced Math Software Package (XMATH)

This package provides a comprehensive set of signal WaveShape Analysis tools providing insight into the wave shape of complex signals. Additional capability provided by XMATH includes:

- 8 math traces total (4 additional)
- Parameter math – add, subtract, multiply, or divide two different parameters
- Histograms expanded with 19 histogram parameters and up to 2 billion events
- Trend (datalog) of up to 1 million events
- Track graphs of any measurement parameter
- FFT capability added to include: power averaging, power density, real and imaginary components, frequency domain parameters, and FFT on up to 25 Mpts.
- Narrow-band power measurements
- Auto-correlation function
- Sparse function
- Cubic and Quadratic Interpolation function

Advanced Customization Software Package (XDEV)

This package provides a set of tools to modify the oscilloscope and customize it to meet your unique needs. Additional capability provided by XDEV includes:

- Creation of your own measurement parameter or math function, using third-party software packages, and display the result in the oscilloscope. Supported third-party software packages include:
  - VBScript
  - MATLAB
  - Excel
  - Mathcad
- CustomDSO – create your own user interface in a oscilloscope dialog box.
- Addition of macro keys to run VBScript files
- Support for plug-ins

Jitter and Timing Analysis Software Package (JTA2)

This package provides jitter timing and analysis using time, frequency, and statistical views for common timing parameters, and also includes other useful tools. JTA2 includes:

- Jitter and timing parameters, with "Track" graphs of
  - Cycle-Cycle Jitter
  - N-Cycle
  - N-Cycle with start selection
  - Frequency
  - Period
  - Half Period
  - Width
  - Time Interval Error
  - Setup
  - Hold
  - Skew
  - Duty Cycle
  - Duty Cycle Error
- Edge@lv parameter (counts edges)
- 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 trace (mean, range, sigma)

Digital Filter Software Package (DFP2)

LeCroy's Digital Filter Package (DFP2) implements a set of linear-phase Finite Impulse Response (FIR) filters and IIR filters. It enhances the user's ability to examine important signal components by filtering out undesired spectral components such as noise. With the custom design feature, corrupted signals can be reconstructed by applying matched (mirror) filters to compensate for known distortions.

The DFP2 option has a broad range of applications:

- System Identification
- Prediction
- Noise Cancellation
- Low-pass Filters
- Band-stop Filters
- Band-pass Filters
- High-pass Filters
- Raised Cosine, Raised Root Cosine, and Gaussian Filters

Application Specific Test and Analysis Packages

Power Measure Analysis Package (PMA2)

This package provides exceptional ability to measure and analyze the operating characteristics of power conversion devices and circuits.

- Automatic setup and display of relevant waveforms and parameters
- Waveforms scaled and displayed in volts, amps, watts, ohms, etc.
- Power device performance analyzed in-circuit
- Measure and view time domain response of the entire control loop
- Pre-compliance line harmonic testing to EN 61000-3-2
- Complete solutions available including probes and differential amplifiers

Advanced Optical Recording Measurements (AORM)

The AORM option in our new-generation X-Stream oscilloscope environment provides a completely updated user interface and improved debug tools written to support ever-increasing read/write data rates and larger media capacity required for the latest CD and DVD implementations. Typical applications include game box technology and high-capacity DVD Read/Write.

The unique combination of deep acquisition memory available in LeCroy oscilloscopes and the flexibility of AORM in adapting to optical recording standards provides the user with ultimate measurement accuracy and 2-dimensional correlation of recording parameters.

Note: *AORM is supported in WavePro 7200A oscilloscopes and higher.*

Parameter Definition Table

Timing Analysis Parameters		Amplitude Analysis Parameters	
deltap2c	Data edge shift referred to clock	paa	Average amplitude of RF signal
deltap2cs	Standard deviation of deltap2c	pasym	Asymmetry of RF signal
edgsh	Pit or space width difference from ideal value	pbase	Base of pit or space
period	Period of each cycle of clock	pmax	Maximum of pit or space
pnum	Number of pit or space pair	pmidl	Middle voltage of pit or space
pwid	Width of pit or space pairs	pmin	Minimum of pit or space
t@pit	Delay of pit or space from trigger	pmoda	Modulation of RF signal
timj	Standard deviation of edgsh	pres	Resolution of RF signal
		ptop	Top of pit or space

Disk Drive Measurements Package (DDM2)

This package provides disk drive parameter measurements and related mathematical functions for performing disk drive WaveShape Analysis.

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

- Correlation function
- Trend (datalog) of up to 1 million events
- Histograms expanded with 18 histogram parameters and up to 2 billion events

Ordering Information

WavePro 4-Channel Digital Oscilloscopes	Product Code
4 Ch; 3 GHz; 10 GS/s; 10 Mpts/Ch; 20 Mpts/Ch 20 GS/s using 2 or 1 Ch; 50 Ω and 1 MΩ Input	WavePro 7300A
4 Ch; 2 GHz; 10 GS/s; 10 Mpts/Ch; 20 Mpts/Ch 20 GS/s using 2 or 1 Ch; 50 Ω and 1 MΩ Input	WavePro 7200A
4 Ch; 1 GHz; 10 GS/s; 10 Mpts/Ch; 20 Mpts/Ch 20 GS/s using 2 or 1 Ch; 50 Ω and 1 MΩ Input	WavePro 7100A

Memory Options	
24 Mpts/Ch (48 Mpts using 2 or 1 Ch)	WP7-XL
16 Mpts/Ch (32 Mpts using 2 or 1 Ch)	WP7-VL

Long Memory Versions	
4 Ch 3 GHz; 10 GS/s; 50 Mpts/Ch; 100 Mpts/Ch 20 GS/s using 2 or 1 Ch; 50 Ω and 1 MΩ Input	WavePro 7300A XXL
4 Ch 2 GHz; 10 GS/s; 50 Mpts/Ch; 100 Mpts/Ch 20 GS/s using 2 or 1 Ch; 50 Ω and 1 MΩ Input	WavePro 7200A XXL
4 Ch 1 GHz; 10 GS/s; 50 Mpts/Ch; 100 Mpts/Ch 20 GS/s using 2 or 1 Ch; 50 Ω and 1 MΩ Input	WavePro 7100A XXL

Included with Standard Configuration	
÷10, 500 MHz 10 MΩ Passive Probe (Qty. 4)	PP005A
Optical 3-button Wheel Mouse, USB 2.0	
Protective Front Cover	
Printed Operator's Manual	
Printed Getting Started Guide	
Printed Remote Control Manual	
Product Manual Set on CD-ROM	
Software Option Manual CD-ROM	
Norton Anti-virus Software (1 year subscription)	
Microsoft XP Pro License	
Commercial Calibration with Performance Certificate	
Power Cable for the Destination Country	
3-Year Warranty	

Software Options

Advanced Math and WaveShape Analysis Software Options	
Advanced Math Software Package	XMATH
Advanced Customization Software Package	XDEV
Processing Web Editor Software Package for Functions and Parameters	XWEB
Jitter and Timing Analysis Software Package	JTA2
Master Analysis Software Package (Includes JTA2, XMATH, and XDEV)	XMAP
Digital Filter Software Package	DFP2
8B/10B Decoding and Analysis Software Package	SDA-8B10B
Standard Compliance Software Options	
Serial Data Mask Software Package	SDM
Ethernet Test Software Package	ENET
USB 2.0 Compliance Test Software Package	USB2
Application Specific Test and Analysis Options	
Disk Drive Measurement Software Package	DDM2
Advanced Optical Recording Measurement Software Package	AORM*
PowerMeasure Analysis Software Package	PMA2
EMC Pulse Parameter Software Package	WP7-EMC

*For only WP7200A and WP7300A oscilloscopes.

Hardware Options and Accessories	
IEEE-488 GPIB Control Interface	GPIB-1
Internal Graphics Printer	WM-GP02
Removable Hard Drive Package (includes USB, CD-ROM, removable hard drive and spare hard drive)	WM-RHD
Additional Removable Hard Drive	WM-RHD-02
CD-ROM Read/Write Upgrade	WM-CDRW
Dual Monitor Display	DMD-1

Serial Data Options	Product Code
I2C Decode only Option	WP7K-I2Cbus TD
SPI Decode only Option	WP7K-SPIbus TD
CANbus TDM Trigger, Decode and Measure/Graph Option	CANbus TDM
CANbus TD Trigger and Decode Option	CANbus TD

Hardware and Software Option	
32 Digital Channel Oscilloscope Mixed Signal Option	MS-32-DSA

Selected Probes and Signal Conditioners	
Set of 4 ZS1500 High Impedance Active Probes	ZS1500-QUADPAK
Set of 4 ZS1000 High Impedance Active Probes	ZS1000-QUADPAK
÷10, 500 MHz 10 MΩ Passive Probe (4 included)	PP005A
SMT Probing Accessories for PPE Series, PP005A and PP065 Surface Mount Technology Products	PK106
2.5 GHz, 0.7 pF Active Probe (÷10), Small Form Factor	HFP2500
1.5 GHz, 0.7 pF Active Probe (÷10), Small Form Factor	HFP1500
WaveLink 4 GHz Differential Probe with Adjustable Tip Module	D300A-AT*
WaveLink 7 GHz, Differential Probe Small Tip Module	D600ST*
WaveLink 4 GHz, 5 V Differential Probe Small Tip Module	D350ST*
WaveLink 6 GHz, Differential Positioner Mounted Tip Probe Module	D500PT*
WaveLink ProBus Probe Body	WL300
1 GHz Active Differential Probe (÷1, ÷10, ÷20)	AP034
500 MHz Active Differential Probe (x10, ÷1, ÷10, ÷100)	AP033
Optical-to-Electrical Converter, 500–870 nm ProBus BNC Connector	OE425
Optical-to-Electrical Converter, 950–1630 nm ProBus BNC Connector	OE455
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
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
30 A; 50 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A_{peak} Pulse	AP015
1 Ch, 100 MHz Differential Amplifier with Precision Voltage Source	DA1855A
1,400 V, 100 MHz High-Voltage Differential Probe	ADP305
1,400 V, 20 MHz High-Voltage Differential Probe	ADP300

*For a complete probe, order WL300 Probe Body with Probe Tip Module

Selected Accessories	
Keyboard, USB	KYBD-1
Rackmount Adapter with 25" (64 cm) Slides	RMA-25
Rackmount Adapter with 30" (76 cm) Slides	RMA-30
Hard Transit Case	WM-TC1
Oscilloscope Cart with Additional Shelf and Drawer	OC1024
Oscilloscope Cart	OC1021
Additional Graphic Printer Paper (10 Rolls Pkg.)	GPR10
Video Trigger Module	VT75
Telecom Adapter Kit, 100 Ω Bal, 120 Ω Bal, 75 Ω Unbal	TF-ET
Ethernet Compliance Test Fixture for 10Base-T	TF-10BT
Ethernet Compliance Test Fixture for 100Base-T/1000Base-T [(Includes a Set of 2 Test Fixtures Signals on Twisted Pair Cables (UTP)]	TF-ENET
USB 2.0 Testing Compliance Test Fixture	TF-USB

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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