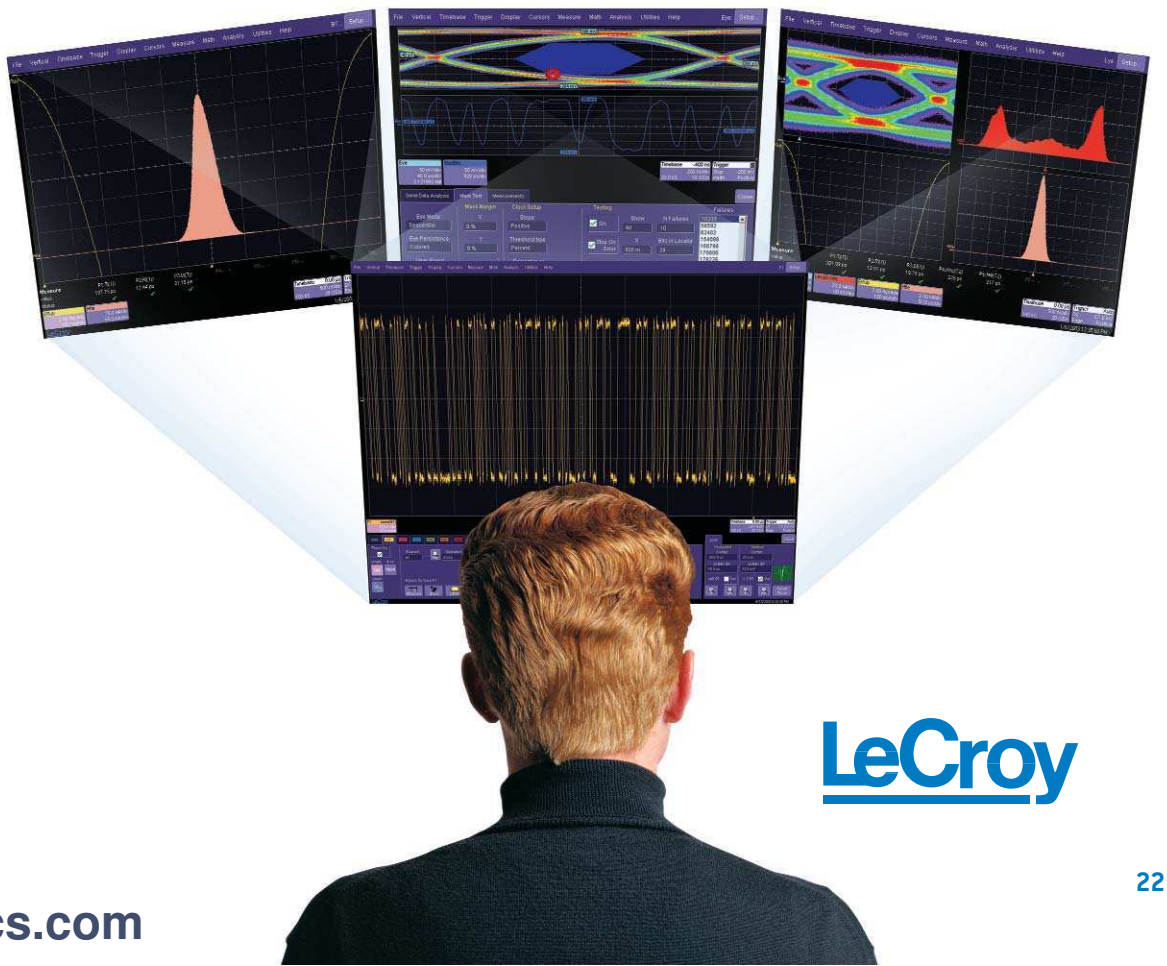
LeCroy

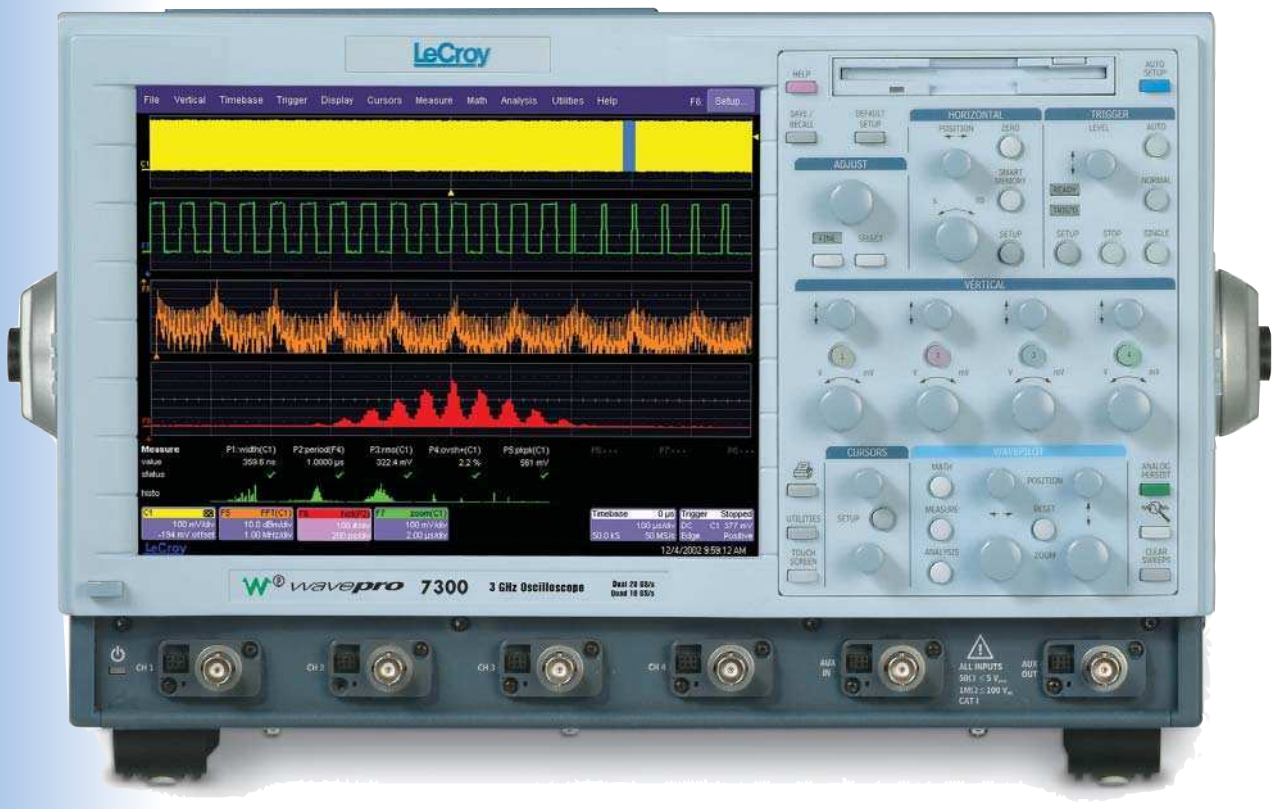
wavepro™

WavePro
DIGITAL OSCILLOSCOPES



LeCroy

Unleashing the Power of X-Stream Technology



Deep Memory—1 Mpts per channel standard memory. Options extend all the way to an industry-best 24 Mpts per channel.

Advanced Windows®—based operating system offers robust system performance, with an intuitive and informative user interface.

Display—Large 10.4" SVGA touch screen has 20% larger waveform display area than comparable oscilloscopes.

Accessories—Passive, active, and differential probes, as well as an O/E converter, can be connected to a WavePro DSO.

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

WavePilot—Controls give easy access to powerful signal analysis capabilities so you can gain insight and trace problems directly to their source.

QuickZoom—Automatically displays 10x magnified traces of all signals on multi-grids.

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

Auto SetUp—One button automatically calls up a signal on the display.

X-Stream Technology—Proprietary technology that enables data processing that is 10–100 times faster.

WavePro 7000 Series

MEASURE COMPLEX SIGNALS WITH CONFIDENCE

LeCroy has now integrated its industry leading SiGe ADC/amplifiers and groundbreaking X-Stream™ Technology into the WavePro DSO line. The WavePro 7000 Series brings fast and accurate measurement capability to 1 GHz and 3 GHz bandwidth applications. And it does it at an extremely attractive price.

Viewing a signal on a high-resolution screen is a good start, but today's engineering requires the ability to go inside the signal and conduct next-generation waveform measurement and analysis to get to the source of a problem. Such ability gives you far greater confidence in your measurements.

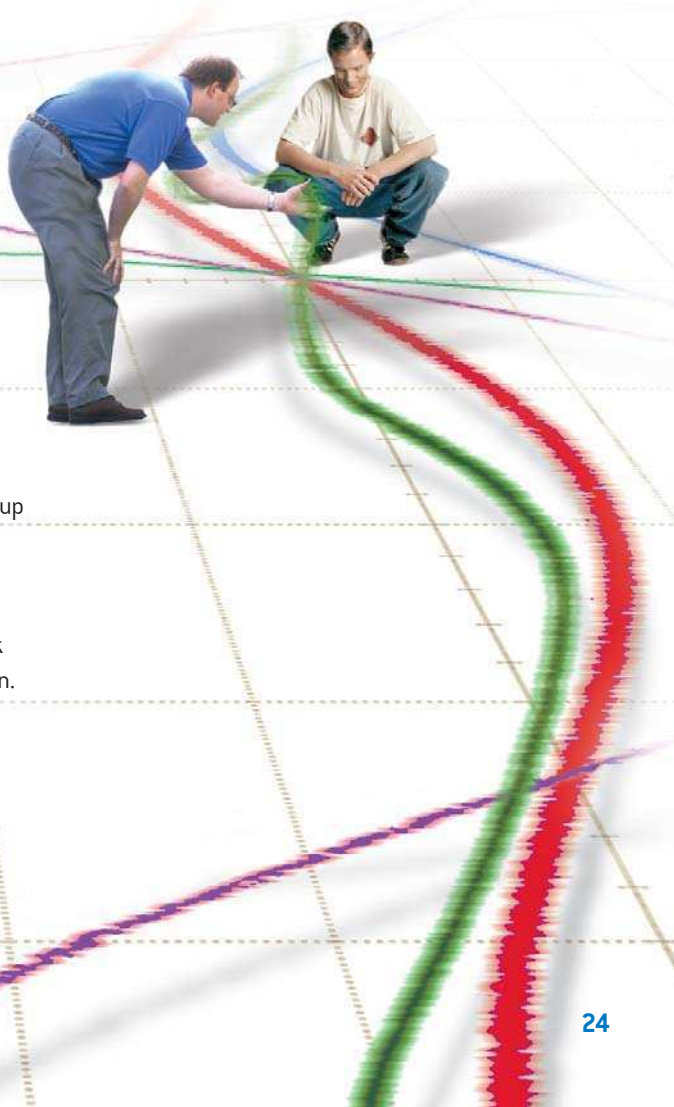
You can make faster more accurate more confident measurements with the WavePro 7000 Series through:

- Excellent signal integrity from SiGe amplifiers and ADCs
- GS/s single-shot sample rate on all channels (20 GS/s maximum) to capture signal details
- Acquisition of up to 48 million data points to maintain high sampling rates and complex signals
- Built-in 1 MΩ and 50 Ω selectable inputs
- 2 ps jitter noise floor
- Unique processing chain that gives you the ability to add customized measurements inside
- Fast WaveShape Analysis

LeCroy's proprietary X-Stream Technology is an extremely fast streaming architecture that eliminates the trade-offs between long record lengths and quick processing. The WavePro DSO, incorporating X-Stream Technology, can conduct WaveShape Analysis 10–100 times faster than any other oscilloscope in the 1 GHz – 3 GHz bandwidth class. That makes them excellent tools for next-generation designs, such as:

- Datacom/telecom standards development
- Gigabit Ethernet
- USB 2.0
- Advanced Military Designs
- Much, much, more

The WavePro oscilloscopes have a host of other features that simplify operation, such as a new processing web that makes it easy for you to setup measurements, a large color touch screen, and fast access to powerful capabilities. With our WavePro 7000 Series oscilloscopes, you'll never look at signal analysis the same way again.



WavePro 7000 Series

WavePro oscilloscopes are the only instruments in their bandwidth class that can accurately measure the long complex signals found in many of today's devices. That is because they fully incorporate LeCroy's proprietary X-Stream Technology. No other company can offer X-Stream Technology in any class. Only LeCroy can give you the measurement confidence you need to make sure your designs work.

WHAT IS X-STREAM TECHNOLOGY?

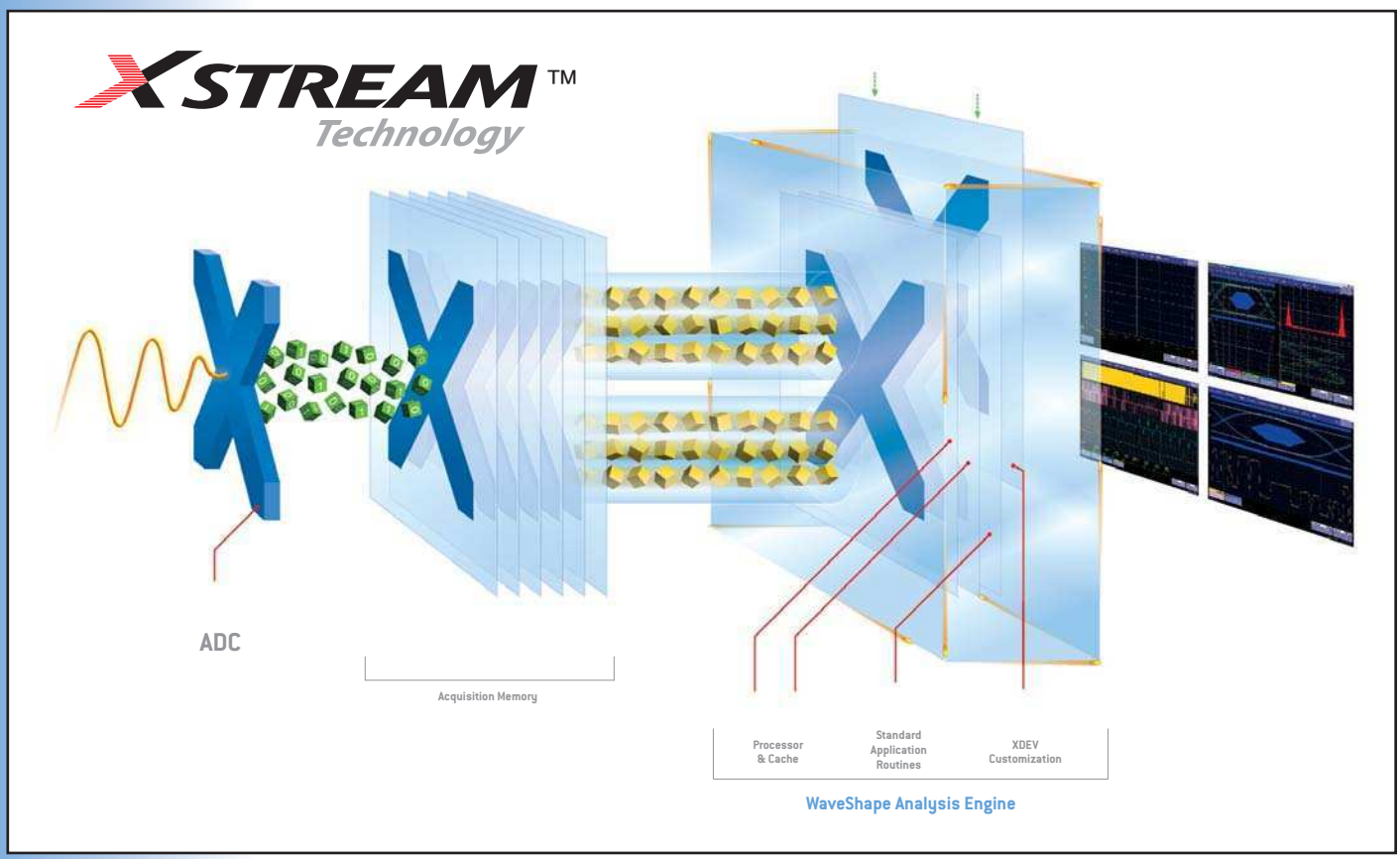
It's the foundation upon which LeCroy's WaveMaster and WavePro instruments rest. X-Stream Technology allows engineers to perform WaveShape Analysis at depths they could only dream about. X-Stream Technology makes those dreams come true by delivering extraordinary performance:

- Capture and analyze long records faster than ever before
- Utilize advanced tools for detailed analysis
- Customize your measurement capability
- Display your signal in 3D views and "Histicons" to see inside a signal

All of this is achieved because X-Stream Technology is an extremely fast streaming architecture that enables high throughput of data — even when the WavePro oscilloscopes are conducting complex measurements.

LeCroy's proprietary CMOS memory accepts 10 Gbytes 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.

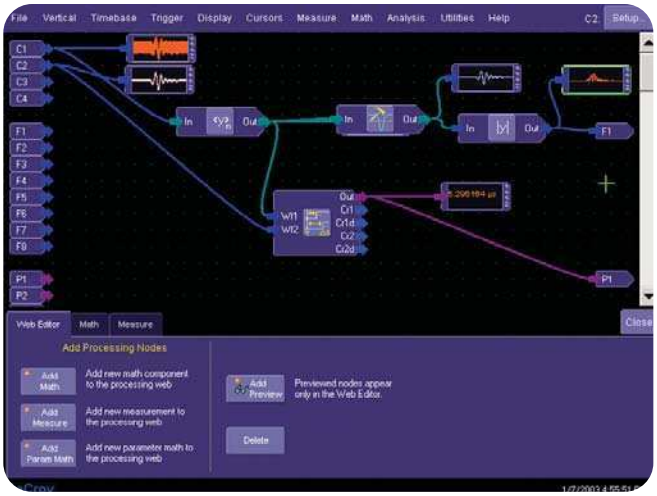
This process eliminates the "fetching" of data and math instructions from RAM to minimize calculation time. It also allows user-created functions and measurements to be inserted using our XDEV option.



WavePro 7000 Series

WORLD CLASS SIGNAL INTEGRITY AND IN-DEPTH ANALYSIS — Without Digging Deep into Your Pocket

Integrating the industry's only SiGe ADCs, large high resolution screen, advanced Windows operating system, and X-Stream Technology into the WavePro 7000 Series gives the new DSOs in-depth analysis capability that is friendly to your bottom line. Now, you don't have to make a choice between total measurement confidence and budgetary constraints. With the WavePro oscilloscopes you can have both.



With the XMAP option, LeCroy's Processing Web lets you think about signal analysis graphically. Visualize an oscilloscope measurement as a chain of operations while seeing results at every step.

It starts with the oscilloscope's SiGe amplifiers with very flat bandwidth response followed by a 10 GS/s ADC on each channel (5 GS/s for the model 7000). The model 7100 is the first 1 GH/z oscilloscope in this class with 10 GS/s over-sampling. Standard memory is 1 Mpt per channel (500 kpts for the model 7100), with options extending all the way to an industry-best 24 Mpts per channel (48 Mpts when in dual channel mode). Such capability assures signal integrity when you analyze, so you don't have to worry about under-sampling the waveform.

Performance advantages continue with the oscilloscope's 2 ps jitter noise floor, which allows even small signal imperfections to be detected.

Plus, the WavePro 7300 is the first oscilloscope to offer both 1 MΩ and 50 Ω inputs in a 3 GHz instrument. This flexibility gives the WavePro 7300 the convenience of a high-impedance input for capturing lower bandwidth signals up to 500 MHz, combined with a very high performance SiGe 3 GHz, 50 Ω input.

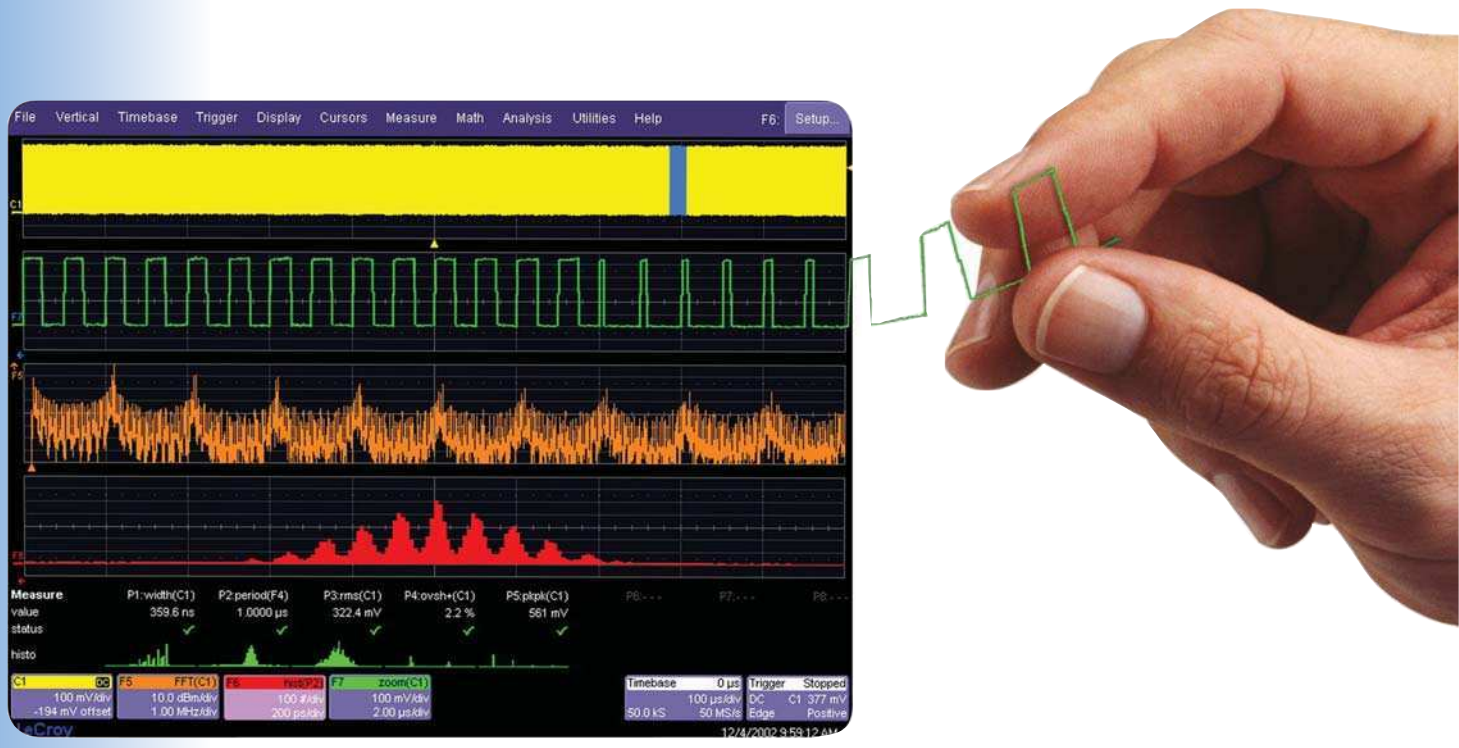
EASY TO USE, SIMPLE TO VIEW RESULTS

Operation of the WavePro DSO is easy and intuitive. 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 the way you like to work. An advanced Windows 2000-based operating system handles all the pull down menus and I/O to peripherals to add to the familiarity, and offers robust system performance. Viewing the results is as easy as acquiring them. All WavePro oscilloscope models are designed with a 10.4-inch SVGA touch screen display with a waveform viewing area 20% larger than comparable oscilloscopes. Plus, LeCroy has designed features into the WavePro oscilloscopes that allow you to view your signal in the time, frequency, or statistical domains.

For example, the 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 AutoScroll is available to roll through the waveform.

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.

WavePro 7000 Series



A COMPREHENSIVE SUITE OF ANALYSIS OPTIONS

Now with the WavePro oscilloscopes there is a new level of WaveShape Analysis that allows engineers to troubleshoot 1–3 GHz circuits in ways that have never been possible. The XMAP suite of analysis options gives the oscilloscopes advanced capabilities that have previously been reserved for instruments operating at a higher bandwidth and price.

Imagine capturing large amounts of data and graphing it in intuitive, easily understandable ways to allow deep insight. Histogram, Track, and Trend capabilities allow you to use the long memory of the WavePro DSO to its best advantage. Expanded FFT algorithms provide unique spectral insights.

Simplify your use of an oscilloscope when you want to perform customized analysis or math operations. Your own user-defined math, parameter measurement, or control routines can be quickly and easily inserted into the DSO processing stream. You can go way beyond basic "connectivity" or data export and make the oscilloscope your own measurement tool.

Jitter and timing analysis functions allow period, width, cycle-to-cycle, and other timing parameters to be measured. Results can be presented as statistics, histograms, or time domain tracks. Users can also view a Jitter FFT, which provides a spectral fingerprint of a signal's jitter sources.

The XMAP option gives you all this utility and insight, and is just one of the full line of analysis packages available for the WavePro 7000 Series.

WavePro 7000 Series

With WavePro oscilloscopes powered by X-Stream Technology, the possibilities are only limited by your requirements — or your imagination!

CUSTOMIZED MEASUREMENTS EXPAND ANALYSIS CAPABILITY

WavePro DSOs provide the most powerful set of analysis you can get in an oscilloscope. That means you have a whole new way to analyze the pulseshape or perform special types of waveform math.

X-Stream Technology lets you insert new analysis directly into the processing chain of the WavePro oscilloscope. You can write your own Visual Basic script, MATLAB, Mathcad, or Excel function, and seamlessly integrate it into your oscilloscope's processing chain without having to run a different program, establish remote communication between the oscilloscope and another program, create a new reference waveform, or transfer large data files between the DSO and another program.

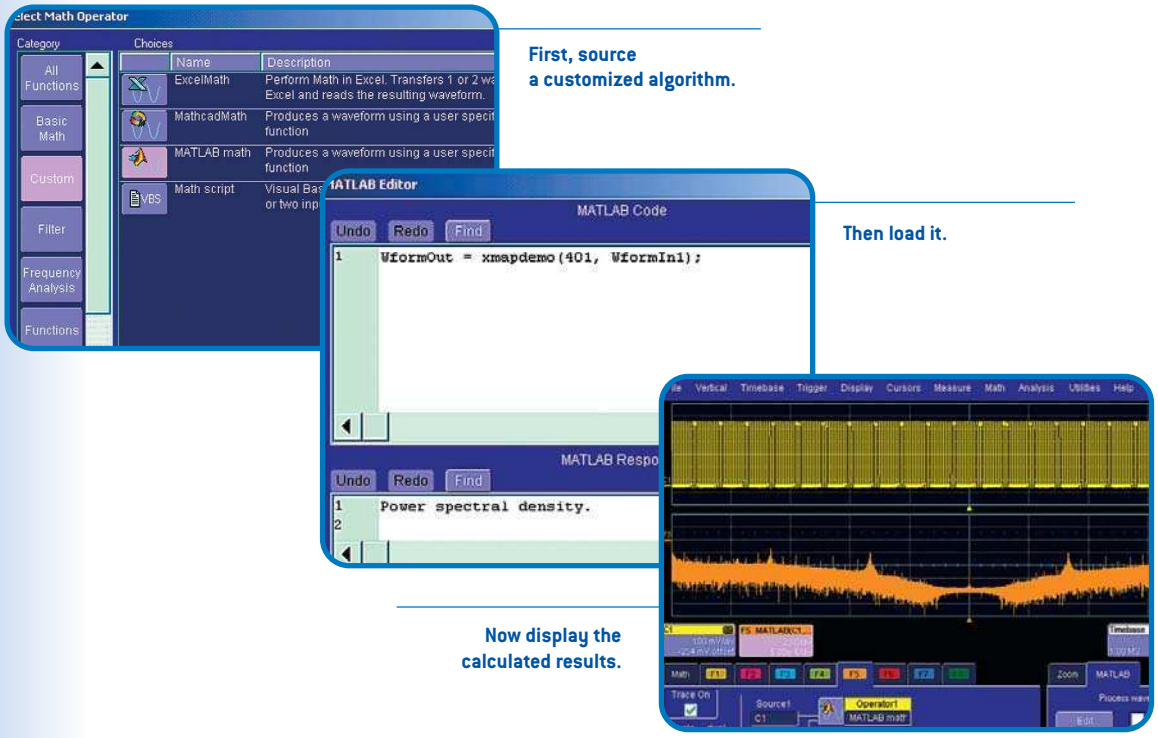
The WavePro DSO's customization functions go beyond measurement techniques. LeCroy's CustomDSO package allows the User Interface (UI) to be modified to accommodate your test process, starting from the panel setups.

Control of the WavePro oscilloscopes can be customized as well. Using LeCroy's standard remote command language, IVI, or LabView drivers, the WavePro oscilloscopes can interface with third party software. Microsoft-compliant Automation language can also be used for integration into most Windows-based programs. Connections can be made with the standard 10/100Base-T network connection or via optional GPIB.

WavePro 7000 Series

- Port tools such as filters from your simulation environment into the scope 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.

WavePro 7000 Series

7300/7200

	WavePro 7300	WavePro 7200
Bandwidth	3 GHz	2 GHz
Sample Rate on 4 channels (Maximum 2 Ch)	10 GS/s (20 GS/s / 2 Ch)	10 GS/s (20 GS/s / 2 Ch)
Memory Standard	1M/Ch (2M / 2 Ch)	1M/Ch (2M / 2 Ch)
Optional Memory Maximum	24M/Ch (48M / 2 Ch)	24M/Ch (48M / 2 Ch)
Hi Z and 50 Ω selectable inputs	Yes	Yes
Triggering	SMART Trigger, glitch, edge, pattern, interval	

WavePro 7000 Series

wavepro®

7100/7000

	WavePro 7100	WavePro 7000
Bandwidth	1 GHz	1 GHz
Sample Rate on 4 channels (Maximum 2 Ch)	10 GS/s (20 GS/s / 2 Ch)	5 GS/s (10 GS/s / 2 Ch)
Memory Standard	1M/Ch (2M / 2 Ch)	500k/Ch (1M / 2 Ch)
Optional Memory Maximum	24M/Ch (48M / 2 Ch)	4M/Ch (8M / 2 Ch)
Hi Z and 50 Ω selectable inputs	Yes	Yes
Triggering	SMART Trigger, glitch, edge, pattern, interval	

WavePro 7000 Series Technical Specifications

VERTICAL SYSTEM	WAVEPRO 7000	WAVEPRO 7100	WAVEPRO 7200	WAVEPRO 7300
Analog Bandwidth @ 50 Ω (–3 dB)	1 GHz	1 GHz	2 GHz	3 GHz
Rise Time (Typical)	400 ps	400 ps	225 ps	150 ps
Input Channels	4			
Bandwidth Limiters	25 MHz; 200 MHz			
Input Impedance	50 Ω; 10 MΩ //11pF typical (using PP005A probe)			
Input Coupling	1 MΩ: AC, DC, GND; 50 Ω: DC			
Maximum Input Voltage	50 Ω: 5 Vrms, 1 MΩ: 100 Vmax (peak A: ≤ 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 M Ω: 2 mV – 2 V/div fully variable			
DC Gain Accuracy	±1.5% of full scale; ±1% (typical)			
Offset Range	50 Ω: ±700 mV @ 2–4.99 mV/div ±1.5 V @ 5–100 mV/div ±10 V @ 0.102–1 V/div 1 MΩ: ±700 mV @ 2–4.99 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	
Timebases	Internal timebase common to 4 input channels; an external clock may be applied at the auxiliary input
Time/Division Range	20 ps/div – 1000 s/div
Math and Zoom Traces	4 independent zoom and 4 math/zoom traces standard; 8 math/zoom traces available with XMAP (Master Analysis package) or XMATH (Advanced Math package)
Clock Accuracy	≤ 5 ppm @ 0–40 °C
Time Internal Accuracy	≤ 0.06 / SR + (5 ppm * Reading) (rms)
Sample Rate and Delay Time Accuracy	± 5 ppm ≤ 10s interval
Jitter Noise Floor	2 ps rms @ 100 mV/div (typical)
Trigger and Interpolator Jitter	≤ 2.5 ps (typical)
Channel-Channel Deskew Range	±4.5 ns
External Clock	30 MHz – 1 GHz; 50 Ω impedance; applied at the auxiliary input

ACQUISITION SYSTEM				
Single-Shot Sample Rate/Ch	5 GS/s	10 GS/s	10 GS/s	10 GS/s
2 Channel Max.	10 GS/s	20 GS/s	20 GS/s	20 GS/s
Random Interleaved Sampling (RIS)	200 GS/s for repetitive signals: 20 ps/div – 1 µs/div			
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)	4 Ch / (2 Ch)	Sequence Mode
Standard		500k / 1M	1M / 2M	500 segments
M – Memory Option		4M / 8M	4M / 8M	1,000 segments
L – Memory Option		–	8M / 16M	5,000 segments
VL – Memory Option		–	16M / 32M	10,000 segments
XL – Memory Option		–	24M / 48M	20,000 segments

ACQUISITION PROCESSING	
Averaging	Summed averaging to 1 million sweeps; continuous averaging to 1 million sweeps
Enhanced Resolution (ERES)	From 8.5 to 11 bits vertical resolution
Envelope (Extrema)	Envelope, floor, roof for up to 1 million sweeps
Interpolation	Linear, sinx/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 Mode	DC50Ω, GND, DC1MΩ, AC1MΩ			
Pre-trigger Delay	0–100% of horizontal time scale			
Post-trigger Delay	0–10,000 divisions			
Hold-off by Time or Events	Up to 20 s or from 1 to 99,999,999 events			
Internal Trigger Range	±5 div from center			
Max. Trigger Frequency	1 GHz w/Edge Trigger; 750 MHz w/SMART Trigger	1 GHz w/Edge Trigger; 750 MHz w/SMART Trigger	2 GHz w/Edge Trigger; 750 MHz w/SMART Trigger	3 GHz w/Edge Trigger; 750 MHz w/SMART Trigger

WavePro 7000 Series Technical Specifications (continued)

BASIC TRIGGERS

Edge/Slope/Line	Triggers when signal meets slope 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	Triggers on positive or negative glitches with widths selectable from 600 ps to 20 s or on intermittent faults
Signal or Pattern Width	Triggers on positive or negative pulse widths selectable from 600 ps to 20 s or on intermittent faults
Signal or Pattern Interval	Triggers on intervals selectable between 2 ns and 20 s

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	(2) PP005A standard; Optional passive and active probes available
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
Realtime Clock	Dates, hours, minutes, seconds displayed with waveform SNTP support to synchronize to precision internet clocks
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 package) or XMATH (Advanced Math package)

CPU

Processor	Intel 1.7 GHz or better with MS Windows 2000 Platform
Processing Memory	Up to 1 Gbyte

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, floppy drive or to a USB-connected peripheral device

WavePro 7000 Series Technical Specifications (continued)

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
Floppy Drive	Internal, DOS-format, 3.5" high-density
USB Ports	4 USB ports support Windows compatible devices
External Monitor Port Standard	15-pin D-Type SVGA-compatible
Parallel Port	1 standard

AUXILIARY OUTPUT

Signal Types	Select from calibrator or control signals output on front panel
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

AUXILIARY INPUT

Signal Types	Selected from External Trigger or External Clock input on front panel

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 Power consumption: < 800 VA

ENVIRONMENTAL

Temperature (Operating)	+5 °C to +40 °C including floppy disk and CD-ROM drives
Temperature (Nonoperating)	–20 °C to +60 °C
Humidity (Operating)	5% to 80% relative humidity (noncondensing) up to +30 °C Upper limit derates to 25% relative humidity (noncondensing) at +40 °C
Humidity (Nonoperating)	5% to 95% relative humidity (noncondensing) as tested per MIL-PRF-28800F
Altitude (Operating)	up to 10,000 ft. (3048 m) at or below +25 °C
Altitude (Nonoperating)	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 (Nonoperating)	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 Approved, 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 service

WavePro 7000 Series Technical Specifications (continued)

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)

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, email the image of the failure, save waveforms, send a pulse out at the front panel auxiliary NC output, or (with the GPIB option) send a GPIB SRQ.

OPTIONAL

Master Analysis Package (XMAP)

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

Advanced Math Package (XMATH)

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

- Intuitive, Graphical Math Setup (Processing Web) with unlimited chaining of functions
- 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 Package (XDEV)

This package provides a set of tools to modify the scope 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 scope.

  Supported third party software packages include:
  - VBScript - MATLAB - Excel - Mathcad
- CustomDSO – create your own user interface in a scope dialog box
- Addition of macro keys to run VBScript files
- Support for plug-ins

Measure Tools

Displays 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
phase
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.

Timing Tools

LeCroy M1 Timing Tools software runs inside your WavePro oscilloscope, acquires data, and calculates, displays, and analyzes jitter in clock and serial data. A wide variety of measurement tools are available including differential crossing point measurements. Jitter viewing tools include line graph, histogram, jitter, spectrum text, and eye diagram. Available in an advanced or or basic version.

LeCroy M1 Timing Tool (Advanced, 1 scope)	LeCROY M1 / ADV-1
LeCroy M1 Timing Tool (Advanced, 4 scopes)	LeCROY M1 / ADV-4
LeCroy M1 Timing Tool (Basic)	LeCROY M1 / BASIC

Jitter and Timing Analysis 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)

Disk Drive Measurements Package (DDM2)

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

- Disk Drive Parameters are as follows:
  - 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

WavePro 7000 Series Ordering Information

WAVEPRO 4-CHANNEL DIGITAL OSCILLOSCOPES	PRODUCT CODE
3 GHz 20 GS/s (2 Ch); 10 GS/s 4 Ch 1 MΩ & 50 Ω Color DSO 2 Mpts/2 Ch; 1 Mpts/Ch Standard	WavePro 7300
2 GHz 20 GS/s (2 Ch); 10 GS/s 4 Ch 1 MΩ & 50 Ω Color DSO 2 Mpts/2 Ch; 1 Mpts/Ch Standard	WavePro 7200
1 GHz 20 GS/s (2 Ch); 10 GS/s 4 Ch 1 MΩ & 50 Ω Color DSO 2 Mpts 2 Ch; 1 Mpts/Ch Standard	WavePro 7100
1 GHz 10 GS/s (2 Ch); 5 GS/s 4 Ch 1 MΩ & 50 Ω Color DSO 1 Mpts 2 Ch; 500 kpts/Ch Standard	WavePro 7000

INCLUDED WITH STANDARD CONFIGURATION	
10:1 10 MΩ Passive Probes (Qty. 2)	PP005A
Operators Manual; Quick Reference Guide; CD-ROM with OM/RCM and Utility software and Recovery software	
Remote Control Manual	
Floppy Disk Drive	
CD-ROM Drive	
Optical 3 button Wheel Mouse – USB	
Standard Ports; 10/100Base-T Ethernet, Parallel, SVGA Video Output, USB	
Protective Front Cover	
Standard Commercial Calibration and Performance Certificate	
3-Year Warranty	

MEMORY OPTIONS	
8 Mpts/2 Ch, 4 Mpts/Ch	-M
16 Mpts/2 Ch, 8 Mpts/Ch	-L
32 Mpts/2 Ch, 16 Mpts/Ch	-VL
48 Mpts/2 Ch, 24 Mpts/Ch	-XL
Note: WavePro 7000 unit's maximum memory is "M" option	

HARDWARE OPTIONS	
IEEE-488 Remote Control Interface	GPIB-1
Removable Hard Drive Option	RHD

WAVESHAPE ANALYSIS PACKAGES	
X-Stream Math, Processing and Developer's Kit (includes XMATH, XDEV, JTA2)	XMAP
Advanced Math Analysis Package	XMATH
Developer's Customization Kit	XDEV
Jitter and Timing Analysis	JTA2
Digital Filter Package	DFP2
Serial Data Mask Testing Package	SDM
Disk Drive Measurement Package	DDM2
LeCroy M1 Timing Tools	M1/ADV-1

SELECTED ACCESSORIES	
10:1 10 MΩ Passive Probes	PP005A
3.5 GHz Active Voltage Probe	HFP3500
2.5 GHz Active Voltage Probe	HFP2500
1.5 GHz Active Voltage Probe	HFP1500
WaveLink Differential Probes	D300/200
Current Probe	CP and AP series
O/E Converters 500–1630 nm	OE 425/455 & 525/555
Keyboard	KYBD-1
Oscilloscope Cart	OC1021
Oscilloscope Cart with additional shelf and drawer	OC1024
Rackmount – 25" Slide	RMA-25
Rackmount – 30" Slide	RMA-30
AntiVirus Software	AV