

# WavePro Oscilloscopes

## Specifications



### Vertical System

	WavePro 960 DISCONTINUED	WavePro 950 DISCONTINUED	WavePro 940 DISCONTINUED
Input Channels	4	4	4
Analog Bandwidth @ 50 Ohms (-3 dB)	2 GHz*	1 GHz	500 MHz
Bandwidth Limiters	20 MHz, 200 MHz		
Input Impedance	50 Ohms $\pm$ 1.5%; 10 MOhms // 11 pF typical (using PP005 probe)		
Input Coupling	1 MOhms : AC, DC, GND; 50 Ohms : DC, GND		
Maximum Input	50 Ohms : 5 Vrms; 1 MOhms : 100 Vmax (peak AC = 5 kHz + DC)		
Vertical Resolution	8 bits; up to 11 bits with enhanced resolution (ERES)		
Sensitivity	50 Ohms : 1 mV – 1 V/div fully variable ; 1 MOhms : 1 mV – 2 V/div fully variable		
DC Accuracy	$\pm$ 2.0% full scale + 1.5% offset value @ gain > 10 mV		
Offset Accuracy	$\pm$ (1.5% + 0.5% of full scale + 1 mV)		
Offset Range	50 Ohms or 1 MOhms : 1 mV – 4.99 mV/div: $\pm$ 400 mV 50 Ohms : 5 mV – 99 mV/div: $\pm$ 1 V; 0.1 V – 1 V/div: $\pm$ 10 V 1 MOhms: 5 mV – 100 mV/div: $\pm$ 1 V; 101 mV – 2 V/div: $\pm$ 20 V		
Isolation — Channel-to-Channel	> 250:1 at same V/div settings		

### Timebase System

Timebases	Main and up to four independent zoom traces simultaneously		
Ranges	200 ps/div – 1000 s/div		
Clock Accuracy	=10 ppm		
Interpolator Resolution	5 ps		
External Clock Frequency	500 MHz maximum, 50 Ohms, or 1 MOhms impedance		
Roll Mode – Operating Range	time/div 500 ms – 1000 s/div or sample rate < 100 kS/s max		
External Reference	10 MHz timebase reference clock available with input on rear panel		
External Timebase Clock	500 MHz maximum external sample clock input on front panel EXT BNC		

### Acquisition System

#### Single-Shot Sample Rate

1 Channel Max.	16 GS/s	16 GS/s	8 GS/s
2 Channels Max.	8 GS/s	8 GS/s	8 GS/s
3 – 4 Channels Max.	4 GS/s	4 GS/s	4 GS/s

Maximum Acquisition Points/Ch	( 1 Ch ) / ( 2 Ch ) / ( 3 – 4 Ch )		
Standard	1M / 500k / 250k	1M / 500k / 250k	1M / 500k / 250k
M – Memory Option	4M / 2M / 1M	4M / 2M / 1M	4M / 2M / 1M
L – Memory Option	16M / 8M / 4M	16M / 8M / 4M	16M / 8M / 4M
VL – Memory Option	32M / 16M / 8M	32M / 16M / 8M	32M / 16M / 8M
XL – Memory Option	64M / 32M / 16M	–	–

### Acquisition Modes

Random Interleaved Sampling (RIS)	50 GS/s for repetitive signals: 200 ps/div – 1 $\mu$ s/div
Single-Shot	For transient and repetitive signals: 200 ps/div – 1000 s/div
Sequence	2 – 8000 segments
Intersegment Time	Typically 30 $\mu$ s

### Acquisition Processing

Averaging	Summed averaging to 103 sweeps (standard). Continuous averaging up to 106 sweeps with weighting range from 1:1 to 1:1023 (option).
Enhanced Resolution (ERES)	From 8.5 to 11 bits vertical resolution
Envelope (Extrema)	Envelope, floor, roof for up to 106 sweeps

### Triggering System

Modes	Normal, Auto, Single, and Stop
Sources	Any input channel, external, Ext/5 or line; slope, level, and coupling unique to each source (except line trigger)
Slope	Positive, Negative, Window
Coupling modes	DC, AC, HF, HFREJ, LFREJ
AC Cutoff Frequency	7.5 Hz Typical
HFREJ, LFREJ	50 kHz typical
Pre-trigger delay	0 – 100% of horizontal time scale
Post-trigger delay	0 – 10000 divisions
Hold-off by time or events	Up to 20s or from 1 to 99 999 999 events
Internal trigger range	$\pm$ 5 div
Max trigger frequency	1 GHz (DC, AC), >1 GHz (HF) on WavePro 950, >2.0 GHz (HF) on WavePro 960
External trigger input range	$\pm$ 0.5 ( $\pm$ 2.5 V with Ext/5 selected )
Maximum ext. input @ 50 Ohms	$\pm$ 5 V DC or 5Vrms

Maximum ext. input @ 1  
MOhms

100 Vmax ( DC + peak AC < 5 kHz )

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### Automatic setup

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

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### Probes

<b>Model PP005</b>	10 : 1, 10 MOhms with autodetect (one per channel)
<b>Probe System: Probus®</b>	Automatically detects and supports a wide variety of differential amplifiers; active, high-voltage, current, and differential probes
<b>Scale Factors</b>	Up to 12 automatically or manually selected

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### Color Waveform Display

<b>Type</b>	Color 10.4" flat-panel TFT-LCD
<b>Resolution</b>	VGA 640 x 480 pixels
<b>Screen Saver</b>	Display blanks after 10 minutes (when screen saver is "on")
<b>Real Time Clock</b>	Date, hours, minutes, and seconds displayed with waveform
<b>Number of Traces</b>	Display a maximum of eight traces. Simultaneously display channel, zoom, memory, and math traces.
<b>Grid Styles</b>	Single, Dual, Quad, Octal, XY, Single + XY, Dual + XY; Full Screen gives enlarged view of each style.
<b>Intensity Controls</b>	Separate intensity control for grids and waveforms
<b>Waveform Styles</b>	Sample dots joined or dots only — regular or bold sample point highlighting.
<b>Trace Overlap Display</b>	Select opaque or transparent mode with automatic waveform overlap management.

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### Analog Persistence Display

<b>Analog &amp; Color-Graded Persistence</b>	Variable saturation levels; stores each trace's persistence data in memory.
<b>Trace Selection</b>	Activate Analog Persistence on a selected trace, top 2 traces, or all traces.
<b>Persistence Aging Time</b>	Select from 500 ms to infinity.
<b>Trace Display</b>	Opaque or transparent overlap
<b>Sweeps Displayed</b>	All accumulated or all accumulated with last trace highlighted

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### Zoom Expansion Traces

<b>Display up to Four Zoom Traces</b>	Vertical zoom up to 5X expansion, 50X with averaging
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Horizontal zoom expand to 2 pts/div, magnify to 50000X

Auto Scroll automatically scans and displays any zoom or math trace.

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### Rapid Signal Processing

<b>Processor</b>	PowerPC
<b>Processing Memory</b>	Up to 256 Mbytes
<b>Realtime Clock</b>	Dates, hours, minutes, seconds

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### Internal Waveform Memory

<b>Waveform</b>	M1, M2, M3, M4 (Store full-length waveforms with 16 bits/data point)
<b>Zoom and Math</b>	Four traces A, B, C, D with chained trace capability

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### Setup Storage

<b>Front Panel and Instrument Status</b>	Four non-volatile memories and floppy drive are standard. Hard drive and memory card are optional.
<b>CustomDSO</b>	Customize and access scope settings with up to 6 CustomDSO files stored in non-volatile Virtual Disk (VDisk).

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### Interface

<b>Remote Control</b>	Full control of all front panel controls and internal functions via RS232C, GPIB, or Ethernet
<b>RS-232-C</b>	Asynchronous transfer rate of up to 115.2 kbaud
<b>GPIB Port</b>	Full control via IEEE – 4888.2; configurable as talker/listener for computer control and data transfer
<b>Ethernet (optional)</b>	10 BaseT Ethernet interface
<b>Floppy Drive</b>	Internal, DOS-format, 3.5" high-density
<b>PC Card Slot (optional)</b>	Supports memory and hard drive cards
<b>External Monitor Port Standard</b>	15-pin D-Type VGA-compatible
<b>Centronics Port</b>	Parallel printer interface
<b>Internal Graphics Printer (optional)</b>	Hard copy output in <10 seconds or strip chart mode up to 200 cm/div
<b>Pass/Fail and Trigger Output</b>	Front panel Cal BNC output provides choice of Cal Signal, Pass/Fail Condition, Trigger Ready, or Trigger Out signals

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### Outputs

<b>Calibrator Signal</b>	500 Hz – 2 MHz square wave or 25 ns pulse; 0.05 to +1.0 Volt into 1 MOhms output on front panel BNC
<b>Control Signals</b>	Trigger ready, trigger out, pass/fail status.

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## Environmental and Safety

### Operating Conditions

<b>Temperature</b>	5 – 40 °C rated accuracy (41 to 104 °F) 0 – 45 °C operating -20 – 60 °C non-operating
<b>Humidity</b>	75% max relative humidity, non-condensing at 45 °C
<b>Altitude</b>	3 000 meters (10 000 feet) operating at 25 °C 4 500 meters (15 000 feet) non-operating

### CE Approved

**EMC** EMC Directive 89/336/EEC; EN 61326-1 Emissions and Immunity

**Safety** Low Voltage Directive 73/23/EEC; EN 61010-1 Product Safety (Installation Category II, Pollution Degree 2)

**UL and cUL approved** UL Standard UL 3111-1  
cUL Standard CSA-C22.2 No. 1010-1

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## Service

LeCroy service programs include unique service upgrades for LeCroy oscilloscopes, metrology modules customized for your company, and more. Whether you own one LeCroy instrument or hundreds, whether you need prompt attention from our service offices or an onsite service contract, LeCroy is committed to your success. Call your LeCroy service representative to discuss your company's specific requirements.

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## General

<b>Auto Calibration</b>	Ensures specified DC and timing accuracy is maintained for 1 year minimum
<b>Auto Calibration time</b>	<500 ms
<b>Power Requirements</b>	90 – 132 V AC at 45-440 Hz; 180–250 V AC at 45-66 Hz; Power consumption: 350 VA max
<b>Battery Backup</b>	Front panel settings retained for two years minimum
<b>Warranty and Calibration</b>	Three years; calibration recommended yearly

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## Physical Dimensions

<b>Dimensions (HWD)</b>	264 mm x 397 mm x 453 mm; 10.4" x 15.65" x 17.85" (height excludes feet)
<b>Weight</b>	14 kg; 31 lbs (with internal printer)
<b>Shipping Weight</b>	22.2 kg; 49 lbs

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\*with sample speeds > 4 GS/s