

WavePro Oscilloscopes

Specifications



Vertical System	WavePro 960	WavePro 950	WavePro 940
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 μ s/div
Single-Shot	For transient and repetitive signals: 200 ps/div – 1000 s/div
Sequence	2 – 8000 segments
Intersegment Time	Typically 30 μ 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)

Automatic setup

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

Probes

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

Color Waveform Display

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

Analog Persistence Display

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

Zoom Expansion Traces

Display up to Four Zoom Traces	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.

Rapid Signal Processing

Processor	PowerPC
Processing Memory	Up to 256 Mbytes
Realtime Clock	Dates, hours, minutes, seconds

Internal Waveform Memory

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

Setup Storage

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

Interface

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

Outputs

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

Environmental and Safety

Operating Conditions

Temperature	5 – 40 °C rated accuracy (41 to 104 °F) 0 – 45 °C operating -20 – 60 °C non-operating
Humidity	75% max relative humidity, non-condensing at 45 °C
Altitude	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

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.

General

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

Physical Dimensions

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

*with sample speeds > 4 GS/s