The WaveRunner® 6000A Series is the best oscilloscope for everyday signal testing. Its remarkable functionality includes the following capabilities:
- acquisition technology that delivers measurements you can trust
- an efficient interface that feels just right to the busy engineer
- uncommon capabilities—right out of the box
- a platform for building on even more functionality

A Rich Feature Set is Standard
The WaveRunner 6000A Series is an everyday bench scope with true “lab instrument” capabilities. This series offers:
- Bandwidths from 350 MHz to 2 GHz
- Sample rates of 2.5 to 10 GS/s
- Standard memory of 4 Mpts/Ch
- All channels expandable to 12 Mpts
- Up to 24 Mpts when interleaved

Most importantly, these features are delivered at a price far below other oscilloscopes in this class.

Outstanding Signal Fidelity
The WaveRunner 6000A Series is powered by the same SiGe chipset that is used in LeCroy’s higher bandwidth WaveMaster oscilloscopes.
- High sample rate captures high frequency transients and sharp edges
- Very low residual jitter (2 ps typical)
- Includes ultra-stable clock (±5 ppm)

This outstanding performance gives you timing resolution that rivals oscilloscopes that cost twice as much.

Windows® XP Operating System
The open Windows XP operating system allows you to install Windows application software to analyze waveform data directly in the oscilloscope, eliminating the need for processing in another PC.
5 GS/s on Each Channel—See Details Others Miss

The WaveRunner 6000A is a true 4 channel instrument—you can sample at a full 5 GS/s on each channel. Other oscilloscopes can only use a single channel at 5 GS/s or 1/4 that rate when using all four channels. WaveRunner 6000A offers more than Nyquist sample rate on each channel.

SMART Trigger™ Makes the Most of Your Long Memory

The WaveRunner 6000A SMART Trigger provides the flexibility to quickly trigger and locate the specific signal characteristic or pattern you want. Trigger on abnormal signals at the touch of a button.

- Exclusion/inclusion feature triggers on signals outside, or within, a specific range of pulse widths.
- Selecting multiple threshold levels and pulse widths quickly catches the waveform for viewing and measuring.
- Memory retains thousands of acquired events for viewing at your leisure.
- Replay signal history, scan, and search from sweep to sweep.
The WaveRunner 6000A oscilloscope is designed to be a custom fit to your working style. Hundreds of oscilloscope users helped us meet this goal by contributing their ideas to the uniquely efficient interface.

1. Bright Display
All WaveRunner 6000A Series oscilloscopes include a crisp and bright SVGA screen with 800 x 600 pixels for superior resolution. It’s the best resolution available for this class of scope.

2. One-touch Efficiency
The descriptor labels show the oscilloscope settings and status. Touch the screen once to open a setup dialog and change settings. Quickly measure a signal’s timing characteristics. Touch “Measure” and “Horizontal” to see multiple common timing parameters. Math, histograms, statistics, and other analysis tools are all within two touches.

3. Dedicated Vertical Controls
Each channel has its own volts per division (V/div) control knob. You can control any channel by turning the knob—eliminating the need to multiplex a single V/div control across all four channels.

4. Intensity Modulated Display
Display intensity can be adjusted from 0–100% to enable a better view of underlying glitches, runts, or signal modulation in long record captures. The perfect accompaniment to the WaveRunner 6000A oscilloscope’s long memory.
**PP007 Passive Probe**

Only 2.5 mm in diameter with low circuit loading and a flat impulse response, this probe is the ideal fit for general-purpose applications.

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**5. Cursor Knobs**

Need a quick measurement? Just turn the cursor knob to bring up a pair of vertical cursors to measure timing relationships and quickly characterize the waveform.

**6. Zoom Control Knobs**

Need a closer look at your signal? Push the QuickZoom button. Four dedicated knobs (zoom and offset in horizontal and vertical directions) make it easy to navigate any trace—from broad relationships to minute details.

**7. "Push" Knobs**

WaveRunner rotating knobs control functions, but pushing them invokes further functionality. Push the trigger level; the scope selects the correct setting for a stable display. Push the offset button; your scope instantly zeroes the offset, restoring the waveform clearly in the middle of the screen. Another push restores the offset.

**8. Handy, Front Accessible USB Port**

Use a memory stick to transfer your captured waveforms, or take your setup from scope to scope to automatically load your configuration. In addition, with one USB port on the front panel and four more on the back, you can connect a variety of plug-n-play peripheral and memory devices.
WaveRunner lets you focus on understanding your signal rather than setting up your oscilloscope. The productivity improvement is dramatic and immediate. Here's a prime example of how thoroughly WaveRunner fits your everyday process.

**LeCroy Introduces a Complete In-scope Solution—Standard on most LeCroy Oscilloscopes**

Now you can efficiently create complete and detailed waveform reports directly in the oscilloscope. An all-in-one solution for annotating and sharing information, LabNotebook™ simplifies results recording and report generation by eliminating the multi-step processes that often involve several pieces of equipment.

LabNotebook enables you to focus on results rather than the process, so you can now:
- Save all displayed waveforms
- Save the relevant setups with the saved waveform
- Add freehand notes with a stylus or as text
- Convert the complete report to pdf, rtf, or html
- Print or e-mail reports

**Create Notes with the Screen Capture**

By pressing Hard Copy, you can annotate waveforms as you capture them. Once the notes are finished, they can be readily saved as a report and e-mailed directly from the oscilloscope.

**Flashback Function**

You can employ the Flashback Function to recall the state of the oscilloscope, including saved waveforms and setup. Additional measurements are easily made using the keyword filter to find the correct notebook entry for recall.
It’s the perfect end-to-end solution: a bench top oscilloscope that can handle everyday signal measurements easily and efficiently, but can expand to perform more sophisticated WaveShape Analysis when needed. Yet it’s priced far below other scopes that are not nearly as versatile and fully featured.

Expanded Analysis
The XMATH Advanced Math software package provides more than 30 math functions and 40 parameter measurements including:
• Parameter math
• Tracking measurements
• Expanded FFT (up to 24 Mpts)
• Expanded histogramming
• Trending of up to one million events
XMATH has a graphical interface that lets you connect input source, measurement, and display icons for surprisingly simple advanced analysis.

Custom Analysis
The XDEV Advanced Customization software 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. XDEV seamlessly integrates your custom measurements directly into the oscilloscope’s data path, eliminating the need to run separate programs. You can also use XDEV to customize the oscilloscope’s interface. This package utilizes the power and efficiency of customization to enable faster analysis and solutions for your specific tasks.

Software Option Packages

**General Purpose**
- Master Analysis Software Package (Includes JTA2, XMATH and XDEV) WR6-XMAP
- Advanced Math Software Package WR6-XMATH
- Customization Software Package WR6-XDEV
- Value Analysis Software Package (Includes XWAV and JTA2) WR6-XVAP
- Intermediate Math Software Package WR6-XWAV
- Processing Web Editor Software Package for Functions and Parameters WR6-XWEB

**Application Specific**
- Jitter and Timing Analysis Software Package WR6-JTA2
- PowerMeasure Analysis Software Package WR6-PMA2
- Digital Filter Software Package WR6-DFP2
- EMC Pulse Parameters Software Package WR6-EMC*
- Disk Drive Measurement Software Package WR6-DDM2
- Ethernet Test Software Package (WaveRunner 6200A Only) WR6-ENET
- USB 2.0 Compliance Test Software Package (WaveRunner 6200A Only) WR6-USB2
- Serial Data Mask Software Package WR6-SDM†

**Software and Hardware Option Packages**
- 32 Digital Channel Oscilloscope Mixed Signal Option MS-32‡
- CANbus TDM Trigger, Decode and Measure/Graph Testing Option CANbus TDM
- CANbus TD Trigger and Decode Testing Option CANbus TD

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* WR6-EMC is compatible with all WaveRunner 6000A oscilloscopes except the WR6030A model.
† WR6200A oscilloscope required for full mask testing capability; lower bandwidth models will have reduced capabilities.
‡ MS-32 is compatible only with WR6000A 4-channel oscilloscopes.
Mixed Signal Testing Oscilloscope Option (MS-32)*
Add 32 digital channels to a 4-channel oscilloscope for 4 analog + 32 digital testing capability, with a simple oscilloscope setup and user interface. Each digital channel has 1 Mpts/Ch (32 Mpts total) to capture all of your signal information for efficient debug and analysis. 32 digital channels is ideal for the most efficient testing of 16-bit embedded controllers where all 16 ADDR and DATA lines can be viewed simultaneously.

*MS-32 is compatible only with WR6000A 4-channel oscilloscopes.

Electromagnetic Compatibility Software Package (EMC)*
The EMC software package adds flexibility to the rise time, fall time, and width parameters that are necessary to accurately measure ESD pulses, EFT bursts, surges and transients that are common in EMC testing. The WaveRunner 6000A provides easy access to parameter statistics and, with the EMC package, allows histogramming up to 2 billion events, parameter math, and measurement filtering.

*WR6-EMC is compatible with all WaveRunner 6000A oscilloscopes except the WR6030A model.

CANbus Trigger, Decode, and Measure/Graph Testing Options (CANbus TDM, CANbus TD)
Flexibly trigger on CAN bus messages. Decode and display hexadecimal data values next to the CAN signal on the screen. Measure and statistically analyze timing and other data. Graph system performance. Easily correlate electrical problems to CAN bus messages or error frame data.

Disk Drive Measurement Software Package (DDM2)
The Disk Drive Measurement Package (DDM2) adds dozens of new disk drive measurements. DDM2, combined with WaveRunner 6000A’s sequence triggering and SMART Triggers, offers the perfect solution for failure analysis when testing disk drives.

Ethernet Test Software Package (ENET)
(WaveRunner 6200A Only)
Conduct complete electrical testing for 1000Base-T, 100Base-T, and 10Base-T Ethernet standards. Jitter and pulse mask tests are performed with automatic waveform alignment, and all test results feature pass/fail indicators corresponding to the IEEE 802.3-2000 and ANSI X3.263 standards being tested.

Serial Data Mask Software Package (SDM)*
The SDM toolset harnesses the WaveRunner 6000A Series oscilloscope’s long memory and low jitter to deliver outstanding serial bus characterization. Choose from a comprehensive list of standard eye pattern masks, or create a user-defined mask. Mask violations are clearly marked on the display, so you don’t have to guess. SDM also allows a software “GOLDEN” PLL reference to recover an eye diagram from a single long acquisition. The measurement is complete in seconds, and the already low trigger jitter is eliminated, giving you the most precise result possible.

*WR6200A oscilloscope required for full mask testing capability; lower bandwidth models will have reduced capabilities.
Application and Analysis Package Specifications

### 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)
- custom (MATLAB, Mathcad, VBScript) – limited points
- derivative
- deskew (resample)
- difference (~)
- enhanced resolution (to 11 bits vertical)
- exp (base e)
- exp (base 10)
- fft (power spectrum, magnitude, phase, up to 50 kpts)
- floor
- histogram of 1000 events
- integral
- invert (negate)
- log (base e)
- log (base 10)
- product (x)
- reciprocal
- rescale (with units)
- roof
- (sinx)/x
- square
- square root
- sum (+)
- trend (datalog) of 1000 events
- zoom (identity)
- ratio (/)
- custom (MATLAB, Mathcad, VBScript) – limited points

#### Measure Tools
Display any 6 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
- delay
- ∆ delay
- duration
- duty cycle
- falltime (90–10%, 80–20%, @ level)
- first
- frequency
- last
- level @ x
- maximum
- mean
- median
- minimum
- number of points
- overshoot
- peak-to-peak
- period
- phase
- risetime (10–90%, 20–80%, @ level)
- rms
- std. deviation
- time @ level
- top
- Δ time @ level
- Δ time @ level from trigger
- width (positive + negative)
- x@ max.
- x@ min.

### 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 XMAP, XDEV, and JTA2.

##### Advanced Math Software Package (XMATH)
This package provides a comprehensive set of WaveShape Analysis tools providing insight into the wave shape of complex signals. Additional capability provided by XMATH includes:
- Parameter math – add, subtract, multiply, or divide two different parameters. Invert a parameter and rescale parameter values.
- 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 24 Mpts.
- Persistence histogram.
- Persistence trace (mean, sigma, range).
- Narrow-band power measurements.
- Auto-correlation function.
- Sparse function.
- Cubic Interpolation function.

##### Advanced Customization Software 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.

##### Value Analysis Software Package (XVAP)
XVAP Adds the following capabilities:

- Measurements:
  - Jitter and Timing parameters (period@level, width@level, edge@level, duty@level, time interval error@level, frequency@level, half period, setup, skew, Δ period@level, Δ width@level).
- Math:
  - Persistence histogram.
  - Persistence trace (mean, sigma, range).
- 1 Mpts FFTs with power spectrum density, power averaging, real, imaginary, and real+imaginary settings.

##### Intermediate Math Software Package (XWAV)
XWAV Adds the following capabilities:

- Math:
  - 1 Mpts FFTs with power spectrum density, power averaging, real, and imaginary components.
- Statistical and Graphical Analysis:
  - 1 Mpts Trends and Histograms.
- Track graphs of any measurement parameter.
Application Specific Test and Analysis Packages

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
- 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 your 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

PowerMeasure 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

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

CANbus TDM Trigger, Decode, and Measure/Graph Testing Option (CANbus TDM)

- Trigger Module with TC251-OPTO optically isolated Trigger Coupler installed (and room for one additional Trigger Coupler). Trigger Couplers are interchangeable.
- CANbus TD Series Oscilloscope Interface Module with 1.0 meter connection cable. Connects Trigger Module to LeCroy oscilloscope ProBus interface.
- Storage case with accessories (other accessories may be required)
- Software for
  - Trigger Setup
  - CAN Protocol Decode
  - CAN Measurement, (CAN-analog, CAN-CAN, and Time@CAN timing parameters, CAN bus load% and CAN-Value Data Extraction parameters)
  - Histogramming (up to 2 billion events)
  - Graphing (Track and Trend).

CANbus TD Trigger and Decode Testing Option (CANbusTD)

- Same hardware package as CANbus TDM
- Software for only
  - Trigger Setup
  - CAN Protocol Decode

Oscilloscope Mixed Signal Option (MS-32)*

32 Digital Channel Oscilloscope Mixed Signal Option. Gripper probe accessories are recommended.

*MS-32 is compatible only with WR6000A 4-channel oscilloscopes.
## Specifications

### Vertical System

<table>
<thead>
<tr>
<th>WaveRunner 6030A</th>
<th>WaveRunner 6050A</th>
<th>WaveRunner 6051A</th>
<th>WaveRunner 6100A</th>
<th>WaveRunner 6200A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal Analog Bandwidth @ 50 Ω, 10 mV/1 V/div</strong></td>
<td>350 MHz</td>
<td>500 MHz</td>
<td>500 MHz</td>
<td>1 GHz</td>
</tr>
<tr>
<td><strong>Rise Time (Typical)</strong></td>
<td>1 ns</td>
<td>750 ps</td>
<td>750 ps</td>
<td>300 ps</td>
</tr>
<tr>
<td><strong>Input Channels</strong></td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Bandwidth Limiters</strong></td>
<td>20 MHz; 200 MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input Impedance</strong></td>
<td>1 MΩ</td>
<td></td>
<td>20 pF (10 MΩ</td>
<td></td>
</tr>
<tr>
<td><strong>Input Coupling</strong></td>
<td>50 Ω: DC, 1MΩ: AC, DC, GND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Input Voltage</strong></td>
<td>50 Ω: 5 Vrms, 1 MΩ: 250 V max. (Peak AC: ≤ 10 kHz ± DC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Channel to Channel Isolation</strong></td>
<td>&gt; 40 dB @ &lt; 100 MHz (&gt; 30 dB @ full bandwidth)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vertical Resolution</strong></td>
<td>8 bits; up to 11 with enhanced resolution (ERES)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>50 Ω: ±400 mV @ 2–4.95 mV/div ±1 V @ 5–100 mV/div ±10 V @ 102 mV/div–1 V/div</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Offset Range</strong></td>
<td>50 Ω: ±400 mV @ 2–4.95 mV/div ±1 V @ 5–100 mV/div ±10 V @ 102 mV/div–1 V/div</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Offset Accuracy</strong></td>
<td>±(1.5% of offset value + 0.5% of full scale +1 mV) all fixed gain setting &lt; 2 V/div ±(1.5% of offset value + 1.0% of full scale + 1 mV) for variable and V/div settings ≥ 2 V/div</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input Connector</strong></td>
<td>ProBus/BNC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Timebase System

- **Timebases** Internal timebase common to all input channels; an external clock may be applied at the auxiliary input
- **Time/Division Range** Real time: 200 ps/div – 10 s/div, RIS mode: to 20 ps/div, Roll mode: up to 1,000 s/div
- **Clock Accuracy** ≤ 5 ppm @ 25 °C (≤ 10 ppm @ 5–40 °C)
- **Sample Rate and Delay Time Accuracy** Equal to Clock Accuracy
- **Trigger and Interpolator Jitter** ≤ 3 ps rms (typical)
- **Time Interval Accuracy** Clock Accuracy + Jitter
- **Channel to Channel Deskew Range** ±9 x time/div setting, 100 ms max., each channel
- **External Sample Clock** DC to 1 GHz; 50 Ω, (limited BW in 1 MΩ), BNC input, limited to 2 Ch operation (1 Ch in WR6051A), (minimum rise time and amplitude requirements apply at low frequencies)
- **Roll Mode** User selectable. Available at lower time/div settings

### Acquisition System

- **Single-Shot Sample Rate/Ch** 2.5 GS/s, 5 GS/s, 5 GS/s, 5 GS/s, 5 GS/s
- **Interleaved Sample Rate (2 Ch)** 5 GS/s, N/A, N/A, 10 GS/s, 10 GS/s
- **Random Interleaved Sampling (RIS)** 200 GS/s
- **Trigger Rate** 125,000 waveforms/second
- **Sequence Time Stamp Resolution** 1 ns
- **Minimum Time Between Segments** 8 µs

### Acquisition Memory Options

<table>
<thead>
<tr>
<th>Max. Acquisition Points (4 Ch/2 Ch, 2 Ch/1 Ch in WR6051A)</th>
<th>Segments (Sequence Mode)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard: 4M/8M</td>
<td>1,000</td>
</tr>
<tr>
<td>Option L: 8M/16M</td>
<td>5,000</td>
</tr>
<tr>
<td>Option VL: 12M/24M</td>
<td>10,000</td>
</tr>
</tbody>
</table>

### Acquisition Processing

- **Time Resolution (min, Single-shot)** 200 ps (5 GS/s) 100 ps (10 GS/s)
- **Averaging** Summed and continuous averaging to 1 million sweeps
- **ERES** From 8.5 to 11 bits vertical resolution
- **Envelope (Extrema)** Envelope, floor, or roof for up to 1 million sweeps
- **Interpolation** Linear or Sinx/x
Specifications

**Trigger System**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>WR6030A</th>
<th>WR6050A</th>
<th>WR6051A</th>
<th>WR6100A</th>
<th>WR6200A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trigger Sensitivity with Edge Trigger (Ch 1-4 + external)</strong></td>
<td>2 div @ &lt; 350 MHz, 1 div @ &lt; 250 MHz</td>
<td>2 div @ &lt; 500 MHz, 1 div @ &lt; 350 MHz</td>
<td>2 div @ &lt; 500 MHz, 1 div @ &lt; 350 MHz</td>
<td>2 div @ &lt; 1 GHz, 1 div @ &lt; 750 MHz</td>
<td>2 div @ &lt; 2 GHz, 1 div @ &lt; 1.8 GHz</td>
</tr>
<tr>
<td><strong>Max. Trigger Frequency with SMART Trigger® (Ch 1-4 + external)</strong></td>
<td>350 MHz @ ≥ 10 mV</td>
<td>500 MHz @ ≥ 10 mV</td>
<td>500 MHz @ ≥ 10 mV</td>
<td>750 MHz @ ≥ 10 mV</td>
<td>750 MHz @ ≥ 10 mV</td>
</tr>
<tr>
<td><strong>Trigger Level DC Accuracy</strong></td>
<td>±4% full scale ±2 mV (typical)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External trigger range</strong></td>
<td>EXT/10 ±4 V, EXT ±400 mV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Basic Triggers**

- **Edge Triggers**: 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 – 2 Ch+EXT on WR6051A). 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 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**: One PP007-WR-1 per channel standard; Optional passive and active probes available.
- **Probes 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 8.4” 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.
- **Persistece**: Aging time select from 500 ms to infinity.
- **Sweeps Displayed**: All accumulated, or all accumulated with last trace highlighted.
# Specifications

## Zoom Expansion Traces
Display up to 4 Zoom/Math traces

## CPU
<table>
<thead>
<tr>
<th>Processor</th>
<th>Intel® Celeron® 2.0 GHz or better.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing Memory</td>
<td>256 MB on Std and M option; 512 MB with L and VL options</td>
</tr>
<tr>
<td>Operating System</td>
<td>Microsoft Windows® XP Professional</td>
</tr>
</tbody>
</table>

## Internal Waveform Memory
M1, M2, M3, M4 Internal Waveform Memory (store full-length waveform 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 the network, or to a USB-connected peripheral device.

## Interface
<table>
<thead>
<tr>
<th>Remote Control</th>
<th>Via Windows Automation, or via LeCroy Remote Command Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPIB Port (Optional)</td>
<td>Supports IEEE – 488.2</td>
</tr>
<tr>
<td>Ethernet Port</td>
<td>10/100Base-T Ethernet interface (RJ-45 connector)</td>
</tr>
<tr>
<td>USB Ports</td>
<td>5 USB 2.0 ports (one on front of instrument) supports Windows-compatible devices.</td>
</tr>
<tr>
<td>External Monitor Port</td>
<td>Standard 15-pin D-Type SVGA-compatible DB-15; connect a second monitor to use dual-monitor display mode.</td>
</tr>
<tr>
<td>Parallel Port</td>
<td>Standard DB-25</td>
</tr>
<tr>
<td>Serial Port</td>
<td>DB-9 RS-232 port (not for remote oscilloscope control)</td>
</tr>
</tbody>
</table>

## Auxiliary Input
<table>
<thead>
<tr>
<th>Signal Types</th>
<th>Selected from External Trigger or External Clock input on front panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupling</td>
<td>50 Ω: DC, 1 MΩ: AC, DC, GND</td>
</tr>
<tr>
<td>Maximum Input Voltage</td>
<td>50 Ω: 5 V&lt;sub&gt;rms&lt;/sub&gt;, 1 MΩ: 250 V max. (Peak AC: ≤ 10 kHz + DC)</td>
</tr>
</tbody>
</table>

## Auxiliary Output
<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Trigger Enabled, Trigger Output, Pass/Fail, or Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Level</td>
<td>TTL, ≈3.3 V</td>
</tr>
<tr>
<td>Connector type</td>
<td>BNC, located on rear panel</td>
</tr>
</tbody>
</table>

## General
<table>
<thead>
<tr>
<th>Auto Calibration</th>
<th>Ensures specified DC and timing accuracy is maintained for 1 year minimum.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibrator</td>
<td>Output available on front panel connector provides a variety of signals for probe calibration and compensation.</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>100–240 V&lt;sub&gt;rms&lt;/sub&gt; at 50/60 Hz; 115 V&lt;sub&gt;rms&lt;/sub&gt; (±10%) at 400 Hz; Automatic AC Voltage Selection Installation Category: 300V CAT II; Max. Power Consumption: 400 VA/400 W; 350 VA/350 W for WaveRunner 6051A</td>
</tr>
</tbody>
</table>

## Environmental
<table>
<thead>
<tr>
<th>Temperature: Operating</th>
<th>+5 °C to 40 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature: Non-Operating</td>
<td>-20 °C to +60 °C</td>
</tr>
<tr>
<td>Humidity: Operating</td>
<td>5% to 80% RH (non-condensing) up to 30 °C, Upper limit derates linearly to 45% RH (non-condensing) at 40 °C</td>
</tr>
<tr>
<td>Humidity: Non-Operating</td>
<td>5% to 95% RH (non-condensing) as tested per MIL-PRF-28800F</td>
</tr>
<tr>
<td>Altitude: Operating</td>
<td>3,048 m (10,000 ft.) max at ≤ 28 °C</td>
</tr>
<tr>
<td>Altitude: Non-Operating</td>
<td>12,190 m (40,000 ft.)</td>
</tr>
</tbody>
</table>

## Physical
<table>
<thead>
<tr>
<th>Dimensions (HWD)</th>
<th>211 mm x 355 mm x 363 mm (excluding feet) 8.3” x 13.8” x 14.3”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Weight</td>
<td>10 kg. (22 lbs.), excluding printer</td>
</tr>
<tr>
<td>Shipping Weight</td>
<td>less than 13.6 kg. (30 lbs.)</td>
</tr>
</tbody>
</table>

## 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, calibration, and customization services.
Ordering Information

WaveRunner 4-Channel/2-Channel Oscilloscopes  
Product Code
2 GHz, 4 Ch, 5 GS/s, 4 Mpts/Ch (10 GS/s, 8 Mpts/2 Ch)  
Color with Windows® XP Pro 6200A

1 GHz, 4 Ch, 5 GS/s, 4 Mpts/Ch (10 GS/s, 8 Mpts/2 Ch)  
Color with Windows XP Pro 6100A

500 MHz, 4 Ch, 5 GS/s, 4 Mpts/Ch (8 Mpts/2 Ch)  
Color with Windows XP Pro 6050A

500 MHz, 2 Ch, 5 GS/s, 4 Mpts/Ch (8 Mpts/1 Ch)  
Color with Windows XP Pro 6051A

350 MHz, 4 Ch, 2.5 GS/s, 4 Mpts/Ch (5 GS/s, 8 Mpts/2 Ch)  
Color with Windows XP Pro 6030A

Included with Standard Configuration
- 10 Hz, 500 MHz Passive Probe (total of 1 Per Channel)  
PP007-WR-1
- Getting Started Manual
- CD-ROMs containing Utility Software
- Optical 3-button Wheel Mouse – USB
- Standard Ports; 10/100Base-T Ethernet, USB 2.0 (5), Parallel, RS-232, VGA Video out, Audio i/out
- Protective Front Cover
- Standard Commercial Calibration and Performance Certificate
- 3-Year Warranty

Memory Options
- 24 Mpts max. when interleaved, 12 Mpts/Ch  
(WR6-VL)
- (for use with 4 Ch WaveRunner 6004A)
- 24 Mpts max., 2 Ch 12 Mpts/Ch Memory Option  
(WR6-VC2)
- 16 Mpts max. when interleaved, 8 Mpts/Ch  
(WR6-L)
- (for use with 4 Ch WaveRunner 6004A)
- 16 Mpts max., 2 Ch 8 Mpts/Ch Memory Option  
(WR6-L2)

Software Options
- Disk Drive Measurement Software Package  
(WR6-DDM)
- Digital Filter Software Package  
(WR6-DFP)
- Ethernet Test Software Package (WR6200A Only)  
(WR6-ENET)
- Jitter and Timing Analysis Software Package  
(WR6-JTA)
- PowerMeasure Analysis Software Package  
(WR6-PMA)
- EMC Pulse Parameter Software Package  
(WR6-EMC)
- Serial Data Mask Software Package  
(WR6-SDM)
- USB 2.0 Compliance Test Software Package (WR6200A Only)  
(WR6-USB)
- Intermediate Math Software Package  
(WR6-XWAV)
- Advanced Math Software Package  
(WR6-XMATH)
- Advanced Customization Software Package  
(WR6-XDEV)
- Value Analysis Software Package (includes XWAV and JTA2)  
(WR6-XAP)
- Master Analysis Software Package  
(WR6-XMAP)
- Processing Web Editor Software Package  
(WR6-XWEB)

* WR6-EMC is compatible with all WaveRunner 6000A oscilloscopes except the WR6030A.
† WR6200A oscilloscope required for full mask testing capability; lower bandwidth models will have reduced capabilities.

Hardware and Software Options
- 32 Digital Channel Oscilloscope Mixed Signal Option  
(MS-32)
- CANbus TDM trigger, Decode and Measure/Graph Testing Option  
(CANbus TDM*)
- CANbus TD trigger and Decode Testing Option  
(CANbus TD)

* MS-32 is compatible only with WP6000A 4-channel oscilloscopes.

Probes and Probe Accessories Options  
Product Code
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)
1 GHz, 0.7 pF Active Probe (10), Small Form Factor  
(HFP1000)
WaveLink® 4 GHz Differential Probe with Adjustable Tip Module  
(D300A-A1)
WaveLink 4 GHz, 5 V Differential Probe with Small Tip Module  
(D310ST)
WaveLink ProBus Probe Body  
(WL300)
1 GHz Active Differential Probe (10, -10, -20)  
(AP034)
500 MHz Active Differential Probe (x10, -10, -100)  
(AP033)
30 A; 100 MHz Current Probe – AC/DC, 40 Arms  
(CP031)
50 A Peak Pulse  
(CP030)
30 A; 50 MHz Current Probe – AC/DC, 40 Arms  
(CP030)
50 A Peak Pulse  
(CP015)
150 A; 10 MHz Current Probe – AC/DC, 150 Arms  
(CP150)
500 A Peak Pulse  
(CP500)
500 A; 2 MHz Current Probe – AC/DC, 500 Arms  
(CP500)
700 A Peak Pulse  

3,000 V, 100 MHz Differential Probe  
(APD300)
1,400 V, 100 MHz Differential Probe  
(APD300)
Basic Adapter Kit for PP007-WR-1 and PP007-WS-1  
(PK701)
Advanced Adapter Kit for PP007-WR-1 and PP007-WS-1  
(PK702)
SMD Adapter Kit for PP007-WR-1 and PP007-WS-1  
(PK703)
Microclip Kit for PP007-WR-1 and PP007-WS-1  
(PK704)
1 Ch 100 MHz Differential Amplifier  
(DA1850)
with Precision Voltage Source

* For a complete probe, order a WL300 Probe Body with the Probe Tip Module. Only applicable with the WR6200A oscilloscope.

Hardware Options and Accessories
- IEEE-488 GPIB Interface Upgrade  
(WR6-GPIB)
- Graphics Printer  
(WR6-GPP)
- Removable Hard Drive  
(WR6-RHD)
- CD-RW Upgrade  
(WR6-CDR)
- Graphic Printer Retrofit  
(WR6-GRA-RP)
- USB Hoppy Drive  
(WR6-HDPY)
- Hard Transit Case  
(WR6-HARD)
- Soft Carrying Case  
(WR6-SCFT)
- Rackmount, 1U High  
(WR6-RACK)
- Accessory Pouch  
(WR6-POUCH)
- Mini Keyboard, USB  
(WR6-KBD)
- USB Flash Memory  
(WR6-USB)
- Video Trigger Module  
(V75)
- Oscilloscope Cart with Additional Shelf and Drawer  
(OC1024)
- Oscilloscope Cart  
(OC1021)
- Ethernet Compliance Fixture for 10Base-T  
(TF-10BT)
- Ethernet Compliance Fixture for 10Base-T/100Base-T  
(TF-10BT)
- [Includes a Set of 2 Test Fixtures Signals on Twisted Pair Cables (UTP)]
- Telecom Adapter Kit  
(TF-TEL)
- USB 2.0 Testing Compliance Test Fixture  
(TF-USB)

Customer Service
LeCroy oscilloscopes 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.

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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