Test Equipment Solutions Datasheet

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as spectrum analyzers, signal generators, oscilloscopes, power meters, logic analysers etc from all the major suppliers such as Agilent, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. As such, we fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 2 year warranty. Our staff have extensive backgrounds in T&M, totalling over 150 years of combined experience, which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, covering the cost of warranty returns BOTH ways (plus supplying a loan unit, if available) and supplying a free business tool with every order.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based near Heathrow Airport in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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LeCroy

waveRunner®

The New Benchmark for Everyday Oscilloscopes

WaveRunner 6000 Series

Remarkably easy to use

Sets a new standard for value

Simple, affordable, and uncommonly capable

LeCroy

A Brand New Day for the Everyday Bench Scope

The new WaveRunner 6000 Series is an engineer's dream come true: simple, affordable, and uncommonly capable. Until recently, you had to make a choice–shell out for a costly, complex, high-powered analytical oscilloscope for your everyday bench work. Or buy a cheap model and get stuck with an inferior, underpowered, low-end scope. The WaveRunner 6000 Series benchtop oscilloscopes eliminate this trade-off.

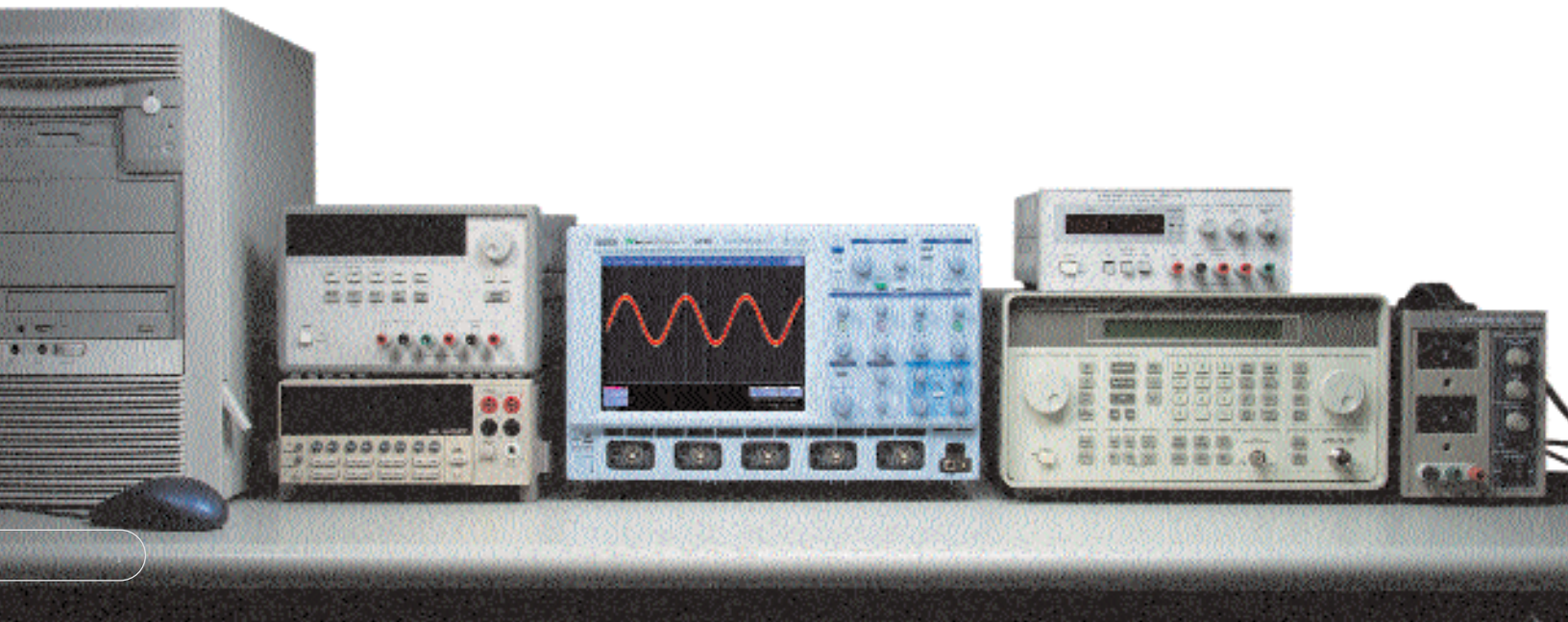
A simple scope for quick and easy measurements.

A high-powered analytical scope for more complex WaveShape Analysis.

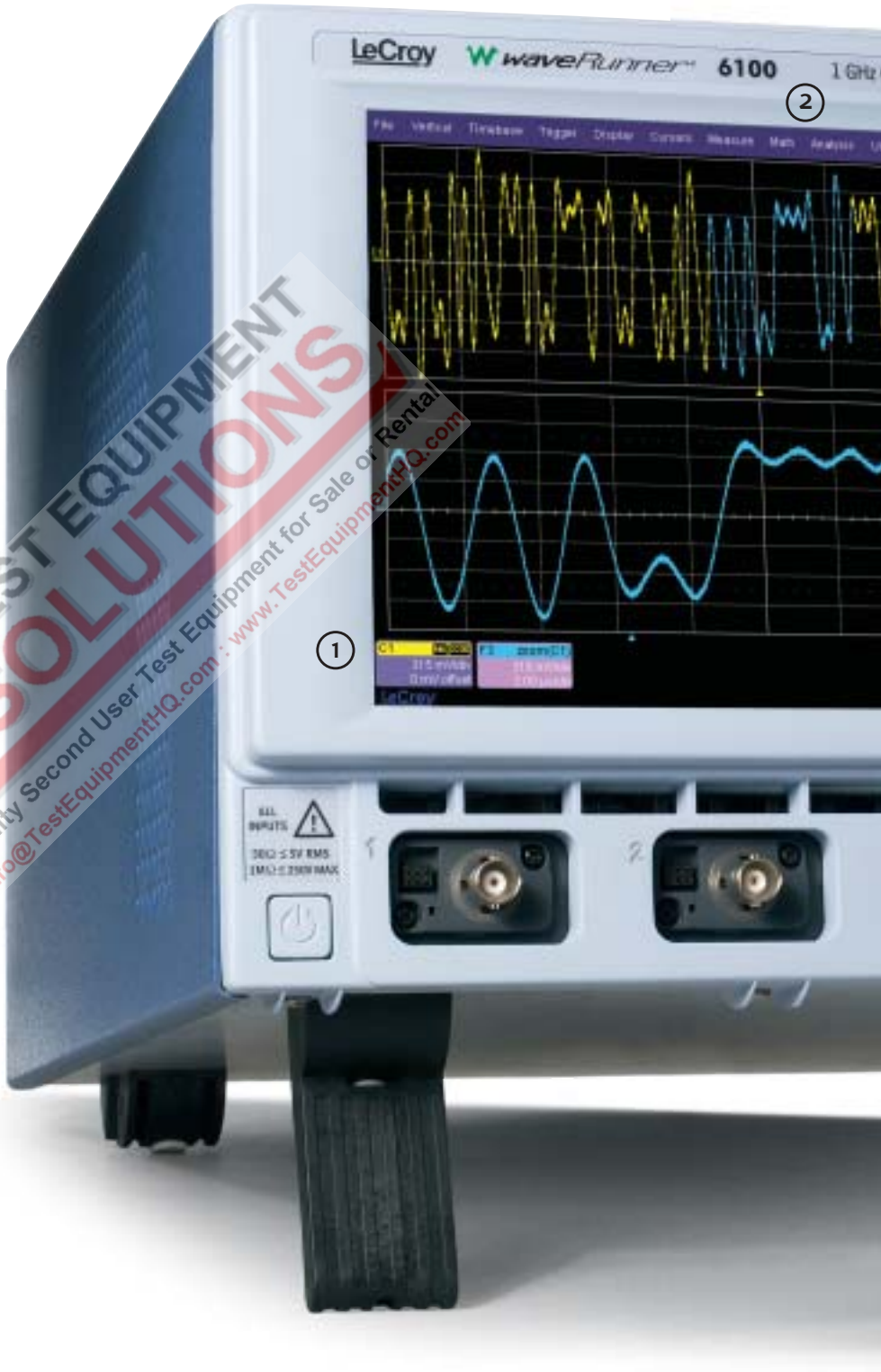
What gives the WaveRunner 6000 Series this unprecedented versatility?

- An intuitive two-tiered user interface puts common tasks at your fingertips — and deeper analysis only two touches away.
- Uncompromising acquisition technology gives you confidence in the accuracy of your waveform measurements.
- Limitless analysis capability expands with your needs, eliminating equipment obsolescence.
- New passive probe with low impedance and a flat impulse response.
- The strongest warranty and longest support life available.

All at a remarkably affordable price.



The New WaveRunner 6000 Series



1. Need to change settings? Touch the screen once.

In addition to the descriptor fields showing comprehensive information about scope settings and status, you can touch them to open up a setup dialog and change your settings.

2. Want to do some analysis? Two touches.

Want to quickly characterize a signal's timing characteristics? Touch 'Measure' and 'Horizontal' to see six 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. 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.

5. Zoom control knobs

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

6. Press a knob — presto!

Lost the waveform? Just press the offset button. Your scope instantly zeroes the offset, restoring the waveform to the middle of your screen where you can see it clearly. Press again to restore the offset. Similar press functions allow you to automatically set the trigger level, zero delay, and reset zooms.

7. Handy USB Port

With one USB port on the front panel and four more on the back, you can connect an unlimited number of plug-n-play peripheral and memory devices.

Bonus feature: use a memory stick to take your setup from scope to scope and have them all automatically boot to your configuration. No more debates over settings with other users.

8. PP007 Passive Probe

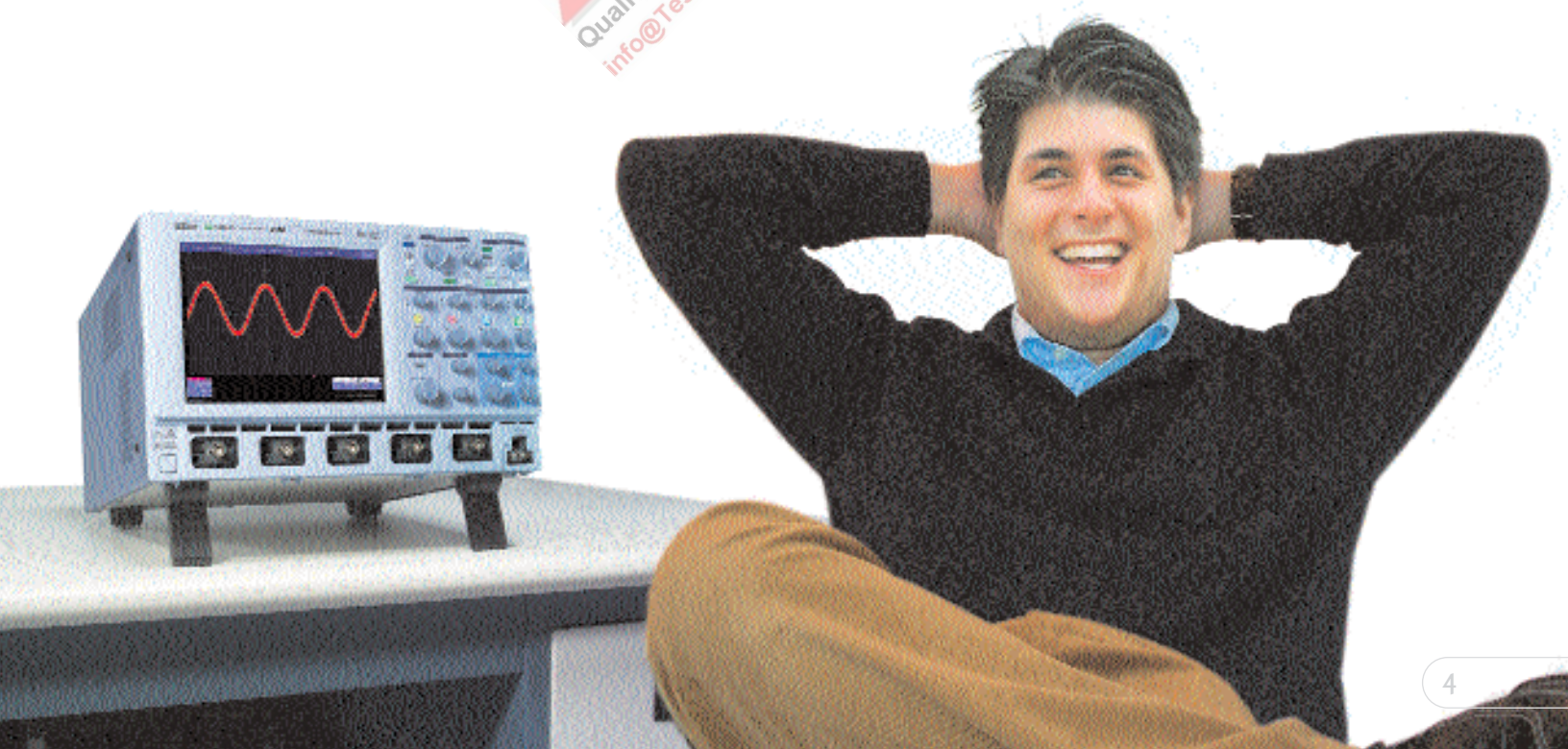
This new probe is perfect for general-purpose applications — only 2.5mm with low capacitance and a flat impulse response.

An Interface that's Easy to Use — Impossible to be Without

Hundreds of scope users like you have contributed to this uniquely simple and convenient user interface. With the WaveRunner 6000, everything you need to view and measure waveforms quickly and efficiently can be controlled from the front panel. Volts per division, offset, zoom, triggers, cursors, and documentation — all are at your fingertips with the turn of a knob or the press of a button.

Need to go beyond quick measurements and do some more sophisticated analysis? Just touch the display screen. Simple pop-up menus guide you, easily and intuitively, through virtually every measurement you might ever want to make.

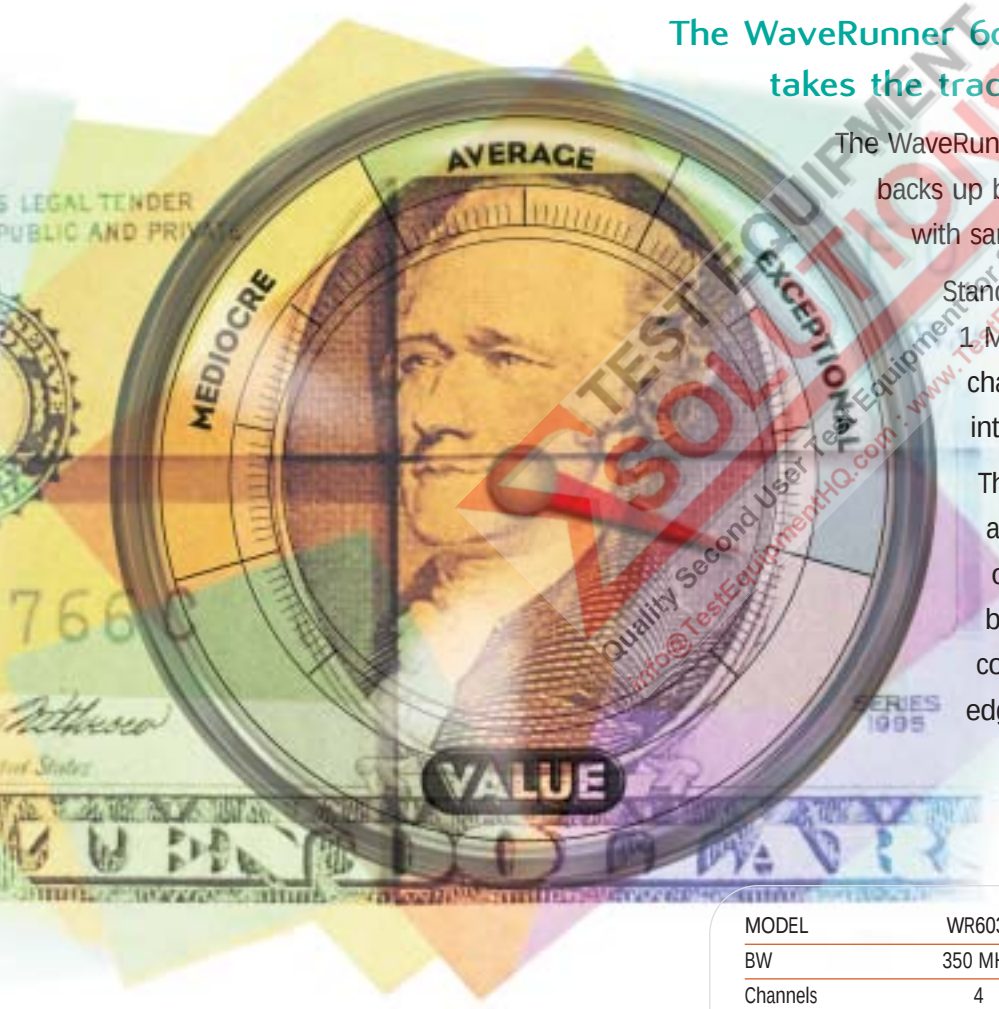
We started from the proven code base of our acclaimed WaveMaster™ and WavePro® scopes. But it was hundreds of concept, alpha, and beta testers who helped us add the convenient little touches that make WaveRunner 6000 an outstanding everyday scope.



Acquisition Performance without Tradeoffs

Old-technology scopes force you to make trade-offs between sample rate and memory that compromise the accuracy of your measurements:

- You can have a fast sample rate, but you can't run at full speed for more than a few microseconds. So you risk missing a detail that is separated from the trigger point. Or . . .
- You can run at full speed longer, but sample at a slower rate. This may cause you to miss a high-frequency transient or a sharp edge.



The WaveRunner 6000 Series takes the trade-offs away.

The WaveRunner 6000 Series of benchtop scopes backs up bandwidths from 350 MHz to 2 GHz, with sample rates of 2.5 to 10 GS/s.

Standard memory length is an impressive 1 Mpts, expandable to 12 Mpts on all channels, and up to 24 Mpts when interleaved.

This performance is delivered at a price far below old-technology oscilloscopes. So even on a tight budget, you can afford the confidence delivered by leading-edge technology.

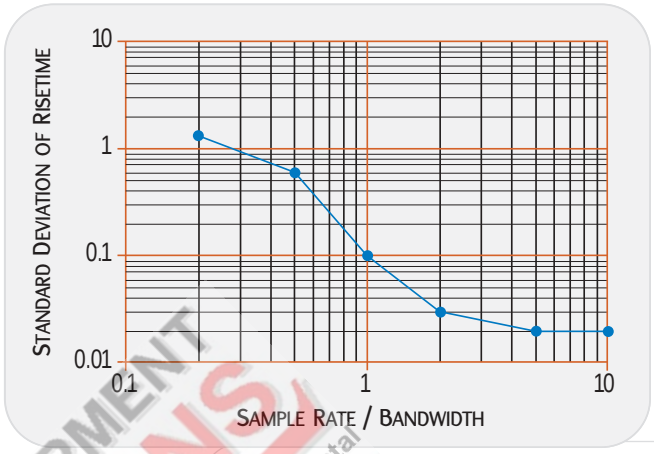
MODEL	WR6030	WR6050	WR6051	WR6100	WR6200
BW	350 MHz	500 MHz	500 MHz	1 GHz	2 GHz
Channels	4	4	2	4	4
SR: All channels	2.5 GS/s	5 GS/s	5 GS/s	5 GS/s	5 GS/s
SR: Interleave	–	–	–	10 GS/s	10 GS/s
Memory: All Channels	1 Mpt (2 Mpt interleaved)				
Memory: Max Option	12 Mpt (24 Mpt interleaved)				

Complete specifications start on page 13

Unrivaled Signal Fidelity. Believe it.

The WaveRunner 6000 Series is powered by the same SiGe technology that is used in LeCroy's high-performance WaveMaster oscilloscopes. High sample rates combined with low jitter (3ps typical) and an ultra-stable clock (±5 ppm) give you timing resolution that rivals oscilloscopes that cost twice as much.

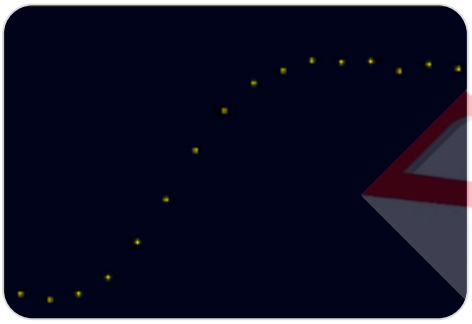
How much oversampling (Sample Rate/ Bandwidth) is necessary? Opinions vary but LeCroy's analysis shows that the answer ranges from 3x to 10x, depending upon how you interpolate and view the data*. Insufficient oversampling results in distorted waveforms.



Sample Rate	SR/BW	Variance Std. Dev.	Variance %
200 MS/s	0.2	1.3 ns	110%
500 MS/s	0.5	0.6 ns	52%
1 GS/s	1.0	0.1 ns	8.7%
2 GS/s	2.0	0.03 ns	2.6%
5 GS/s	5.0	0.02 ns	1.7%
10 GS/s	10.0	0.02 ns	1.7%

Input: 1 ns rising edge

Figure 1



Fast Edge

Figure 1 shows another example. The consistency (low standard deviation) of a simple risetime measurement improves as oversampling approaches 5x, with improvements diminishing significantly beyond 5x.

Regardless of your criteria, the WaveRunner 6000 Series gives you the acquisition headroom you need to be confident in the accuracy of your most critical measurements.

*Interpolation on your DSO, Pupalaikis, 2003

AN OUTSTANDING NEW PASSIVE PROBE

The new PP007 500 MHz passive probe comes standard with the WaveRunner 6000 Series.

Just 2.5 mm, the PP007 lets you take measurements in small spaces without touching another device. The low capacitance (<9.5pF) and flat impulse response ensure your signal is perfectly transmitted to the high-fidelity WaveRunner front-end amplifier.

The probe is compatible with over 30 accessories, including clips, leads, hooks, tips, ground leads, and BNC adapters. This makes it practical in a variety of applications.

The PP007 is just one of over 25 LeCroy passive, active, current and differential probes that are compatible with the WaveRunner 6000 — one is sure to be perfect for your application.

Why is Long Memory Important?

A fast sample rate is useless if you don't have enough memory to use it. Traditional oscilloscopes can run out of memory in microseconds if they are sampling at their fastest rate. If you need to see a longer period of time, you must reduce the sample rate and risk a loss of signal fidelity.

Here's an example. The most famous feature of the Mona Lisa is her smile. Yet, one of the great mysteries of the art world is why she *is* smiling. This parallels a typical debugging session. The smile represents the symptom that is triggering your scope (glitch, reset line going high, etc) and you must find the root cause. Figure 2 shows the dilemma facing the short-memory scope user: either be limited to looking at the smile (2b); or try to find the answer in a blurry picture (2a). Long memory in Figure 3 gives you enough information to see the entire picture at full resolution, and to realize that Mona Lisa is smiling, listening to Leo's new music player.

Other advantages of long sample records:

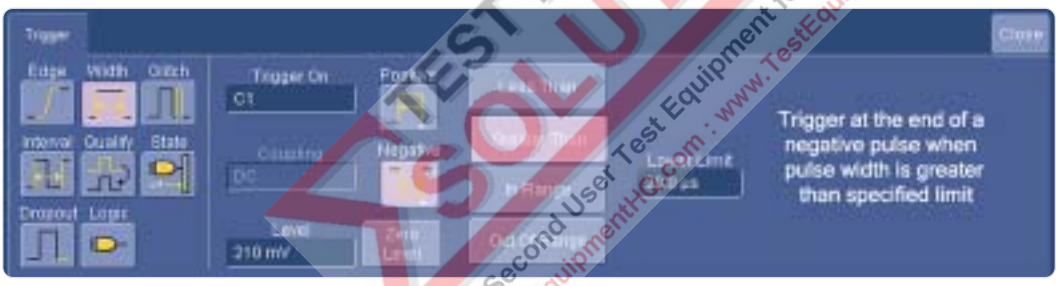
- Reliable capture of events that are unpredictable in time.
- Signal parameters can be tracked over time, which makes it easier to find effects that "drift" or "roll" as a function of time.
- Statistically significant histograms can be generated with a single acquisition.
- When looking for intermittent errors, capturing long records minimizes the "dead time" between data captures as well as jitter.
- Minimized or eliminated trigger jitter from multiple acquisitions.

SMART Trigger Makes the Most of Your Long Memory

The WaveRunner 6000 SMART Trigger provides the flexibility needed to quickly trigger on the specific signal characteristic or pattern you are looking for. You can also trigger on abnormal signals at the touch of a button.

An exclusion/inclusion feature lets you trigger on signals that are either outside, or within, a specific range of pulse width. By selecting multiple threshold levels and the pulse width, you can quickly and easily catch the waveform you want to view and measure.

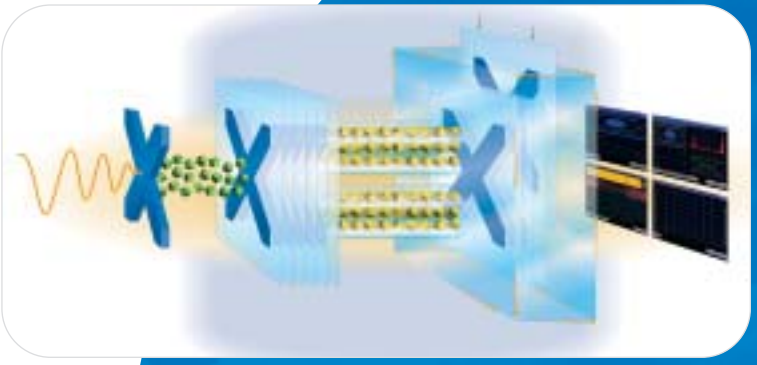
Your WaveRunner 6000 scope's memory retains thousands of events that can be acquired for viewing at your leisure. Replay the signal history, scan and search from sweep to sweep, and stop when you see something of interest.



X-Stream™: Long memory without the wait

LeCroy's proprietary X-Stream Technology, built into all of our WaveRunner 6000 oscilloscopes, enables faster throughput and a highly responsive display.

Proprietary algorithms, CMOS memory, and SiGe amplifiers and ADCs, permit data transfer and processing 10 to 100 times faster than competitors' scopes.



Unlimited Expandability Makes for a Lasting Relationship

It's an engineer's dream: a benchtop oscilloscope that can handle everyday signal measurements easily and efficiently, but can power up to perform more sophisticated WaveShape Analysis when needed.

Designed to grow with your needs, the WaveRunner 6000 Series makes this dream come true. Optional packages allow this versatile benchtop scope to handle your most advanced math and analysis tasks with ease, no matter what your application. Yet it's priced far below other scopes that are not nearly as versatile and fully featured.

WaveShape Analysis Packages

Advanced Math Package	WR6-XMATH
Developer's Customization Kit	WR6-XDEV
Master Analysis Package (XMATH + XDEV + JTA2)	WR6-XMAP
Digital Filter Package	WR6-DFP2
Disk Drive Measurements Package	WR6-DDM2
Ethernet Test Package (WaveRunner 6200 only)	WR6-ENET
Jitter and Timing Analysis	WR6-JTA2
PowerMeasure Analysis	WR6-PMA2
Serial Data Mask Package	WR6-SDM
USB 2.0 Compliance Software (WaveRunner 6200 only)	WR6-USB2

Expanded Analysis

Need more than the standard 30 math functions and 40 parameter measurements? The XMATH Advanced Math Package gives you a comprehensive set of tools for analyzing the wave shapes of complex signals.

XMATH includes parameter math, tracking measurements, expanded FFT (up to 24 Mpts), expanded histogramming, parameter math, and trending of up to one million events. You can even connect an unlimited number of functions together for maximum analysis power. To harness this power, XMATH also comes with a graphical interface that lets you connect input source, measurement, and display icons for surprisingly simple advanced analysis.

Custom Analysis

The XDEV Advanced Customization 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 lets you seamlessly integrate 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. Whether you need to create a template for a special task, or for a special audience (such as manufacturing technicians or students), or even if you simply like to tweak an interface to meet your specific tastes, you are in charge.

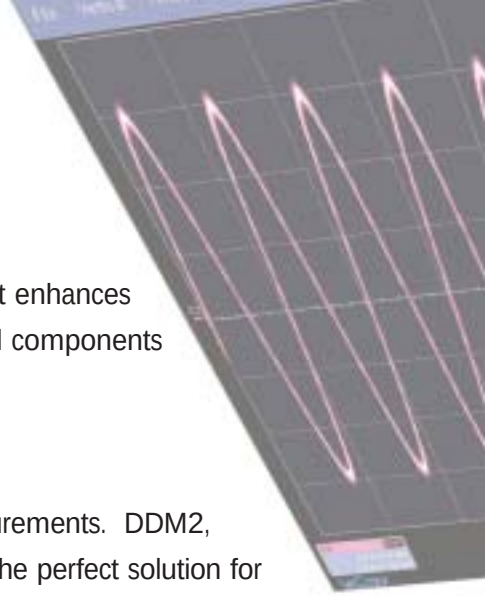
Flexible Programmability

The WaveRunner 6000 Series offers many programming options. In addition to the legacy LeCroy remote command language, you can use COM-based commands or IVI and LabView drivers.

Open Windows OS

Your oscilloscope is an integral part of your tool chain. A modern scope needs to interact with design, simulation, documentation, and communication tools.

WaveRunner 6000's open Windows operating system allows you to install any Windows software you wish, integrate your scope with best-in-class tools and peripherals, connect to the Internet, even operate the scope remotely.



Digital Filter Package

DFP2 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.

Disk Drive Measurement Package

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

Ethernet Test Package (WaveRunner 6200 only)

This package (ENET) allows you to conduct complete electrical testing for 1000Base-T, 100Base-TX, 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.

Jitter and Timing Analysis

Use the JTA2 package to find 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.

PowerMeasure Analysis

The industry-leading PMA2 package automates and enhances your ability to analyze power conversion devices and circuits. Optional accessories, such as differential amplifiers, differential probes, current probes, and deskew fixtures complete the solution.

Serial Data Mask Package

The SDM toolset harnesses the WaveRunner DSO's long memory and low jitter to deliver outstanding serial bus characterization. SDM lets you 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.

USB2.0 Compliance Software (WaveRunner 6200 only)

USB2 provides a complete acquisition and analysis system for USB 2.0 devices, hosts, and hubs, as specified in the USB-IF USB 2.0 Electrical Test Specification, version 1.0.

Every Scope Includes a Partnership

LeCroy has always thrived on a culture of fostering long-term relationships with customers. The importance of this is reflected throughout our product development, manufacturing, sales, and support processes. We are proud of the following company practices and encourage you to compare them with our competition.

Warranty — LeCroy scopes are designed, built, and tested to ensure high reliability. Naturally, we warrant our digital oscilloscopes for three years.

Your downtime and cost related to scope failures during warranty should be minimized. LeCroy ensures this by fully updating, calibrating, insuring, and return shipping your in-warranty units back to you quickly and at no charge.

Long-term Support — Quality capital purchases should be supported over time. LeCroy's policy is to supports its instruments for seven years, at a minimum, after final production. This ensures that you will enjoy productive use of your LeCroy scopes for their entire operating life.

After-sale Option Add-ons and Upgrades — We believe you should be able to add options later if you like, without pricing penalties. With LeCroy, you can.

Software Support — We also believe that you should be able to upgrade to the latest software you like, without charge. Once again, with LeCroy, you can.

Retrofit of New Features — You have a right to expect that, when technically feasible, new features will be available for previously purchased products. LeCroy makes it a point to protect you from product obsolescence.

WaveRunner Specs

Vertical System	WaveRunner 6030	WaveRunner 6050	WaveRunner 6051	WaveRunner 6100	WaveRunner 6200
Nominal Analog Bandwidth @ 50 Ω (–3 dB)	350 MHz	500 MHz	500 MHz	1 GHz	2 GHz
Rise Time (Typical)	1 ns	750 ps	750 ps	400 ps	225 ps
Input Channels	4	4	2	4	4
Bandwidth Limiters	25 MHz; 200 MHz				
Input Impedance	1MΩ // < 20pF (10 MΩ // 9.5pF using PP007 probe)				
Input Coupling	50 Ω: DC, 1MΩ: AC, DC, GND				
Maximum Input Voltage, 50 Ohm	50 Ω: 5 Vrms, 1 MΩ: 250 V max (Peak AC: ≤ 10 kHz + DC)				
Channel to Channel Isolation	> 40dB @ < 100MHz (> 30dB @ full bandwidth)				
Vertical Resolution	8 bits; up to 11 with enhanced resolution (ERES)				
Sensitivity	50 Ω: 2 mV/div – 1 V/div fully variable; 1 MΩ: 2 mV – 10 V/div fully variable				
DC Gain Accuracy	±1.0% of full scale (typical)				
Offset Range	50 Ω: ± 400 mV @ 2–4.99 mV/div ± 1 V @ 5–100 mV/div ± 10 V @ 102 mV/div – 1V/div 1 MΩ: ± 500 mV @ 2–4.99 mV/div ± 1 V @ 5–100 mV/div ± 10 V @ 102 mV/div – 1V/div ± 100 V @ 1.02V/div – 10V/div				
Offset Accuracy	± (1.5% + 0.5% of offset value + 1 mV)				
Probing System	BNC or Probus				

Timebase System

Timebases	Internal timebase common to all input channels; an external clock may be applied at the auxiliary input				
Time/Division Range	20 ps/div – 10 s/div				
Math and Zoom Traces	4 independent zoom and 4 math/zoom traces standard				
Clock Accuracy	≤ 5 ppm @ 25 °C (≤ 10ppm @ 5–40 °C)				
Time Interval Accuracy	Clock Accuracy + Jitter Noise Floor				
Sample Rate and Delay Time Accuracy	Equal to Clock Accuracy				
Trigger and Interpolator Jitter (RMS)	≤ 3 ps rms (typical WaveRunner 6100)				
Channel to Channel Deskew Range	±4.5 ns				
External Sample Clock	30 MHz to 2 GHz; 50 Ω or 1M Ω BNC input				
Roll Mode	Switches Automatically at t/div > 0.5 s/div or sample rate < 20 KS/sec				

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)	N/A	N/A	N/A	10 GS/s	10 GS/s
Random Interleaved Sampling (RIS)	200 GS/s				
Trigger Rate	140,000 waveforms/second				
Sequence Time Stamp Resolution	1 ns				
Minimum Time between Sequential Segments	8 µs				

ACQUISITION MEMORY	Max. Acquisition Points (4 Ch / 2 Ch; 2 Ch / 1 Ch in 6051)	Segments (Sequence Mode)
Standard	1M / 2M	500
Option S	2M / 4M	500
Option M	4M / 8M	1,000
Option L	8M / 16M	5,000
Option VL	12M / 24M	10,000

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, and roof for up to 1 million sweeps
Interpolation	Linear, Sinx/x

WaveRunner Specs (continued)

Trigger System

Trigger Modes	Normal, Auto, Single, Stop
Sources	Any input channel, External, Ext/10, or Line; slope and level unique to each source
Trigger Coupling	DC50 Ω, GND, DC1MΩ, AC1MΩ
Pre-trigger Delay	0–100% of memory size (adjustable in 1% increments, or 100 ns)
Post-trigger Delay	The smaller of 0 to 10,000 divisions or 86,400 seconds
Hold-off	2 ns to 20 s or 1 to 99,999,999 events
Internal Trigger Level Range	±5 div from center (typical)
Max Trigger Frequency	2 divisions at > 750 MHz with Edge Trigger; 1 div at 750 MHz 750 MHz max with SMART Trigger @ ≥ 10 mV (subject to bandwidth limit of oscilloscope)
Trigger Level DC Accuracy	±4% full scale ±2mV (typical)
External Trigger Range	EXT/10 ±4V; EXT ±400mV

Basic Triggers

Edge/Slope/Line	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 6051). 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 Width	Triggers on positive or negative pulse 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 10ns 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
Vertical Find Scale	Automatically sets the vertical sensitivity and offset for the selected channels to display

Probes

Probes	One PP007 per channel 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 8.4" flat-panel TFT-LCD with high resolution touch screen
Resolution	SVGA; 800 x 600 pixels
Real Time Clock	Dates, hours, minutes, seconds displayed with waveform. Accurate to ±50ppm. 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

WaveRunner Specs (continued)

Zoom Expansion Traces

	Display up to 4 Zoom and 4 Math/Zoom traces

CPU

Processor	Intel Pentium 2 GHz or better
Processing Memory	256 MB on Std S & M option; 512 MB with L option & VL option
Operating System	Microsoft Windows 2000 Professional

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

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 (RJ-45 connector)
USB Ports	5 USB ports (one on front of instrument) supports Windows-compatible devices
External Monitor Port	Standard 15-pin D-Type SVGA-compatible DB-15; connect a second monitor to use dual-monitor display mode
Parallel Port	Standard DB-25
Serial Port	DB-9 RS232 port (not for remote oscilloscope control)

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	100–240 Vrms (±10%) at 50/60 Hz; 100–120 Vrms (±10%) at 400 Hz Automatic AC Voltage Selection Installation Category: 300V CAT II; Max. Power Consumption: 425 VA/425 W

Environmental

Temperature: Operating	+5 °C to 40 °C
Temperature: Nonoperating	–20 °C to +60 °C
Humidity: Operating	5% to 80% RH (noncondensing) up to 30 °C; Upper limit derates linearly to 50% RH (noncondensing) at 40°C
Humidity: Nonoperating	5% to 95% RH (noncondensing) as tested per MIL-PRF-28800F
Altitude: Operating	3,048m (10,000 ft.) max at ≤ 25 °C
Altitude: Nonoperating	12,190m (40,000 ft.)
Random Vibration: Operating	5 Hz to 500 Hz, overall level: 0.31 grms, 15 min duration in each of three orthogonal axes
Random Vibration: Nonoperating	5 Hz to 500 Hz, overall level: 2.4 grms, 15 min duration 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 (HWD)	211mm x 355mm x 363mm (excluding feet) 8.3" x 13.8" x 14.3"
Net Weight	10 kg (22 lb.), excluding printer
Shipping Weight	Less than 13.6 kg (30 lb.)

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, calibration, and customization services

WaveRunner Ordering Information

WaveRunner 4-Channel Digital Oscilloscopes

2 GHz, 5 GS/s, 1 Mpts/4 Ch; 10 GS/s, 2 Mpts/2 Ch, 4 Ch Color	WaveRunner 6200
1 GHz, 5 GS/s, 1 Mpts/4 Ch; 10 GS/s, 2 Mpts/2 Ch, 4 Ch Color	WaveRunner 6100
500 MHz, 5 GS/s, 1 Mpts/4 Ch; 5 GS/s, 2 Mpts/2 Ch, 4 Ch Color	WaveRunner 6050
500 MHz, 5 GS/s, 1 Mpts/2 Ch; 5 GS/s, 2 Mpts/1 Ch, 2 Ch Color	WaveRunner 6051
350 MHz, 2.5 GS/s, 1 Mpts/4 Ch; 2.5 GS/s, 2 Mpts/2 Ch, 4 Ch Color	WaveRunner 6030

Included with Standard Configuration

10:1 10 MΩ, 500 MHz BW Passive Probes – Qty 4 (2 with WaveRunner 6051)	PP007
Operators Manual; Quick Reference Guide; CD-ROM with OM/RCM and Utility software and Recovery software	
Remote Control Manual	
Optical 3 button Wheel Mouse – USB	
Standard Ports; 10/100Base-T Ethernet, USB (5), Parallel, RS-232, SVGA Video out, Audio in/out	
Internal Hard Drive	
Protective Front Cover	
Standard Commercial Calibration and Performance Certificate	
3-Year Warranty	

Memory Options

	6200 6100 6050 6030	6051
2 Mpts/Ch, 4 Mpts maximum using 2 Channel (1 Channel for 6051)	S	S2
4 Mpts/Ch, 8 Mpts maximum using 2 Channel (1 Channel for 6051)	M	M2
8 Mpts/Ch, 16 Mpts maximum using 2 Channel (1 Channel for 6051)	L	L2
12 Mpts/Ch, 24 Mpts maximum using 2 Channel (1 Channel for 6051)	VL	VL2

Hardware Options

Removable HDD	WR6-RHD
CD-RW Upgrade	WR6-CDRW

WaveShape Analysis Packages

Jitter and Timing Analysis	WR6-JTA2
PowerMeasure Analysis	WR6-PMA2
Disk Drive Measurement Package	WR6-DDM2
Digital Filter Package	WR6-DFP2
Serial Data Mask Package	WR6-SDM
Ethernet Test Package (WaveRunner 6200 only)	WR6-ENET
USB 2.0 Compliance Software (WaveRunner 6200 only)	WR6-USB2
Advanced Math Package	WR6-XMATH
Intermediate Math Package	XWAV
Master Analysis Package (XMATH + XDEV + JTA2)	WR6-XMAP
Value Analysis Package (XWAV + JTA2)	XVAP
Developer's Customization Kit	WR6-XDEV
Norton Antivirus	WR6-AV

Selected Accessories

Passive Probe, 500 MHz	PP007-1
2.5 GHz Active Voltage Probe	HFP2500
1.5 GHz Active Voltage Probe	HFP1500
1 GHz Active Voltage Probe	HFP1000
500 MHz Differential Probe	AP033
1 GHz Differential Probe	AP034
1GHz Active FET Probe	AP020
500A, 2 MHz Current Probe	CP500
150A, 10 MHz Current Probe	CP150
15A, 50 MHz Current Probe	CP015
30A, 50 MHz Current Probe	AP015
3 GHz Differential Probe and Adjustable Twin Tips	D300 & D300AT
100 MHz Differential Amp	DA1855A
Floppy Drive (External USB)	WR6-FLPY
Rackmount	WR6-RACK
Mini Keyboard	WR6-KBD
Soft Carrying Case	WR6-SOFT
Hard Transit Case	WR6-HARD
Accessory Pouch	WR6-POUCH
GPIB	WR6-GPIB
256 MB USB Memory Key	MEM-USB
Scope Cart – Basic	OC1021
Scope Cart – With extra shelf & drawer	OC1024
Operator's Manual Printed Hardcopy	OM-E
5-Year NIST Calibration and Warranty	WR6-T5

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