TELEDYNE LECROY
Everywhereyoulook™

# HDO4000 High Definition Oscilloscopes

## 200 MHz – 1 GHz

### Key Features

- 12-bit ADC resolution, up to 15-bit with enhanced resolution
- 200 MHz, 350 MHz, 500 MHz, 1 GHz bandwidths
- Long Memory – up to 50 Mpts
- 12.1" touch screen display
- Multi-language User Interface
- WaveScan – Advanced Search and Find
- LabNotebook Documentation and Report Generation
- History Mode – Waveform Playback
- Spectrum Analyzer Mode
- Power Analysis Software
- Serial Data Trigger and Decode

**Combining Teledyne LeCroy's HD4096 high definition 12-bit technology, with long memory, a compact form factor, 12.1" touch screen display and powerful debug tools, the HDO4000 is the ideal oscilloscope for precise measurements and quick debug. Tools such as WaveScan Search and Find, LabNotebook Report Generator, and History Mode help identify and isolate problems for faster troubleshooting.**

### HD4096 Technology

HD4096 high definition technology consists of high sample rate 12-bit ADCs, high signal-to-noise input amplifiers and a low-noise system architecture. This technology enables high definition oscilloscopes to capture and display signals of up to 1 GHz with high sample rate and 16 times more resolution than other oscilloscopes.

### Long Memory

With up to 50 Mpts of memory the HDO4000 High Definition Oscilloscopes can capture large amounts of data with more precision than other oscilloscopes. The 2.5 GS/s, 50 Mpts architecture provides the ability to capture a fast transient or a long acquisition.

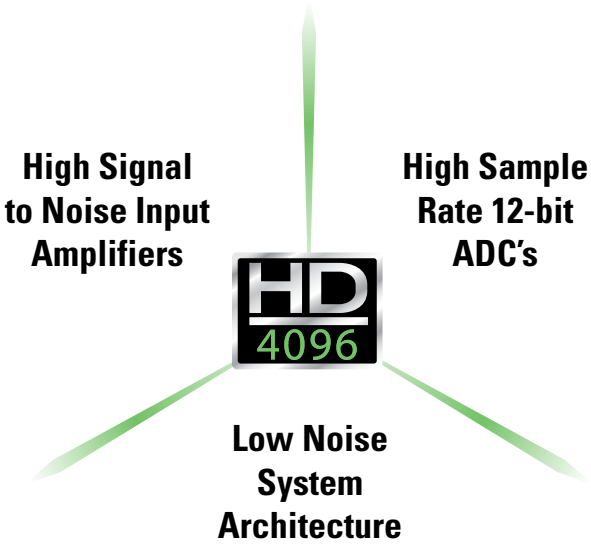
### Large 12.1" Touch Screen

Navigating complicated user interfaces is a thing of the past thanks to the large touch screen display of the HDO4000. The user interface was designed for touch screens which makes navigating the HDO4000 extremely intuitive. Every aspect of the interface is touchable making channel, timebase and trigger settings only one touch away.

### Compact Form Factor

The HDO4000 builds upon Teledyne LeCroy's history of "Large Screen, Small Footprint" with its 12.1" wide touch screen display and 5" depth. Additionally, the innovative rotating, tilting feet enable the HDO4000 to be placed in 4 different viewing positions ensuring optimal viewing no matter where it is being positioned in the lab.

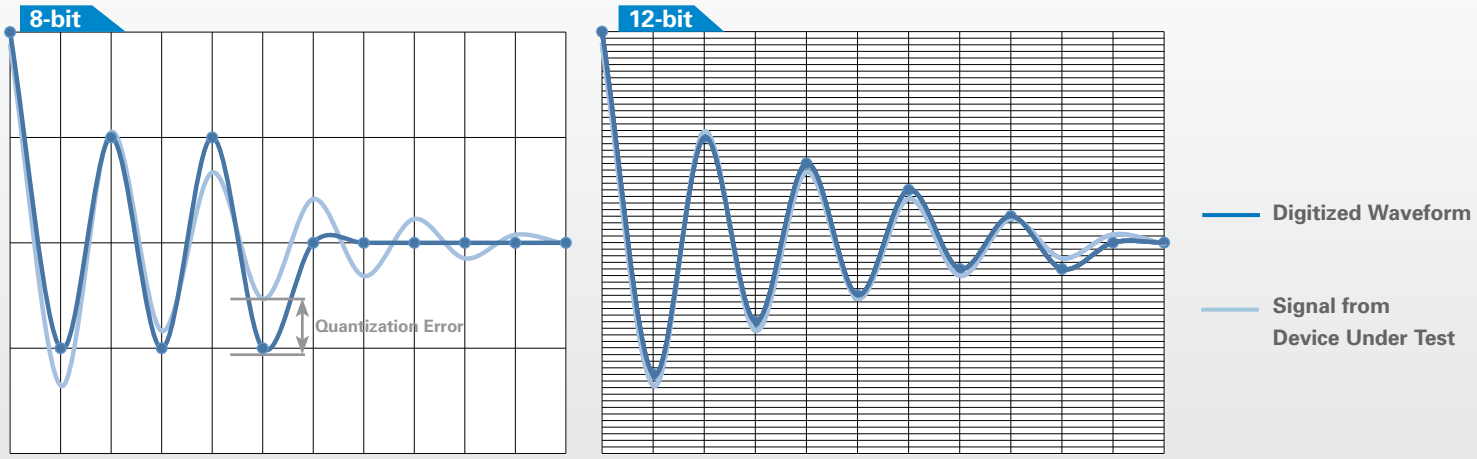
# HD4096 HIGH DEFINITION TECHNOLOGY




**HD4096 high definition technology consists of high sample rate 12-bit ADCs, high signal-to-noise ratio amplifiers and a low-noise system architecture. This technology enables high definition oscilloscopes to capture and display signals of up to 1 GHz with high sample rate and 16 times more resolution than other oscilloscopes.**

Oscilloscopes with HD4096 technology have higher resolution and measurement precision than 8-bit alternatives. The high sample rate 12-bit ADCs provide high resolution sampling at up to 2.5 GS/s. The high performance input amplifiers deliver phenomenal signal fidelity with a 55 dB signal-to-noise ratio and provide a pristine signal to the ADC to be digitized. The low-noise signal architecture ensures that nothing interferes with the captured signal and the oscilloscope displays a waveform that accurately represents the signals from the device under test.

## 16x Closer to Perfect




### 16x More Resolution

12-bits of vertical resolution provides sixteen times more resolution than 8-bits. The 4096 discrete levels reduce the quantization error. Signals captured with lower resolution oscilloscopes have a higher level of quantization error resulting in less accurate waveforms on the display. Signals captured on an oscilloscope with 12-bit HD4096 technology are accurately displayed with minimal quantization error.

# DEBUG IN HIGH DEFINITION WITH HD4096

**Oscilloscopes with HD4096 have a variety of benefits that allow the user to debug in high definition. Waveforms displayed by high definition oscilloscopes are cleaner and crisper. More signal details can be seen and measured; these measurements are made with unmatched precision resulting in better test results and shorter debug time.**

## Clean, Crisp Waveforms

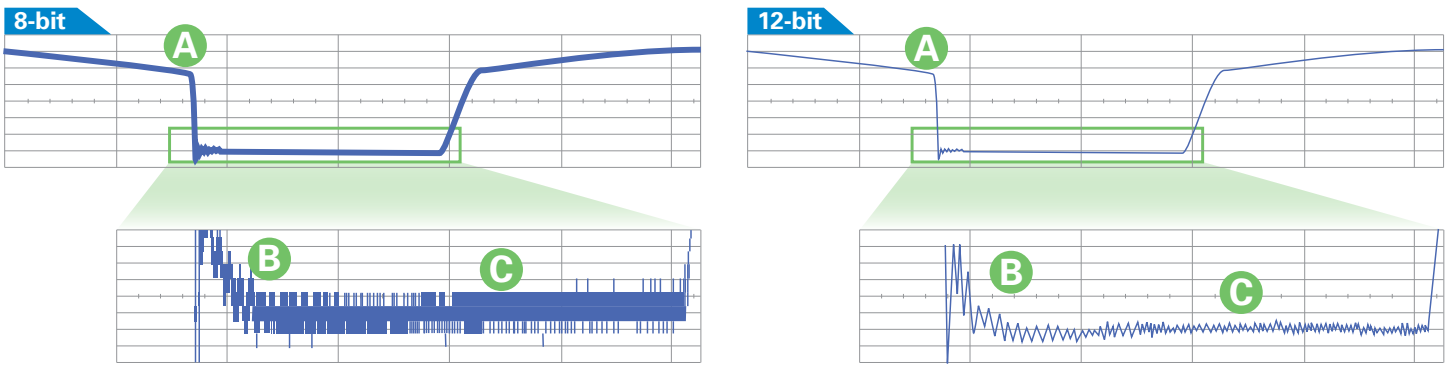
When compared to waveforms captured and displayed by 8-bit oscilloscopes, waveforms captured with HD4096 technology are dramatically crisper and cleaner. Oscilloscopes with HD4096 acquire waveforms at high resolution, high sample rate and low noise to display the most accurate waveforms.

## More Signal Details

Signal details often lost in the noise are clearly visible and easy to distinguish when captured on oscilloscopes with HD4096. Details which were previously difficult to even see can now be easily seen and measured. Using the oscilloscope zoom capabilities gives an even closer look at the details for unparalleled insight to the signals on screen.

## Unmatched Measurement Precision

Precise measurements are critical for effective debug and analysis. HD4096 enables oscilloscopes to deliver unmatched measurement precision to improve testing capabilities and provide better results.

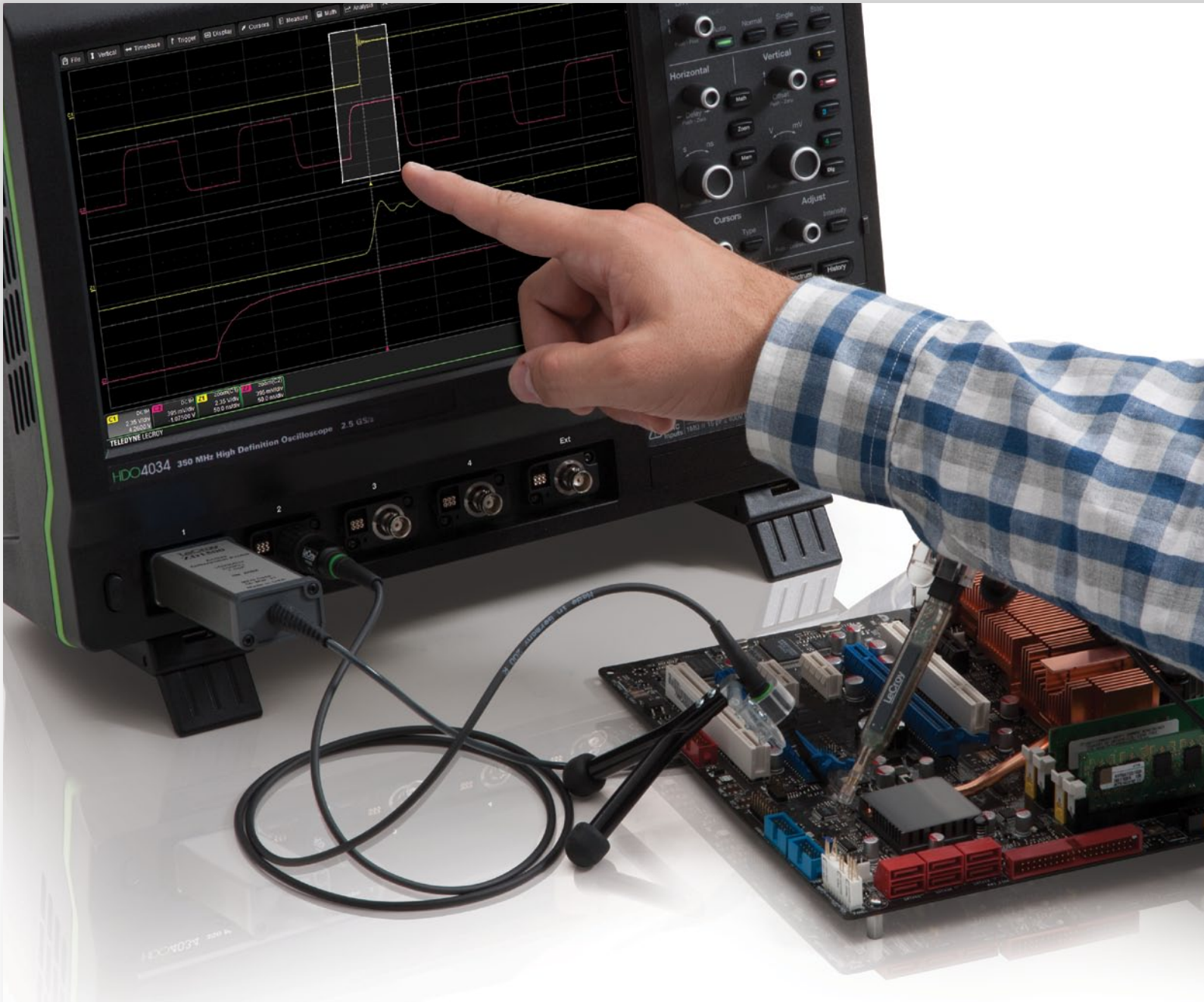



**A** **Clean, Crisp Waveforms** | *Thin traces show the actual waveform with minimal noise interference*

**B** **More Signal Details** | *Waveform details lost on an 8-bit oscilloscope can now be clearly seen*

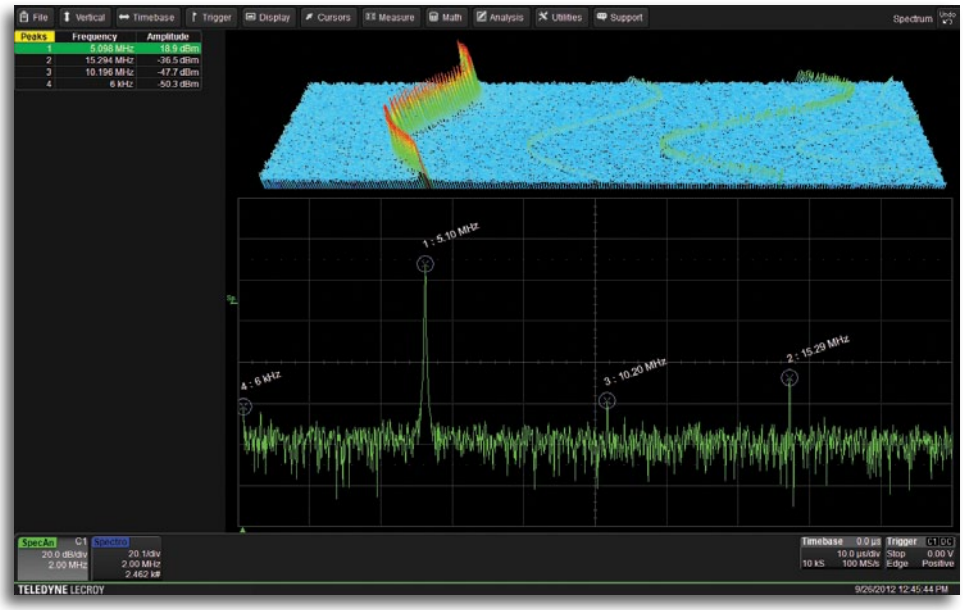
**C** **Unmatched Measurement Precision** | *Measurements are more precise and not affected by quantization noise*

# TOUCH SCREEN SIMPLICITY



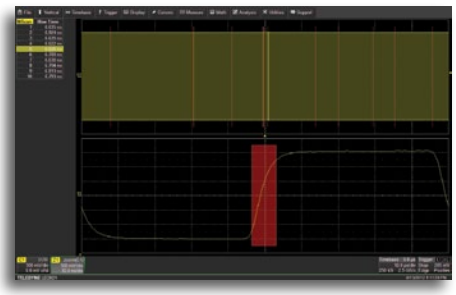

Don't waste time searching through a complex menu structure to find the proper setting. Configuring the HDO4000 is simple thanks to the intuitive touch screen user interface. Everything on the screen is interactive. To adjust channel, timebase, or trigger settings, simply touch the associated descriptor box and the appropriate menu is opened. Measurements can be touched to adjust their settings and cursors can be positioned precisely by touching and dragging them to the proper location. A box can be drawn around a portion of a waveform to create a zoom of that waveform. Even waveform offset and delay can be adjusted simply by touching and dragging the waveform.

# TOOLS FOR EFFICIENT DEBUG AND VALIDATION



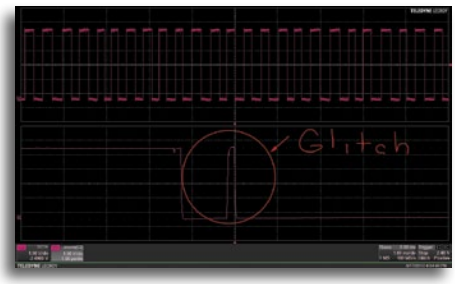

### Spectrum Analyzer Mode

View the frequency content of signals with spectrum analyzer style controls, easily adjust the frequency span, resolution bandwidth and center frequency. A unique peak search detects spectral components and presents frequency and level details in an interactive table. Use the spectrogram display to see changes in the spectrum over time.



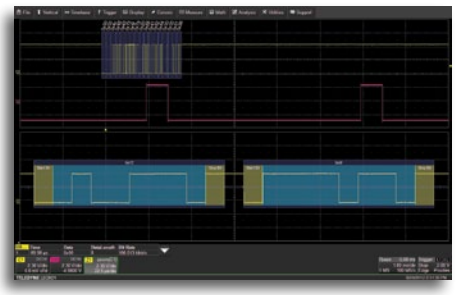
### WaveScan Advanced Search and Find Tool

Quickly search waveforms for runts, glitches or other anomolies with WaveScan.




### LabNotebook Documentation and Report Generation Tool

Save all results and data with a single button press and create custom reports with LabNotebook.



### Serial Bus Trigger and Decode

View decoded protocol information on top of physical layer waveforms and trigger on protocol specific messages.

### Sequence Mode Acquisition

Capture many fast pulses in quick succession or events separated by long periods of time.

### Advanced Math and Measure

Use automatic measurement parameters with statistics and histicons as well as math functions to understand every waveform detail.

### History Mode Waveform Playback

Scroll back in time to isolate anomalies that have previously been captured to quickly find the source of the problem.

# HDO4000 - HIGH DEFINITION OSCILLOSCOPE

**HDO4000 High Definition Oscilloscopes combine Teledyne LeCroy's HD4096 high definition technology with long memory and powerful debug tools in a compact form factor with a 12.1" touch screen display.**

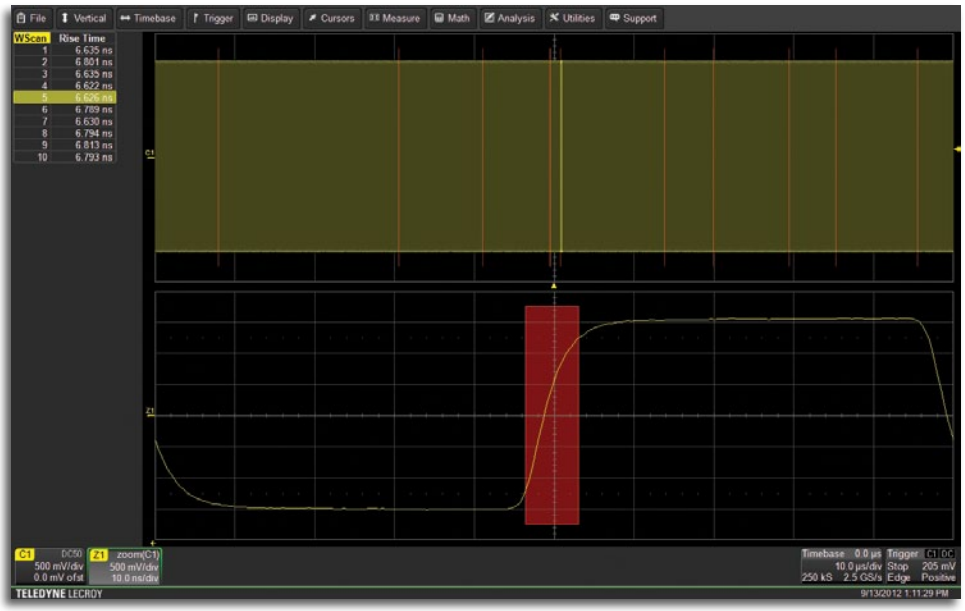
1. Only 13 cm (5") Deep – The most space-efficient oscilloscope for your bench from 200 MHz to 1 GHz
2. 12.1" Widescreen (16 x 9) high resolution WXGA color touch screen display. The most time-efficient user interface is even easier to use with a built-in stylus
3. Local language user interface – Select from 10 language preferences. Add a front panel overlay with your local language
4. "Push" Knobs – All knobs have push functionality that provides shortcuts to common actions such as Set to Variable, Find Trigger Level, Zero Offset, and Zero Delay

5. Waveform Control Knobs – Control channel, zoom, math and memory traces with the multiplexed vertical and horizontal knobs
6. Dedicated Cursor Knob – Select type of cursor, position them on your signal, and read values without ever opening a menu
7. Dedicated buttons to quickly access popular debug tools.
8. Easy connectivity with two convenient USB ports on the front, two on the side
9. Rotating and Tilting Feet provide 4 different viewing positions
10. Auxiliary Output and Reference Clock Input/Output connectors for connecting to other equipment
11. USBTMC (Test and Measurement Class) port simplifies programming

**Document and Share:**

- Quickly save all files with LabNotebook
- Create custom reports with LabNotebook
- Save to internal solid state or network drive
- Print to a USB printer
- Save to USB memory stick
- Connect with LAN or GPIB
- View data on a PC with free WaveStudio utility

# IDENTIFY AND ISOLATE PROBLEMS FASTER




## WaveScan Advanced Search

**WaveScan provides powerful isolation capabilities that hardware triggers can't provide. WaveScan provides the ability to locate unusual events in a single capture (i.e., capture and search), or "scan" for an event in many acquisitions over a long period of time with more than 20 search modes.**

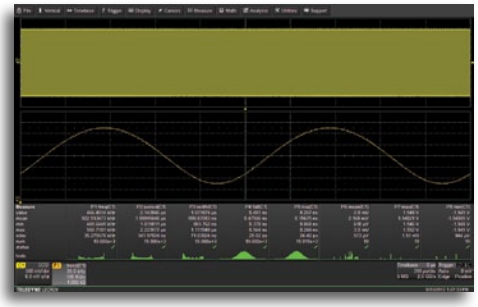
Since the scanning "modes" are not simply copies of the hardware triggers, the utility and capability is much higher. For instance, there is no "frequency" trigger in any oscilloscope, yet WaveScan allows for "frequency" to be quickly "scanned." This allows the user to accumulate a data set of unusual events that are separated by hours or days, enabling faster debugging. When used in multiple acquisitions, WaveScan builds on the traditional Teledyne LeCroy strength of fast processing of data. Quickly scan millions of events looking for unusual occurrences, and do it much faster and more efficiently than other oscilloscopes can.

## Advanced Waveform Capture with Sequence Mode

Use Sequence mode to store up to 10,000 triggered events as "segments" into memory. This can be ideal when capturing many fast pulses in quick succession or when capturing events separated by long time periods. Sequence mode provides timestamps for each acquisition and minimizes dead-time between triggers to less than 1 µs. Combine Sequence mode with advanced triggers to isolate rare events over time and analyze afterwards.

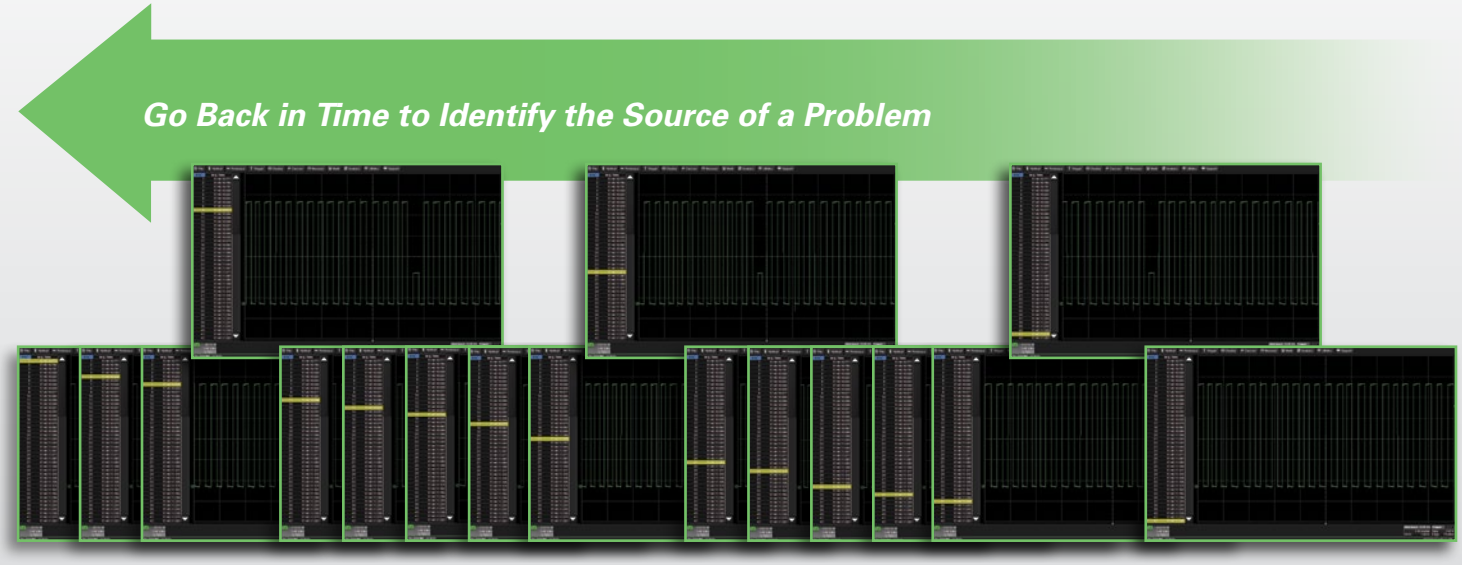
## Advanced Math and Measure

With math functions including averaging, enhanced resolution and FFT plus a wide variety of measurement parameters the HDO4000 can measure and analyze every aspect of a waveform. By utilizing HD4096 technology, the HDO4000 measures 16 times more precisely than traditional 8-bit architectures. Beyond just measuring waveforms, the HDO4000 provides statistics, histicons and trends to show how waveforms change over time.



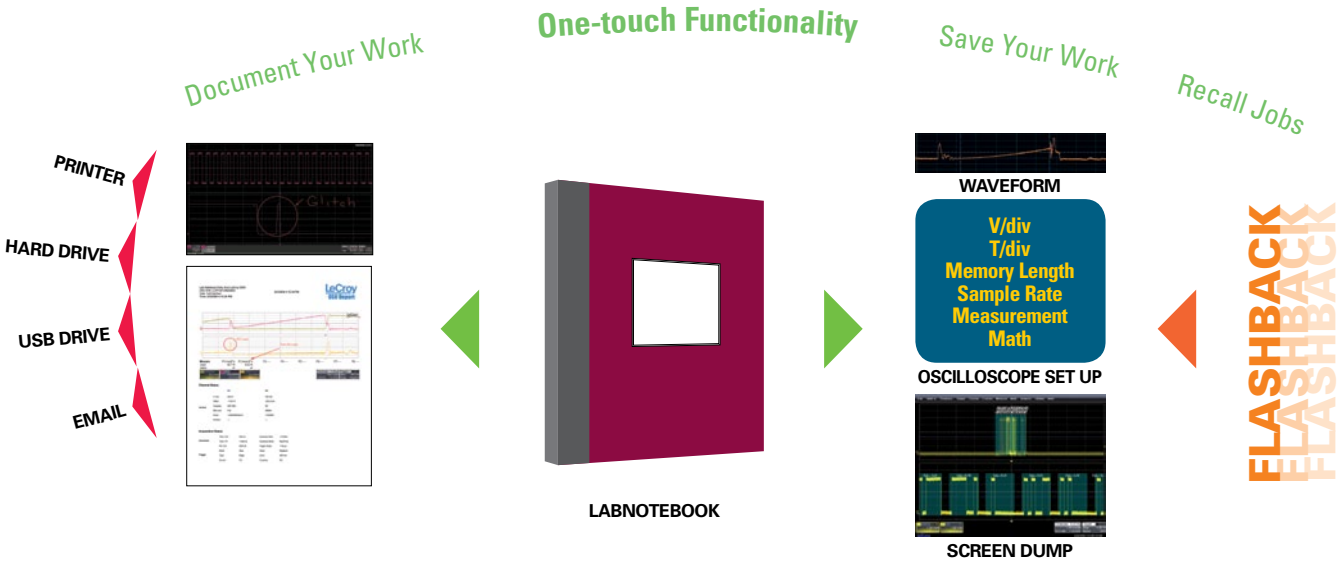
## History Mode Waveform Playback

Scroll back in time using History Mode to view previous waveforms and isolate anomalies. Use cursors and measurement parameters to quickly find the source of problems. History mode is always available with a single button press, no need to enable this mode and never miss a waveform.




## LabNotebook

The LabNotebook feature of HDO4000 provides a report generation tool to save and document all your work. Saving all displayed waveforms, relevant settings, and screen images is all done through LabNotebook, eliminating the need to navigate multiple menus to save all these files independently.




*Easy report generation helps you share your findings and communicate important results.*

*LabNotebook adds a simple way to report your work and save all essential waveforms, settings, and screen images.*

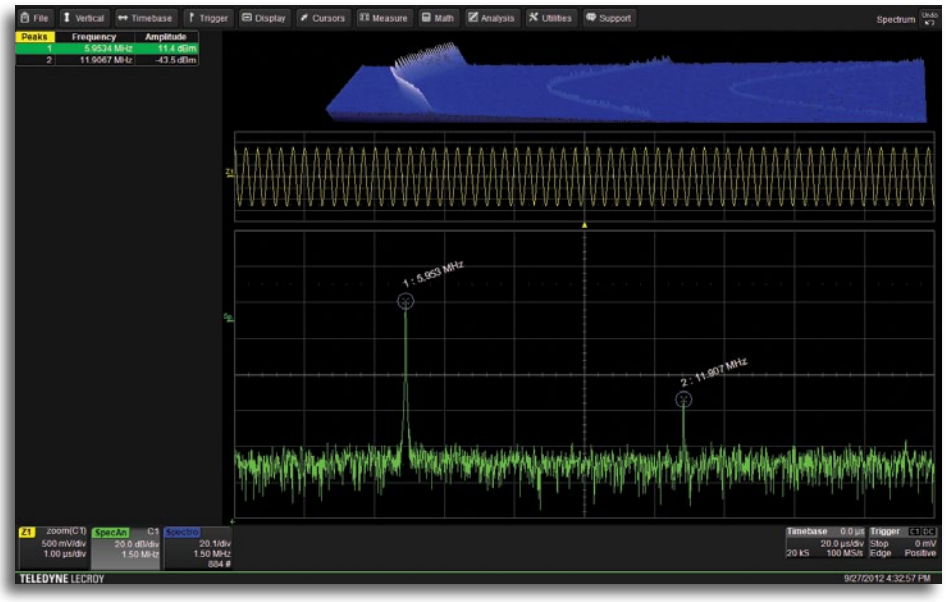
*Quickly save all the necessary files with LabNotebook in a single button press.*

*Recall your settings from any report by using the Flashback capability.*

# SPECTRUM ANALYZER MODE

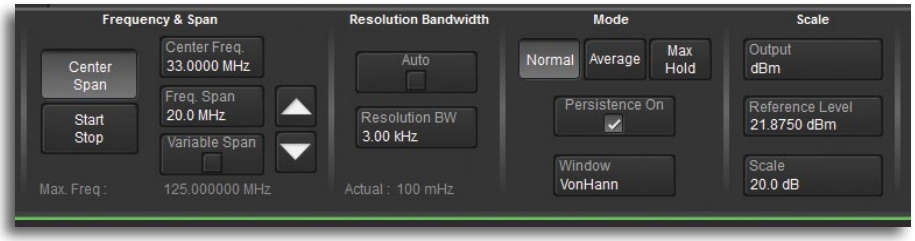
## Key Features

- **Spectrum analyzer style controls for the oscilloscope**
- **Select from six vertical scales**
- **Automatically identify frequency peaks**
- **Display up to 20 markers, with interactive table readout of frequencies and levels**
- **Easily make measurements with reference and delta markers**
- **Automatically identify and mark fundamental frequency and harmonics**
- **Spectrogram shows how spectra changes over time in 2D or 3D views**



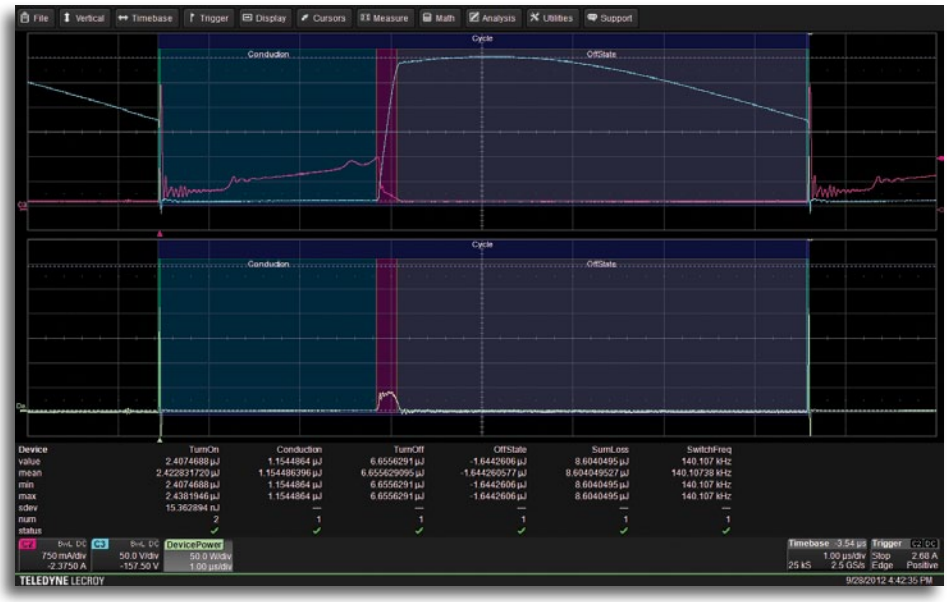

## Simplify Analysis of FFT Power Spectrum

Get better insight to the frequency content of any signal with use of the Spectrum Analyzer mode on the HDO4000. This mode provides a spectrum analyzer style user interface with controls for start/stop frequency or center frequency and span. The resolution bandwidth is automatically set for best analysis or can be manually selected. Vertical Scale can be selected as dBm, dBV, dBmV, dBuV, Vrms or Arms for proper viewing and analysis while the unique peak search automatically labels spectral components and presents frequency and level in an interactive table. Utilize up to 20 markers to automatically identify harmonics and quickly analyze frequency content by making measurements between reference and delta markers. To monitor how the spectrum changes over time, view the spectrogram which can display a 2D or 3D history of the fequency content.




*Spectrum analyzer style controls simplify waveform analysis in the frequency domain.*

# POWER ANALYZER OPTION




## Key Features

- **Automatic switching device measurements**
- **Color coded overlay to identify power losses**
- **Control loop and time domain response analysis**
- **Line power and harmonics tests to IEC 61000-3-2**
- **Total harmonic distortion table shows frequency contribution**
- **B-H Curve shows magnetic device saturation**

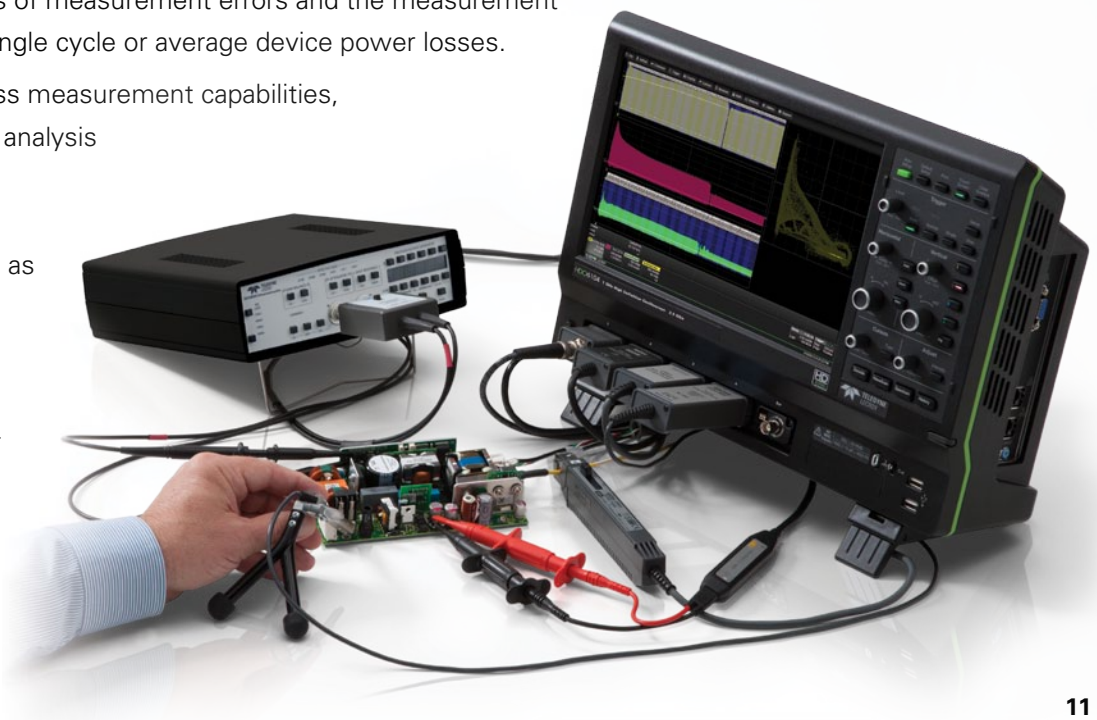
## Power Analyzer Automates Switching Device Loss Measurements

Quickly measure and analyze the operating characteristics of power conversion devices and circuits with the Power Analyzer option. Critical power switching device measurements, control loop modulation analysis, and line power harmonic testing are all simplified with a dedicated user interface and automatic measurements. Areas of turn-on, turn-off, and conduction loss are all identified with color-coded waveform overlays for faster analysis.

Power Analyzer provides quick and easy setup of voltage and current inputs and makes measurements as simple as the push of a button. Tools are provided to help reduce sources of measurement errors and the measurement parameters provide details of single cycle or average device power losses.

Beyond the advanced power loss measurement capabilities, the Power Analyzer modulation analysis capabilities provide insight to understand control loop response to critical events such as a power supply's soft start performance or step response to line and load changes. The Line Power Analysis tool allows simple and quick pre-compliance testing to EN 61000-3-2.

*Teledyne LeCroy has a variety of probes and probing accessories such as high common mode rejection ratio (CMRR) differential amplifiers, differential probes, current probes, and deskew fixtures.*



# SERIAL TRIGGER AND DECODE OPTIONS

Debugging serial data busses can be confusing and time consuming. The serial data trigger and decode options for HDO4000 provide time saving tools for serial bus debug and validation.

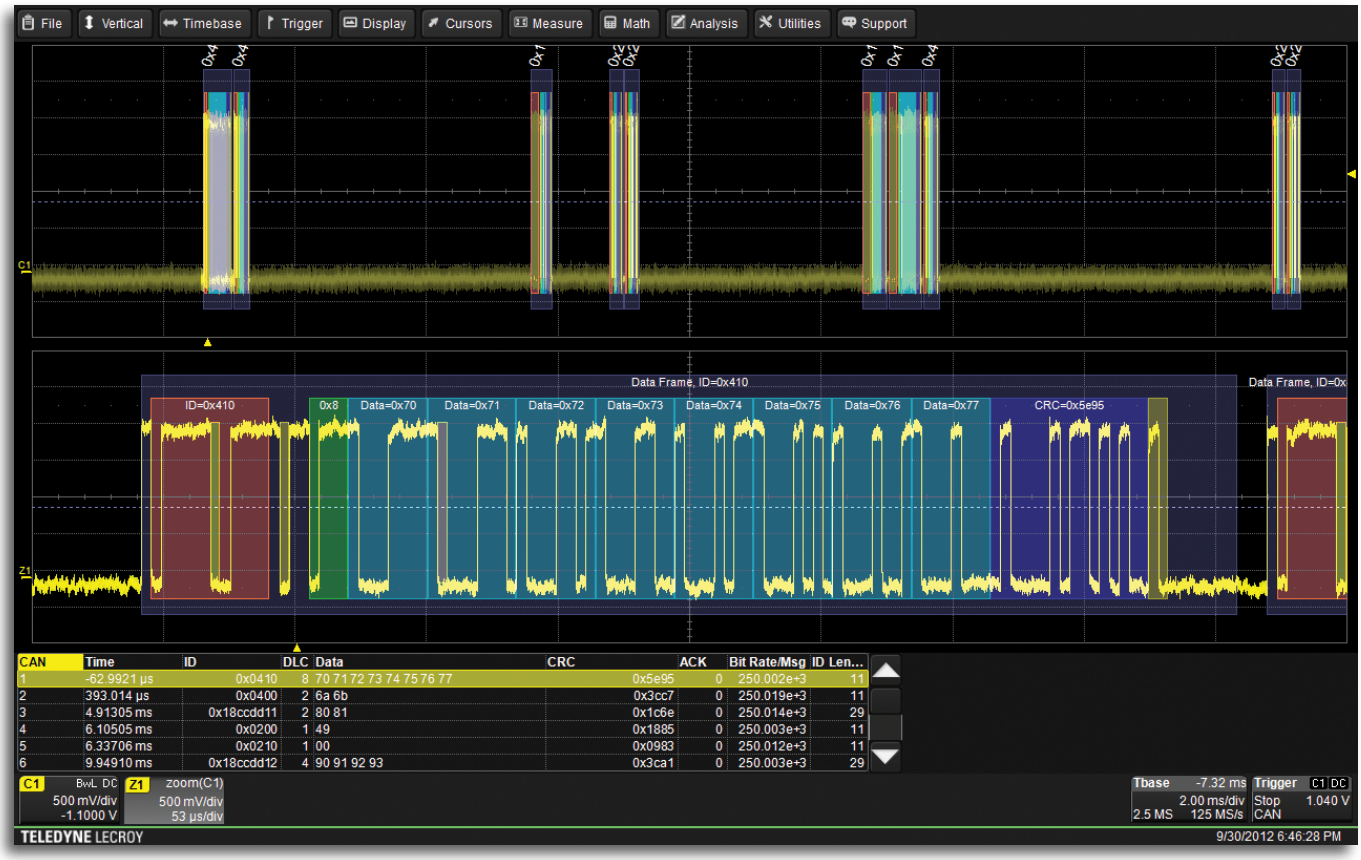
The serial data trigger will quickly isolate events on a bus eliminating the need to set manual triggers and hoping to catch the right information. Trigger conditions can be entered in binary or hexadecimal formats and conditional trigger capabilities even allow triggering on a range of different events.

Protocol decoding is shown directly on the waveform with an intuitive, color-coded overlay and presented in binary, hex or ASCII. Decoding on the HDO4000 is fast even with long memory and zooming in to the waveform shows precise byte by byte decoding.

To further simplify the debug process all decoded data can be displayed in a table below the waveform grid. Selecting an entry in the table with the touch screen will display just that event. Additionally, built-in search functionality will find specific decoded values.

## Supported Serial Data Protocols

- I²C, SPI, UART
- CAN, LIN, FlexRay™, SENT
- Ethernet 10/100BaseT, USB 1.0/1.1/2.0, USB 2.0-HSIC
- Audio (I²S, LJ, RJ, TDM)
- MIL-STD-1553, ARINC 429
- MIPI D-PHY, DigRF 3G, DigRF v4
- Manchester, NRZ




*View decoded protocol information on top of physical layer waveforms and trigger on protocol specific messages.*

# PROBES

**The right probe is an essential tool for accurate signal capture and Teledyne LeCroy offers an extensive range of probes to meet virtually every probing need.**

**ZS Series High Impedance Active Probes**
ZS2500, ZS1500, ZS1000, ZS2500-QUADPAK, ZS1500-QUADPAK, ZS1000-QUADPAK

The ZS Series probes provide high impedance and an extensive set of probe tips and ground accessories to handle a wide range of probing scenarios. The high 1 MΩ input resistance and low 0.9 pF input capacitance mean this probe is ideal for all frequencies. The ZS Series probes provide full system bandwidth for all Teledyne LeCroy oscilloscopes having bandwidths of 1 GHz and lower.

**Differential Probes (200 MHz – 1.5 GHz)**
ZD1500, ZD1000, ZD500, ZD200

High bandwidth, excellent common-mode rejection ratio (CMRR) and low noise make these active differential probes ideal for applications such as automotive development (e.g. FlexRay) and failure analysis, as well as wireless and data communication design. The ProBus interface allows sensitivity, offset and common-mode range to be displayed on the oscilloscope screen.

**High Voltage Differential Probes**
ADP305, ADP300, AP031

Low cost active differential probes are intended for measuring higher voltages. The differential techniques employed permit measurements to be taken at two points in a circuit without reference to the ground, allowing the oscilloscope to be safely grounded without the use of opto-isolators or isolating transformers.

**High Voltage Passive Probes**
PPE1.2KV, PPE20KV, PPE2KV, PPE4KV, PPE5KV, PPE6KV

The PPE Series includes five fixed-attenuation probes covering a range from 2 kV to 20 kV, and one switchable probe providing ÷10/÷100 attenuation for voltage inputs up to 1.2 kV. All fixed-attenuation, standard probes automatically rescale compatible Teledyne LeCroy oscilloscopes for the appropriate attenuation of the probe.

**Current Probes**
CP031, CP030, AP015, CP150, CP500, DCS015

Available current probes reach bandwidths of 100 MHz, peak currents of 700 A and sensitivities of 10 mA/div. Use multiple current probes to make measurements on three-phase systems or a single current probe with a voltage probe to make instantaneous power measurements. Teledyne LeCroy current probes enable the design and testing of switching power supplies, motor drives, electric vehicles, and uninterruptible power supplies.

# SPECIFICATIONS

| | HDO4022 | HDO4024 | HDO4032 | HDO4034 | HDO4054 | HDO4104 |
|---|---|---|---|---|---|---|
| **Vertical** | | | | | | |
| Bandwidth (@ 50Ω) | 200 MHz | | 350 MHz | | 500 MHz | 1 GHz |
| Rise time | 1.75 ns typical | | 1 ns typical | | 700 ps typical | 450 ps typical |
| Input Channels | 2 | 4 | 2 | 4 | 4 | 4 |
| Vertical Resolution | 12-bits; up to 15-bits with enhanced resolution (ERES) | | | | | |
| Sensitivity | 50 Ω: 1mV/div - 1 V/div; 1 MΩ: 1 mV/div - 10 V/div | | | | | |
| DC Gain Accuracy | ±(0.5%) Full Scale, offset at 0 V | | | | | |
| BW Limit | 20 MHz, 200 MHz | | | | | |
| Maximum Input Voltage | 50 Ω: 5 Vrms; 1 MΩ: 400 V max (DC + Peak AC ≤ 10 kHz) | | | | | |
| Input Coupling | 50 Ω: DC, GND; 1 MΩ: AC, DC, GND | | | | | |
| Input Impedance | 50 Ω ±2.0%, 1 MΩ ±2.0% \|\| 15 pF | | | | | |
| Offset Range | 50 Ω: 1 mV - 4.95 mV: ±1.6 V, 5 mV - 9.9 mV: ±4 V, 10 mV - 19.8 mV: ±8 V, 20 mV - 1 V: ±10 V<br>1 MΩ: 1 mV - 4.95 mV: ±1.6 V, 5 mV - 9.9 mV: ±4 V, 10 mV - 19.8 mV: ±8 V, 20 mV - 100 mV: ±16 V,<br>102 mV - 198 mV: ±80V, 200 mV - 1 V: ±160 V, 1.02 V -10 V: ±400 V | | | | | |
| Offset Accuracy | ±(1.0% of offset value + 0.5%FS + 0.02% of max offset + 1 mV) | | | | | |
| **Acquisition** | | | | | | |
| Sample Rate (Single-shot) | 2.5 GS/s | | | | | |
| Sample Rate (Repetitive) | 125 GS/s | | | | | |
| Record Length | Standard -STD: 12.5 Mpts/ch (all channels) 25 Mpts (interleaved)<br>Optional -L: 25 Mpts/ch (all channels), 50 Mpts (interleaved) | | | | | |
| Acquisition Modes | Real Time, Roll, RIS (Random Interleaved Sampling),<br>Sequence (Segmented Memory up to 10,000 segments with 1µs intersegment time) | | | | | |
| Timebase Range | 20 ps/div–10000 s/div; RIS available at ≤ 10 ns/div; Roll Mode available at ≥ 100 ms/div and ≤ 5 MS/s | | | | | |
| Timebase Accuracy | ±2.5 ppm for 5 to 40C + 1.0 ppm/year from calibration | | | | | |
| **Trigger System** | | | | | | |
| Modes | Auto, Normal, Single, Stop | | | | | |
| Sources | Any input channel, External, Ext/10, or line; slope and level unique to each source (except for line trigger) | | | | | |
| Coupling | DC, AC, HFREJ, LFREJ | | | | | |
| Pre-trigger Delay | 0-100% of full scale | | | | | |
| Post-trigger Delay | 0-10,000 Divisions | | | | | |
| Hold-off | 2ns up to 20s or 1 to 1,000,000,000 events | | | | | |
| Internal Trigger Level Range | ±4.1 Divisions | | | | | |
| External Trigger Level Range | Ext: ±400mV, Ext/10: ±4V | | | | | |
| Trigger Types | Edge, Glitch, Width, Logic (Pattern), TV (NTSC, PAL, SECAM, HDTV–720p, 1080i, 1080p), Runt, Slew Rate, Interval (signal or Pattern), Dropout, Qualified (State or Edge) | | | | | |
| **Measure, Zoom and Math Tools** | | | | | | |
| Measurement Parameters | Up to 8 of the following parameters can be calculated at one time on any waveform: Amplitude, Area, Base (Low), Delay, Delta Period @ Level, Delta Time @ Level, Duty, Duty @ Level, Edge @ Level, Fall Time (90%–10%), Fall Time (80%–20%), Frequency, Frequency @ level, Maximum, Mean, Minimum, Overshoot+, Overshoot-, Peak-Peak, Period, Period @ Level, Phase, Rise Time (10%–90%), Rise Time (20%–80%), RMS, Skew, Standard Deviation, Time @ Level, Top (High), Width+, Width-. Statistics and Histicons can be added to any measurement and all measurements can be gated. | | | | | |
| Zooming | Use front panel QuickZoom button, or use touch screen or mouse to draw a box around the zoom area. | | | | | |
| Math Functions | Functions include Sum, Difference, Product, Ratio, Absolute Value, Averaging (summed and continuous), Derivative, Envelope, Enhanced Resolution (to 15-bits), Floor, Integral, Invert, Reciprocal, Rescale (change scale and units), Roof, Square, Square Root, Trend, Zoom and FFT (up to 1 Mpts with power spectrum output and rectangular, VonHann, and FlatTop windows). 2 dual operator math functions may be defined at a time. | | | | | |

# SPECIFICATIONS

| | HDO4022 | HDO4024 | HDO4032 | HDO4034 | HDO4054 | HDO4104 |
|---|---|---|---|---|---|---|
| **Probes** | | | | | | |
| Standard Probes | One PP017 (5mm) per channel | | One PP018(5mm) per channel | | | |
| Probing System | BNC and Teledyne LeCroy ProBus for Active voltage, current and differential probes | | | | | |
| **Display System** | | | | | | |
| Display Size | 12.1" Wide TFT-LCD Touch-Screen | | | | | |
| Display Resolution | 1280 x 800 | | | | | |
| **Connectivity** | | | | | | |
| Ethernet Port | (2) 10/100/1000Base-T Ethernet interface (RJ-45 connector) | | | | | |
| USB Host Ports | (6) USB Ports Total – (2) Front USB Ports | | | | | |
| USB Device Port | (1) USBTMC | | | | | |
| GPIB Port (Optional) | Supports IEEE – 488.2 | | | | | |
| External Monitor Port | Standard 15-pin D-Type SVGA-compatible DB-15 connector, DVI connector and HDMI connector | | | | | |
| Remote Control | Via Windows Automation, or via Teledyne LeCroy Remote Command Set | | | | | |
| **Processor/CPU** | | | | | | |
| Type | Intel B810 Celeron processor 1.6 GHz or better | | | | | |
| Processor Memory | 2 GB Standard | | | | | |
| Operating System | Windows Embedded Standard 7 64-Bit | | | | | |
| Disk Type | Solid State Drive 64 GB or greater | | | | | |
| **Power Requirements** | | | | | | |
| Voltage | 100-240 VAC + 10% at 45-440 Hz; Automatic AC Voltage Selection | | | | | |
| Power Consumption (Nominal) | 200 W / 200 VA | | | | | |
| Max Power Consumption | Max Power Consumption 320 W / 320 VA (with all PC peripherals and active probes connected to 4 channels) | | | | | |
| **Environmental** | | | | | | |
| Temperature | Operating: 5 °C to 40 °C; Non-Operating: -20 °C to 60 °C | | | | | |
| Humidity | Operating: 5% to 90% relative humidity (non-condensing) up to +31 °C, Upper limit derates to 50% relative humidity (non-condensing) at +40 °C; Non-Operating: 5% to 95% relative humidity (non-condensing) as tested per MIL-PRF-28800F | | | | | |
| Altitude | Operating: 3,048 m (10,000 ft) max at ≤ 30C; Non-Operating: Up to 12,192 meters (40,000 ft) | | | | | |
| **Physical** | | | | | | |
| Dimensions (HWD) | 11.48"H x 15.72"W x 5.17"D (291.7 mm x 399.4 mm x 131.31 mm) | | | | | |
| Weight | 5.86 kg (12.9 lbs) | | | | | |
| **Regulatory** | | | | | | |
| CE Certification | Low Voltage Directive 2006/95/EC<br>EN 61010-1:2010, EN 61010-2-030:2010<br><br>EMC Directive 2004/108/EC<br>EN 61326-1:2006, EN61326-2-1:2006 | | | | | |
| UL and cUL Listing | UL 61010-1 (3rd Edition), UL 61010-2-030 (1st Edition)<br>CAN/CSA C22.2 No.61010-1-12 | | | | | |

# ORDERING INFORMATION

| Product Description | Product Code |
|---|---|
| **HDO 4000 Oscilloscopes** | |
| 200 MHz, 2.5 GS/s, 2 Ch, 12.5 Mpts/Ch 12-bit HD Oscilloscope with 12.1" WXGA Touch Display | HDO4022 |
| 200 MHz, 2.5 GS/s, 4 Ch, 12.5 Mpts/Ch 12-bit HD Oscilloscope with 12.1" WXGA Touch Display | HDO4024 |
| 350 MHz, 2.5 GS/s, 2 Ch, 12.5 Mpts/Ch 12-bit HD Oscilloscope with 12.1" WXGA Touch Display | HDO4032 |
| 350 MHz, 2.5 GS/s, 4 Ch, 12.5 Mpts/Ch 12-bit HD Oscilloscope with 12.1" WXGA Touch Display | HDO4034 |
| 500 MHz, 2.5 GS/s, 4 Ch, 12.5 Mpts/Ch 12-bit HD Oscilloscope with 12.1" WXGA Touch Display | HDO4054 |
| 1 GHz, 2.5 GS/s, 4 Ch, 12.5 Mpts/Ch 12-bit HD Oscilloscope with 12.1" WXGA Touch Display | HDO4104 |

**Included with Standard Configuration**

÷10 Passive Probe (Total of 1 Per Channel), Getting Started Guide, Anti-virus Software (Trial Version), Microsoft Windows Embedded Standard 7 P 64-Bit License, Commercial NIST Traceable Calibration with Certificate, Power Cable for the Destination Country, 3-year Warranty

| | |
|---|---|
| **Memory Option** | |
| 25 Mpts/CH (50 Mpts interleaved) memory | HDO4K-L |
| **Hardware Options** | |
| Removable Solid State Drive Package (includes removable solid state drive kit and two hard drives | HDO4K-RSSD |
| Additional Removable Solid State Drive | HDO4K-RSSD-02 |
| **General Accessories** | |
| External GPIB Accessory | USB2-GPIB |
| Soft Carrying Case | HDO4K-SOFTCASE |
| Rack Mount Accessory | HDO4K-RACK |
| Accessory Pouch | HDO4K-POUCH |
| **Local Language Overlays** | |
| German Front Panel Overlay | HDO4K-A-FP-GERMAN |
| French Front Panel Overlay | HDO4K-A-FP-FRENCH |
| Italian Front Panel Overlay | HDO4K-A-FP-ITALIAN |
| Spanish Front Panel Overlay | HDO4K-A-FP-SPANISH |
| Japanese Front Panel Overlay | HDO4K-A-FP-JAPANESE |
| Korean Front Panel Overlay | HDO4K-A-FP-KOREAN |
| Chinese (Tr) Front Panel Overlay | HDO4K-A-FP-CHNES-TR |
| Chinese (Simp) Front Panel Overlay | HDO4K-A-FP-CHNES-SI |
| Russian Front Panel Overlay | HDO4K-A-FP-RUSSIAN |
| **Software Options** | |
| Electrical Telecom Mask Test Package | HDO4K-ET-PMT |
| Spectrum Analysis Option | HDO4K-SPECTRUM |
| Power Analysis Option | HDO4K-PWR |
| **Serial Data Options** | |
| ARINC 429 Symbolic Decode Option | HDO4K-ARINC429bus DSymbolic |
| Audiobus Trigger and Decode Option for $I^2S$, LJ, RJ, and TDM | HDO4K-Audiobus TD |
| CAN, LIN and FlexRay Trigger and Decode Option | HDO4K-AUTO |
| CAN TD Trigger and Decode Option | HDO4K-CANbus TD |
| D-PHY Decode Option | HDO4K-DPHYbus D |
| DigRF 3G Decode Option | HDO4K-DigRF3Gbus D |
| DigRF v4 Decode Option | HDO4K-DigRFv4bus D |

| Product Description | Product Code |
|---|---|
| **Serial Data Options (cont'd)** | |
| ENET Decode Option | HDO4K-ENETbus D |
| FlexRay Trigger and Decode Option | HDO4K-FlexRaybus TD |
| $I^2C$, SPI and UART Trigger and Decode Option | HDO4K-EMB |
| $I^2C$ Bus Trigger and Decode Option | HDO4K-I2Cbus TD |
| LIN Trigger and Decode Option | HDO4K-LINbus TD |
| Manchester Decode Option | HDO4K-Manchesterbus D |
| MIL-STD-1553 Trigger and Decode Option | HDO4K-1553 TD |
| NRZ Decode Option | HDO4K-NRZbus D |
| SENT Decode Option | HDO4K-SENTbus D |
| SPI Bus Trigger and Decode Option | HDO4K-SPIbus TD |
| UART and RS-232 Trigger and Decode Option | HDO4K-UART-RS232bus TD |
| USB 2.0 Trigger and Decode Option | HDO4K-USB2bus TD |
| USB2-HSIC Decode Option | HDO4K-USB2-HSICbus D |
| **Probes and Amplifiers** | |
| 250 MHz Passive Probe for HDO4000 and HDO6000, 10:1, 10 MOhm | PP017 |
| 500 MHz Passive Probe for HDO4000 and HDO6000, 10:1, 10 MOhm | PP018 |
| Set of 4 ZS1500, 1.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe | ZS1500-QUADPAK |
| Set of 4 ZS1000, 1 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe | ZS1000-QUADPAK |
| 200 MHz, 3.5 pF, 1 MΩ Active Differential Probe | ZD200 |
| 500 MHz, 1.0 pF, 1 MΩ Active Differential Probe | ZD500 |
| 1 GHz, 1.0 pF, 1 MΩ Active Differential Probe | ZD1000 |
| 1.5 GHz, 1.0 pF, 1 MΩ Active Differential Probe | ZD1500 |
| 1,400 V, 100 MHz High-Voltage Differential Probe | ADP305 |
| 1,400 V, 20 MHz High-Voltage Differential Probe | ADP300 |
| 1 Ch, 100 MHz Differential Amplifier with Precision Voltage Source | DA1855A |
| 30 A; 100 MHz Current Probe – AC/DC; 30 $A_{rms}$; 50 $A_{peak}$ Pulse | CP031 |
| 30 A; 50 MHz Current Probe – AC/DC; 30 $A_{rms}$; 50 $A_{peak}$ Pulse | CP030 |
| 30 A; 50 MHz Current Probe – AC/DC; 30 $A_{rms}$; 50 $A_{peak}$ Pulse | AP015 |
| 150 A; 10 MHz Current Probe – AC/DC; 150 $A_{rms}$; 500 $A_{peak}$ Pulse | CP150 |
| 500 A; 2 MHz Current Probe – AC/DC; 500 $A_{rms}$; 700 $A_{peak}$ Pulse | CP500 |
| Deskew Calibration Source for CP031, CP030 and AP015 | DCS015 |
| 10:1/100:1 200/300 MHz, 50 MΩ High-voltage Probe 600 V/1,2 kV Max. Volt. DC | PPE1.2KV |
| 100:1 400 MHz 50 MΩ 2 kV High-voltage Probe | PPE2KV |
| 100:1 400 MHz 50 MΩ 4 kV High-voltage Probe | PPE4KV |
| 1000:1 400 MHz 50 MΩ 5 kV High-voltage Probe | PPE5KV |
| 1000:1 400 MHz 50 MΩ 6 kV High-voltage Probe | PPE6KV |
| 1000:1 100 MHz 50 MΩ 6 kV High-voltage Probe 20 kV Max. Volt DC + 40 kVPeak AC | PPE20KV |

## Customer Service

Teledyne LeCroy oscilloscopes and probes 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 and our probes are warranted for one year. This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

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