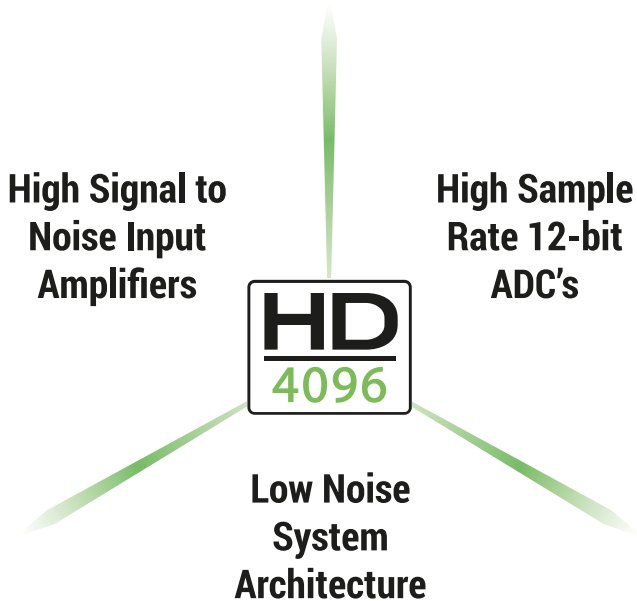


# Product Line Card 2022



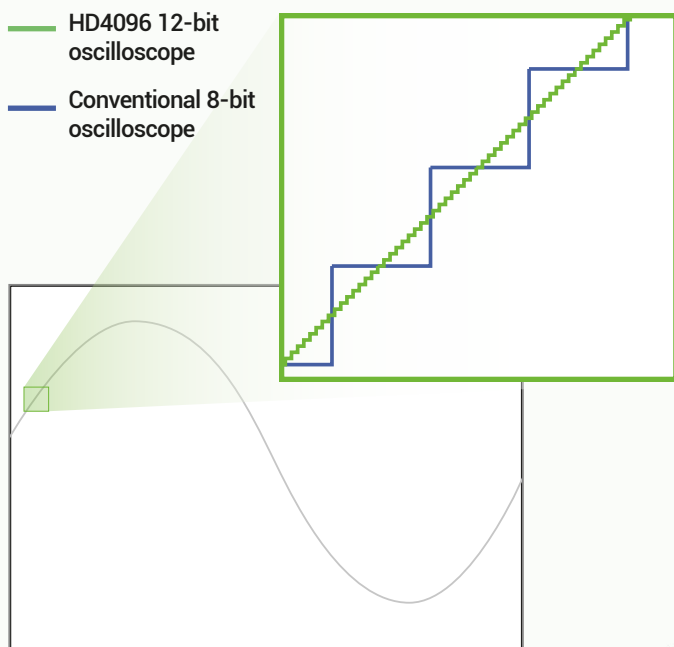
# HD4096 TECHNOLOGY – 16X CLOSER TO PERFECT



Teledyne LeCroy invented the high definition 12-bit oscilloscopes using the unique HD4096 technology to provide superior and uncompromised measurement performance:

- 12-bit ADCs with high sample rates
- High signal-to-noise amplifiers
- Low noise system architecture (to 8 GHz)

Oscilloscopes with HD4096 technology have higher resolution than conventional 8-bit oscilloscopes (4096 vs. 256 vertical levels) and low noise for uncompromised measurement performance. The 12-bit ADCs support capture of fast signals and oscilloscope bandwidth ratings up to 8 GHz, while 20 GS/s sample rate ensures the highest measurement accuracy and precision. The high performance input amplifiers deliver pristine signal fidelity, and the low-noise system architecture provides an ideal signal path to ensure that signal details are delivered accurately to the oscilloscope display – 16x closer to perfect.



## 16x Closer to Perfect

### 16x more resolution

HD4096 technology provides 12 bits of vertical resolution with 16x more resolution compared to conventional 8-bit oscilloscopes. The 4096 discrete vertical levels reduce the quantization error compared to 256 vertical levels. This improves the accuracy and precision of the signal capture and increases measurement confidence.



# EXPERIENCE THE DIFFERENCE



Experience HD4096 accuracy, detail, and precision and never use an 8-bit oscilloscope again. Whether the application is general-purpose design and debug, high-precision analog, power electronics, automotive electronics, mechatronics, or other specialized applications, the HD4096 technology provides unsurpassed confidence and measurement capabilities.

## Clean, crisp waveforms

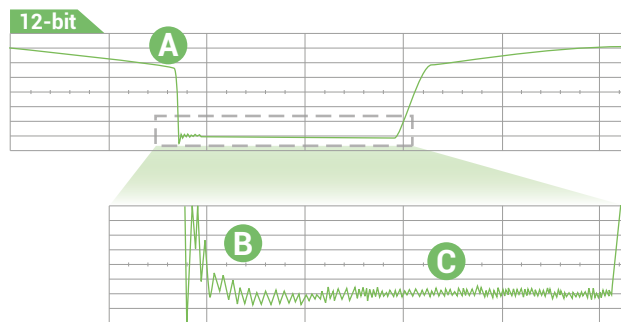
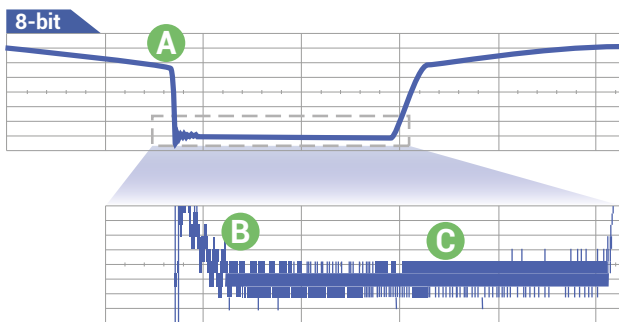
When compared to waveforms acquired and displayed using conventional 8-bit oscilloscopes, waveforms captured with HD4096 12-bit technology are dramatically crisper and cleaner, and are displayed more accurately. Once you see a waveform acquired with HD4096 technology, you will not want to go back to using a conventional 8-bit oscilloscope.

## More signal details

16x more resolution provides more signal detail. This is especially helpful for wide dynamic range signals in which a full-scale signal must be acquired while at the same time very small amplitude signal details must be analyzed. 12-bit acquisitions combined with the oscilloscope's vertical and horizontal zoom can be used to obtain unparalleled insight to system behaviors and problems.

## Unmatched measurement precision

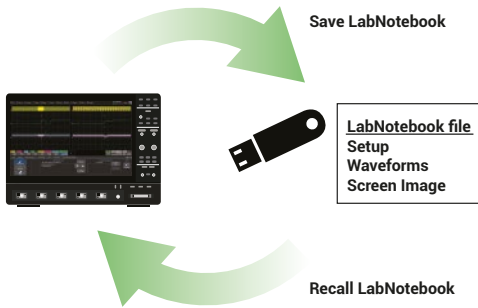
HD4096 technology delivers measurement precision several times better than conventional 8-bit oscilloscopes. Higher oscilloscope measurement precision provides better ability to assess corner cases and design margins, perform root cause analysis, and create the best possible solution for any discovered design issue.



- A Clean, Crisp Waveforms** | Thin traces show the actual waveform with minimal noise interference
- B More Signal Details** | Waveform details can now be clearly seen on an HD4096 12-bit oscilloscope
- C Unmatched Measurement Precision** | Measurements are more precise and not affected by quantization noise



# DOCUMENTATION & DATA SHARING



## LabNotebook

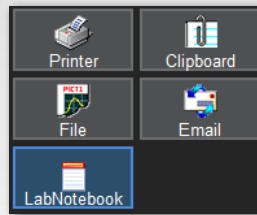
- Store the setup, waveforms and screen image in a single LabNotebook file.
- Add descriptive notes to LabNotebooks, or mark up screen images.
- Recall ("Flashback") LabNotebooks to restore oscilloscope to past state – including the setup, waveforms and table data.
- Extract component files from .LNB format files, or append other files to .LNB.

## Generate Reports



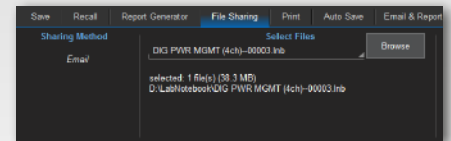
Generate preformatted PDF, RTF or HTML reports from saved LabNotebooks or the oscilloscope current state. Reports can show your company logo or use Print color palette to save ink/toner.

## Print/Save



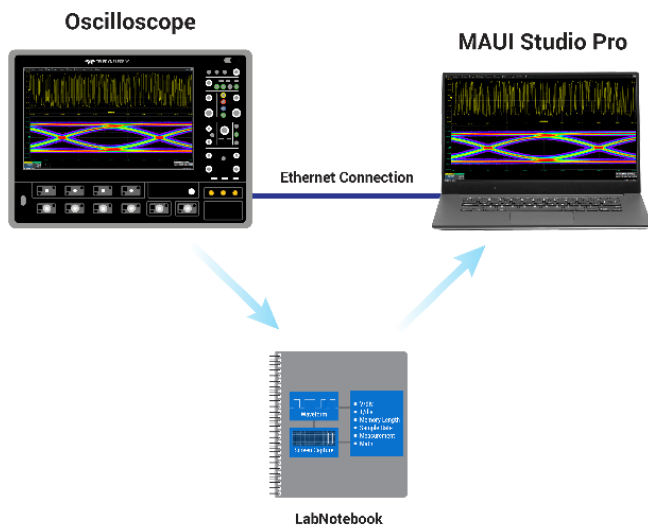
Configure front panel button to create a LabNotebook or screen image file with one press.

## Email



Email LabNotebooks and other files from the oscilloscope. Preset the recipient address to save time.

# MORE CAPABILITY, INCREASED PRODUCTIVITY

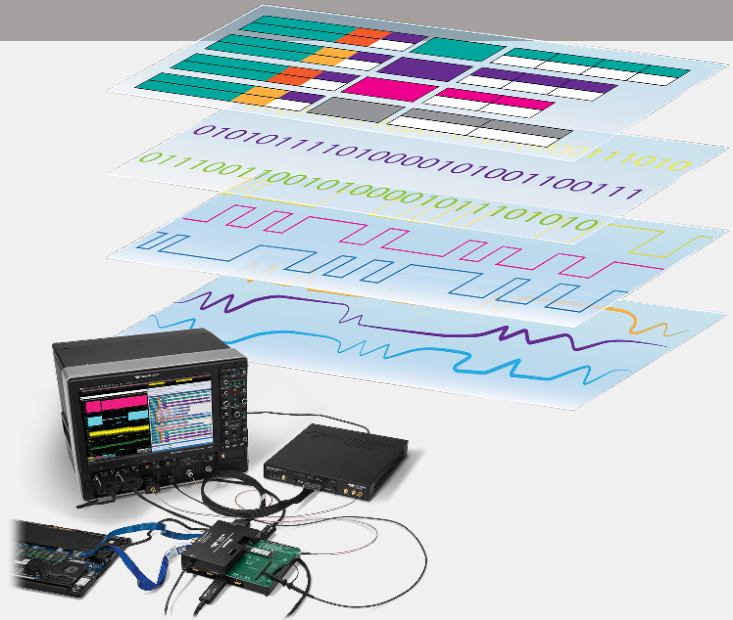


## MAUI Studio

Unleash the power of a Teledyne LeCroy oscilloscope anywhere, using a PC with MAUI Studio. Work from anywhere while having the full functionality of an oscilloscope at your fingertips. Collaborate with ease by giving everyone access to the same software options to use for offline analysis.

## Cross-layer analysis

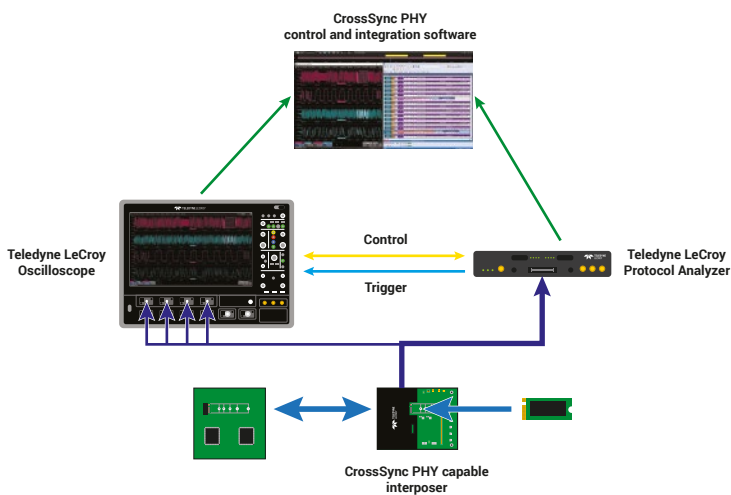
Interoperability issues can lead to finger-pointing exercises that cost money and time-to-market. Teledyne LeCroy CrossSync PHY software and interposers seamlessly merge the functions of your Teledyne LeCroy protocol analyzer and oscilloscope – giving insight into link behavior that no other instrument can provide.



### The CrossSync PHY concept

CrossSync PHY enables waveforms from Teledyne LeCroy oscilloscopes to be viewed alongside protocol analyzer traces, with complete time-correlation of electrical and protocol information for easy and powerful validation and root-cause analysis.

A growing range of CrossSync PHY capable interposers eliminates the complexity of cross-probing the same interface for capture by both the protocol analyzer and oscilloscope.



### Validate and debug active link operation

- CrossSync PHY capable interposers enable observation of both electrical and protocol behavior without disturbing the link
- Sideband signals, reference clock and power rails are all easily accessible to oscilloscope probes
- Optional high-bandwidth oscilloscope probing points for PCI Express data lanes

### Quickly resolve interoperability issues by capturing the entire protocol stack

- Trigger protocol analyzer and oscilloscope captures on the same high-level event
- Easily measure timing relationships between protocol and electrical domains
- Faster root-cause analysis means fewer costly finger-pointing exercises

### Analyze link training with integrated physical and protocol views

- Observe electrical-level results of protocol-level commands
- Combined navigation means always knowing which protocol and electrical behaviors happen at the same time
- No single instrument can deliver this level of cross-layer insight into link training

# 12-BIT UP TO 8 GHz, 20 GS/s, 5 GPTS

## WavePro HD

## Capture Every Detail with 2.5 GHz to 8 GHz HD Oscilloscopes



WavePro HD High-Definition oscilloscopes employ unique Teledyne LeCroy HD4096 technology to achieve 12-bit resolution at up to 8 GHz bandwidth, for the lowest noise and unmatched signal fidelity. Up to 5 Gpts of highly responsive acquisition memory gives more visibility into system behavior, and the exceptional analysis toolbox enables deep insight.

### Key Features

- HD4096 technology provides 12-bit resolution at all times up to 8 GHz and 20 GS/s
- 2.5 GHz – 8 GHz bandwidth
- 20 GS/s sample rate
- Up to 5 Gpts of acquisition memory enables detailed viewing of long events
- 15.6" 1920 x 1080 Full HD capacitive touchscreen
- New ProBus2 input supports up to 8 GHz bandwidth and direct compatibility with a wide variety of existing ProBus probes – 50  $\Omega$  and 1 M $\Omega$  coupling modes support all input types on a single connector
- MAUI with OneTouch user interface for intuitive and efficient operation
- Deep toolbox enables and simplifies complex analysis
- Intuitive navigation to quickly find important features in long waveforms
- High dynamic range and 0.5 % gain accuracy.

### HD4096 High Definition Technology

Next-generation Teledyne LeCroy HD4096 technology enables capture and display of signals with 16 times more resolution than other oscilloscopes, up to 8 GHz bandwidth and 20 GS/s sample rate. Waveforms captured and displayed are cleaner and crisper. The oscilloscopes deliver unmatched measurement precision for improved debug and analysis. High-resolution performance comes with no special operating modes or compromises on bandwidth or sample rate.

### 5 Gpt Acquisition Memory

With up to 5 Gpts of acquisition memory, WavePro HD 12-bit oscilloscopes capture events occurring over long periods of time, while still maintaining high sample rate for visibility into the smallest details. A sophisticated acquisition and memory management architecture makes even the longest acquisitions

fast and responsive. WavePro HD can capture 250 ms of data at full 20 GS/s sample rate – and always with 12 bits of resolution. Oscilloscopes with less memory require trading off sample rate for acquisition time.



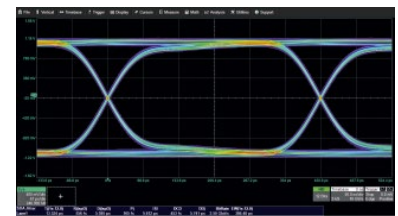
### Deeply Embedded Computing Systems Testing

WavePro HD has unsurpassed capabilities to acquire the longest records at the highest resolution for the most comprehensive deeply embedded computing system (analog, digital, serial data and sensor) testing.



### Power Integrity Test

WavePro HD's combination of high bandwidth and high resolution provides the capability to validate and debug all aspects of power supply, delivery and consumption – ensuring complete confidence.



### Serial Data Jitter and Noise Analysis

WavePro HD 12-bit oscilloscopes bring the high signal fidelity of HD4096 technology to high-speed serial data analysis. 12-bit resolution, exceptionally low noise and 60 fs timebase jitter mean a low jitter measurement floor, for the most accurate serial data jitter and noise measurements possible.

# 12-BIT 8 CHANNEL WITH UP TO 2 GHz

## WaveRunner 8000HD

### HD 12-Bit Oscilloscopes up to 2 GHz, 10 GS/s, 5 Gpts and up to 16 Channels

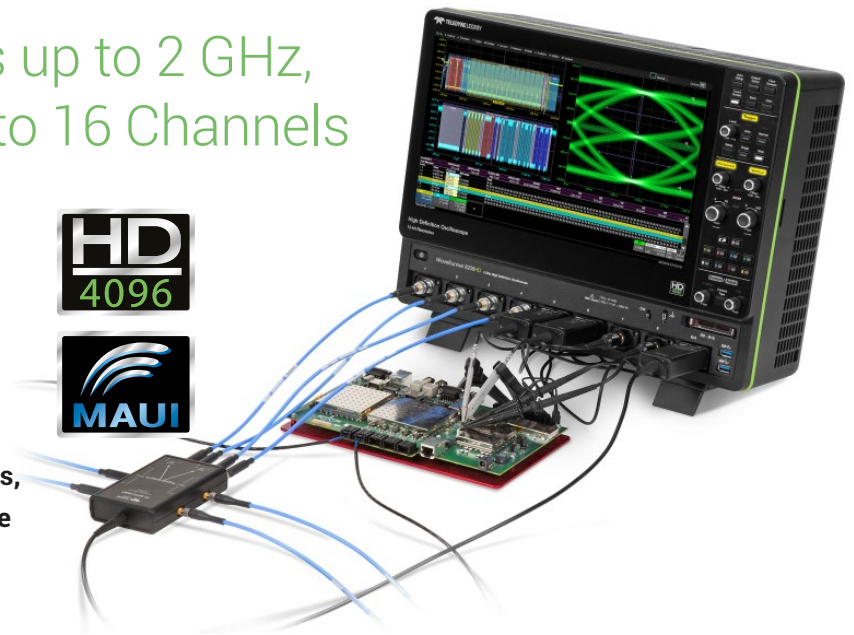
Today's highly complex power-conversion systems, automotive ECUs and embedded control systems are becoming smaller, denser and faster, with more signals, sensor inputs and lower-voltage power rails than ever. WaveRunner 8000HD's combination of 12-bit resolution at 2 GHz bandwidth, 8 (or 16) channels, very long capture times, and a complete software toolset makes it ideal for these key applications.

#### Key Features

- Up to 16 analog channels
- 12-bit ADC resolution, up to 15-bit with enhanced resolution
- 350 MHz, 500 MHz, 1 GHz, and 2 GHz bandwidths
- 10 GS/s Sample Rate
- Longest memory – up to 5 Gpts with simple navigation
- 16 analog channels with OscilloSYNC™
- 16 digital channel MSO option
- 15.6" touch screen display
- MAUI with OneTouch Gesture Control
- Wide probe selection for power electronics, embedded electronics, and mechatronics applications
- Advanced analysis and reporting toolsets
- Advanced triggering supplemented with TriggerScan and measurement trigger
- Serial data trigger & decode and debug toolkit options

**HD**  
4096

**MAUI**



#### HD4096 – 12 Bits All the Time, 16x Closer to Perfect

HD4096 high definition technology consists of 12-bit ADCs with 10 GS/s sample rates, high signal-to-noise (55 dB) input amplifiers and a low-noise system architecture. This technology enables high definition oscilloscopes to capture and display signals of up to 2 GHz with 16 times more resolution than conventional 8-bit oscilloscopes.

#### Longest Memory, Simple Navigation, No Compromise

With up to 5 Gpts of acquisition memory, WaveRunner 8000HD 12-bit oscilloscopes capture long periods of time, yet maintain high sample rate for visibility into the smallest details.

#### 3-phase Power Analysis

WaveRunner 8000HD 12-bit oscilloscopes deliver 8 analog channels (16 with OscilloSYNC), 3-phase

power analysis software, and high-performance probes for inverter subsection, power system and control testing.

#### Automotive Electronics Testing

WaveRunner 8000HD 12-bit oscilloscopes combine a high channel count, long memory, and wide range of validation and debug software to best address the specific test needs of the automotive industry.

#### Power Integrity and Power Sequencing Testing

WaveRunner 8000HD 12-bit oscilloscope's high resolution, long memory and high channel count let you validate and debug all aspects of power supply, delivery and consumption for complete confidence.

#### Deeply Embedded Computing Systems Testing

WaveRunner 8000HD 12-bit oscilloscopes acquire the longest records at the highest resolution for the most comprehensive deeply embedded computing system analysis (analog, digital, serial data and sensor).

#### OscilloSYNC Technology



Setup is incredibly easy with just four simple steps:

1. Connect Ref. In/Out terminals.
2. Connect Aux Out terminals.
3. Connect Ethernet ports.
4. Enter IP Address and press Connect.

➡ Acquire 16 channels on one display.

# 12-BIT 8 CHANNEL MOTOR DRIVE ANALYZER

## MDA 8000HD

### HD 12-Bit Motor Drive Analyzer – Static, Dynamic, Complete

The Motor Drive Analyzer is built on an 8 channel, 12-bit resolution oscilloscope platform. It acquires any signal and performs three-phase electrical and mechanical power calculations. It provides complete power section and embedded control test coverage.

#### Longest Memory, Simple Navigation, No Compromise

With up to 5 Gpts of acquisition memory, MDA 8000HD 12-bit oscilloscopes capture long periods of time, yet maintain high sample rate for visibility into the smallest details.

#### Static Power Analysis

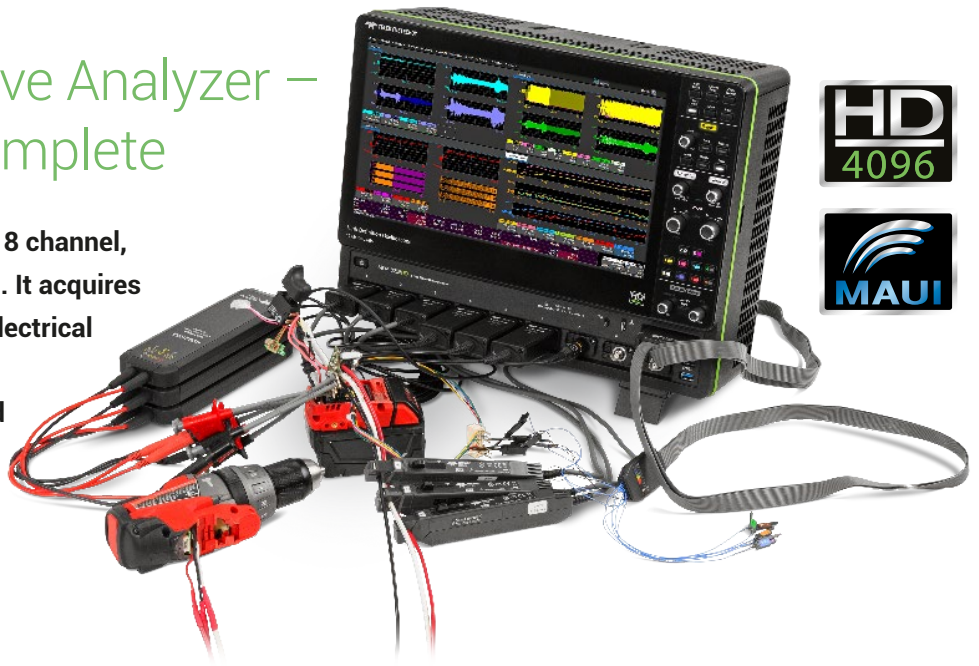
The mean-value Numerics table displays voltage, current, power, speed, torque, etc. values for short (or long) time periods during constant load, speed and torque operating conditions – just like what a dedicated power analyzer instrument provides.

#### Dynamic Power Analysis

Capture thousands of power cycles over long time periods. Per-cycle Waveform views help you understand dynamic behaviours. Use Zoom+Gate to isolate and correlate power behaviours to control system operation during dynamic load, speed, and torque operating conditions.

#### Complete Test Coverage

Acquire and display analog, digital and serial data signals from both power and embedded control systems. Correlate power system behaviors to control system activity during time periods as short as a single device switching cycle.



#### Comprehensive Mechanical Interface

Nine speed, four angle, and five torque sensors supported – most supported only by the Motor Drive Analyzer. Calculate mechanical power at your bench without external sensors connected.

#### Harmonics Calculation Option

Rigorous software DFT method precisely separates desired frequency content. Provides THD numeric calculation and per-cycle Waveforms, harmonic order table and spectral displays (up to nine simultaneous).

#### 3-phase Vector Display Option

Two simultaneous vector displays permit visualization of three-phase system voltage and current. Vector information can be harmonically filtered and is compatible with Zoom+Gate to show vector changes during dynamic or long acquisitions.

#### Waveform Transformations option (THREEPHASEdq0)

Support for two simultaneous  $\alpha\beta$  (Clarke) and  $dq0$  (Park) real-time transformations with X-Y plot capability available for  $d$  vs.  $q$  and  $\alpha$  vs.  $\beta$  components

#### 16 Channels with OscilloSYNC™

View and control 16 analog channels on a single display with OscilloSYNC Oscilloscope Synchronization. Setup is incredibly easy – it's like having a single 16-channel acquisition system with the benefit of being able to use each oscilloscope or MDA independently.

#### Key Features

- Up to 16 analog channels
- 12-bit ADC resolution, up to 15-bit with enhanced resolution
- 350 MHz, 500 MHz, 1 GHz, and 2 GHz bandwidths
- 10 GS/s Sample Rate
- Longest memory – up to 5 Gpts with simple navigation
- 16 analog channels with OscilloSYNC™
- 16 digital channel MSO option
- 15.6" touch screen display
- MAUI with OneTouch Gesture Control
- Wide probe selection for power electronics, embedded electronics, and mechatronics applications
- Advanced analysis and reporting toolsets
- Advanced triggering supplemented with TriggerScan and measurement trigger
- Serial data trigger & decode and debug toolkit options



# 12-BIT UP TO 1 GHz

## NEW HDO6000B

## Highly Accurate measurements with 12-Bit HD Oscilloscopes up to 1 GHz, 10 GS/s



**HDO6000B uses Teledyne LeCroy's HD4096 high definition true 12-bit technology, long memory, a big 15.6" display, the smallest footprint in its class, powerful measurement and analysis tools, and mixed signal capability. It is the ideal oscilloscope for circuit validation, system debug and waveform analysis. The powerful feature set provides analytical tools and unique application packages to streamline the testing process.**

### Key Features

- 12-bit ADC resolution, up to 15-bit with enhanced resolution
- 350 MHz, 500 MHz, and 1 GHz bandwidths
- 10 GS/s Sample Rate
- Long memory – up to 250 Mpts/Ch
- 15.6" touch screen display
- MAUI with OneTouch Gesture Control
- Advanced tools
  - WaveScan – search and find
  - LabNotebook documentation and report generation
  - History Mode – waveform playback
- Advanced triggering with Trigger-Scan and Measurement Trigger
- Power Analyzer Option
- Spectrum Analyzer Options
- Function Generator Option
- Serial Data Toolsets
  - Trigger
  - Decode
  - Measure/Graph
  - Eye Diagram
- 16 digital channels with 1.25 GS/s
  - Analog and digital cross-pattern triggering
  - Digital pattern search and find
  - Analog and digital timing measurements
- Wide probe selection for power electronics, embedded electronics, and mechatronics applications

### Big Display, Small Footprint

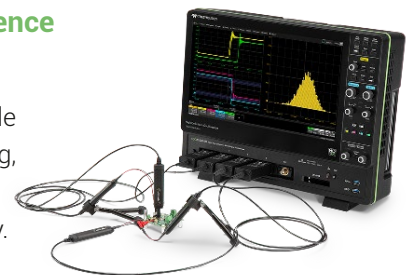
With a 15.6" display and 1920x1080 resolution, the HDO6000B allows the user to capture more detail. Connect to a second monitor and view the extended desktop in glorious 4K resolution.

Being 25 % thinner than competitive products, the HDO6000B is the sleekest instrument on the market. The HDO6000B occupies less bench space, allowing you to spread out your test circuits and probes and focus on your design validation needs.

### HDO6000B Provide Application Excellence

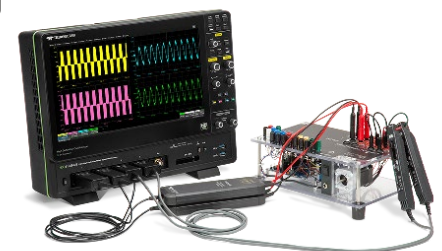
#### AUTOMOTIVE ELECTRONICS

HDO6000B 12-bit oscilloscopes provide a wide range of probing solutions, compliance testing, and debug software to best address the specific test needs of the automotive industry.



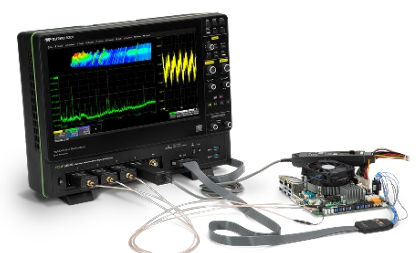
#### POWER CONVERSION

HDO6000B 12-bit oscilloscopes deliver 4 analog channels, 3-phase power analysis software, and high performance probes for inverter subsection, power system and control testing.



#### BEST EMBEDDED SYSTEM DEBUG

HDO6000B 12-bit oscilloscopes acquire long records at the highest resolution for the most comprehensive deeply embedded computing system analysis (analog, digital, serial data, and sensor).



#### POWER INTEGRITY

HDO6000B 12-bit oscilloscopes' high resolution and long memory let you validate and debug all aspects of power supply, delivery and consumption – for complete confidence.

# 12-BIT UP TO 1 GHz

## HDO4000A

### Low Noise Measurements with True 12-Bit in HD up to 1 GHz, 10 GS/s



Combining HD4096 high definition technology with long memory, a compact form factor, 12.1" touch screen display, powerful debug tools, and mixed signal capability, the HDO4000A is the ideal oscilloscope for precise measurements and fast debugging. Tools such as WaveScan Search and Find, LabNotebook Report Generator, and History Mode help to identify and to isolate problems for faster troubleshooting.



### Long Acquisition Window

With up to 50 Mpts of memory the HDO4000A High Definition Oscilloscopes can capture large amounts of data with more precision than other oscilloscopes. The 10 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. The MAUI OneTouch user interface is designed for touch screens which makes navigat-

ing the HDO4000A extremely intuitive. Every aspect of the interface is touchable, making channel, timebase and trigger settings only one touch away.

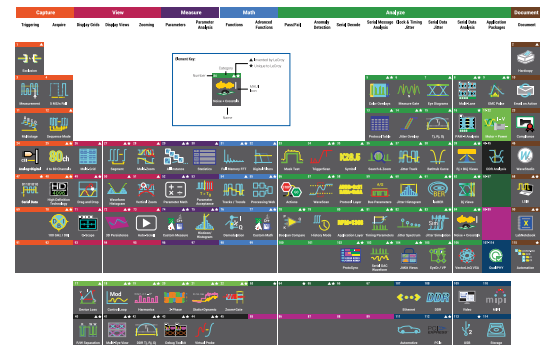
### True 12-Bit Technology

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.



### Key Features

- 12-bit ADC resolution, up to 15-bit with enhanced resolution
- 200 MHz, 350 MHz, 500 MHz, 1 GHz bandwidths
- 10 GS/s Sample Rate
- Long memory – up to 50 Mpts
- 12.1" touch screen display
- MAUI with OneTouch
  - › Designed for touch
  - › Built for simplicity
  - › Made to solve
- Multi-language user interface
- WaveScan – search and find
- LabNotebook documentation and report generation
- History Mode
- Spectrum Analyzer Options
- Power Analysis Option
- Serial data trigger and decode
  - › 16 digital channels with 1.25 GS/s
    - › Analog and digital cross-pattern triggering
    - › Digital pattern search and find
    - › Analog and digital timing measurements
    - › Activity indicators



### Powerful, Deep Toolbox

Our waveshape analysis tools and application packages provide unparalleled insight. Learn more at Periodic Table of Oscilloscope Tools. Combine our powerful, deep toolbox with up to 50 Mpts/ch of acquisition memory and the most powerful motherboard in its class – an Intel® Core™ i3-2330E Dual (core), 2.2 GHz (per core) with 8 GB of RAM standard.

# 12-BIT 4 CHANNEL UP TO 1 GHz

## WaveSurfer 4000HD

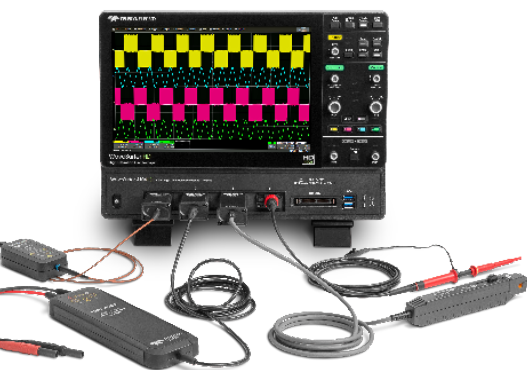
Unrivalled Performance.  
Unbeatable Value.

Today's highly complex power-conversion systems and embedded control systems are becoming smaller and denser, with more sensor inputs and lower-voltage power rails than ever. WaveSurfer 4000HD's combination of 12-bit resolution at 1 GHz bandwidth and a competitive software toolset makes it ideal for these key applications.



### Key Features

- 12-bit ADC resolution, up to 15-bit with enhanced resolution
- 200 MHz, 350 MHz, 500 MHz, and 1 GHz bandwidths
- Up to 5 GS/s Sample Rate
- Up to 25 Mpts memory
- 12.1" touch screen display
- 16 digital channel MSO option
- Function Generator Option
- Spectrum Analyzer Option
- MAUI with OneTouch Gesture Control
- More capability – integrates multiple instruments into one
- Comprehensive probe support – supports over 30 probes in 9 categories



### HD4096 – 12 Bits All the Time, 16x Closer to Perfect

Teledyne LeCroy high definition 12-bit oscilloscopes use unique HD4096 technology to provide superior and uncompromised measurement per-

formance. HD4096 technology provides the highest resolution and lowest noise at full bandwidth – 12 bits all the time with no compromise.

### Clock Analysis

The WaveSurfer 4000HD standard toolset gives good insight into the quality of a clock signal.

- Built-in WaveScan Anomaly Detection
- Statistical View of Data with all-instance measurements for every clock edge for any acquisition length
- Graphical View of Data using trend and histicons

### Power Rail Analysis

WaveSurfer 4000HD is ideally suited to power rail analysis.

- Most Accurate Measurements with HD4096 12-bit resolution
- Find Noise Sources using FFT (standard) or Spectrum Analyzer (optional)
- Native Probing with built-in high offset capability

### Protocol Analysis

WaveSurfer 4000HD supports serial trigger and decode for widely used embedded systems protocols: CAN, CAN FD, LIN, FlexRay, I<sup>2</sup>C, SPI and UART-RS232.

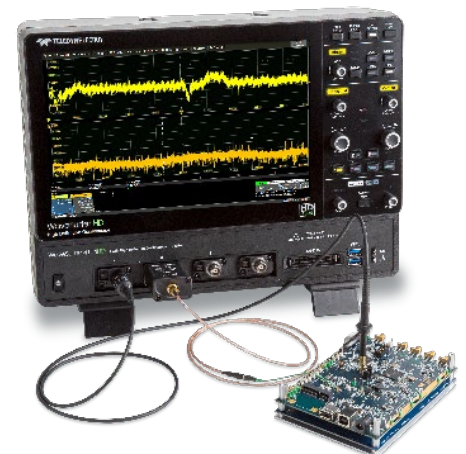
- Intuitive Decoding with color-coded overlays and exportable tables

- Powerful Serial Triggering
- Time Synchronized Views – interactive table shows simultaneous decoding of two protocols

### Power Analysis

Add the Power Analysis software option to the WaveSurfer 4000HD to measure and analyze the operating characteristics of power conversion circuits.

- Predefined Tests to analyze device, control loop or line power
- Easy Test Setup of voltage and current inputs
- Power Measurements – automatically calculate switching device measurements, input/output power and input harmonics.



## LabMaster 10 Zi-A

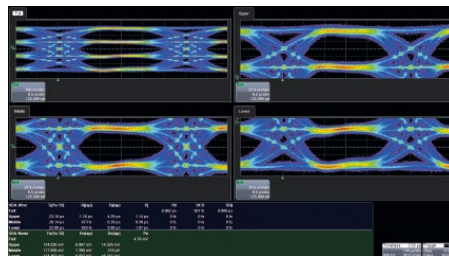
### Real-time Oscilloscopes up to 65 GHz, 160 GS/s

#### Key Features

- Up to 65 GHz bandwidth, 160 GS/s sample rate, 80 Ch, 1.5 Gpts/Ch of analysis memory
- Modular – start with four channels and expand your system over time
- Wide bandwidth upgrade range provides investment protection
- Single trigger circuit for all modules eliminates additive trigger jitter
- Simple – connect and acquire – Teledyne LeCroy has done the hard work for you
- 15.3" widescreen touch screen display – or external monitor with up to WQXGA 2560 x 1600 pixels
- Highly stable timebase over long acquisitions, low jitter and Rj noise floor
- Eye Doctor™ II and Virtual Probe Signal Integrity toolsets provide real-time de-embedding, emulation, and equalization on serial data channels
- Seamless MATLAB analysis – Run custom scripts in real-time
- Superior Analysis Capabilities
  - Eye, Jitter and Noise Analysis with SDAIII-CompleteLinQ
  - Optical Modulation Analysis with Optical-LinQ



The performance of the LabMaster 10 Zi-A series is key to acquiring, analyzing and understanding the fastest phenomena found in R&D labs, where engineers are working on next-generation communication systems, high bandwidth electrical components and fundamental scientific research.



*PAM4 signaling is seen as the next step in the evolution of serial data signal formats, allowing two bits of information to be transmitted per UI rather than one.*

#### High Bandwidth Oscilloscopes for the Most Demanding Signals

Whether working on communications technology capable of terabit/s symbol rates, analyzing the quickest and most energetic laser pulses, or building links using very high speed NRZ or PAM4 signals, the LabMaster 10 Zi-A Series oscilloscopes can acquire and analyze the waveforms.

#### Sophisticated Software for Sophisticated Analysis

The LabMaster 10 Zi-A Series offers an extensive set of standard math tools and add-on software packages that integrate seamlessly into the oscilloscope's MAUI User Interface. LabMaster 10 Zi-A oscilloscopes excel at performing in-depth analysis of complicated signals. For NRZ signals, the SDAIII-CompleteLinQ package compares eye, jitter and noise on up to four lanes simultaneously. With the Optical-LinQ package, analyze coherent optical signals such as DP-QPSK, DP-16QAM. Additionally, the PAM4 Signal Analysis package performs eye, jitter and noise measurements on PAM4 signals. Since the fastest signals often require custom analysis, LabMaster 10 Zi-A also comes standard with the ability to run MATLAB scripts in-stream.

## WaveMaster 8 Zi-B

Exceptional Performance  
up to 30 GHz, 80 GS/s, 4 GHz – 30 GHz



The WaveMaster 8 Zi-B combines the performance, signal fidelity and feature set needed for today's high-speed measurements with the ease of use of a standard benchtop oscilloscope. Featuring the highest-speed serial data triggers, the only complete multi-lane serial data analysis and eye diagram solution, and the most comprehensive set of compliance packages, the WaveMaster 8 Zi-B simplifies the most complex testing. With up to 30 GHz bandwidth, 80 GS/s sample rate, extremely stable timebase and a 14.1 Gb/s serial trigger the WaveMaster 8 Zi-B has the hardware performance to capture today's high-speed signals.

### Key Features

- Up to 30 GHz bandwidth, 80 GS/s sample rate, 512 Mpts/Ch of analysis memory
- The industry's only true hardware 14.1 Gb/s serial pattern trigger
- Low Jitter Measurement Floor and exceptional timebase stability
- Comprehensive set of serial data analysis, debug, validation and compliance tools
- Integrated 50 Ω and 1 MΩ inputs for true connection and probing flexibility
- Multi-lane serial data eye, jitter and crosstalk analysis
- Real-time de-embedding, emulation, and equalization
- 15.3" touch screen display

### Configurations Optimized for Serial Data Analysis

The SDA 8 Zi-B models have been specifically configured to handle today's most challenging serial data applications. As well as doubling the standard memory depth, the SDA 8 Zi-B comes as standard with a 6.5 Gb/s true hardware serial pattern trigger, and the SDAIII core toolset, which provides tightly-integrated and comprehensive eye diagram and jitter analysis for NRZ signals.



### SDAIII toolset

The Teledyne LeCroy SDAIII-CompleatLinQ Serial Data Analysis products contain multilane eye and jitter analysis, LaneScape™ comparison modes, vertical noise measurements, and crosstalk analysis tools. These capabilities provide the deepest insight into the behavior of multi- or single-lane serial data systems.

### Decode From Bit-level to Protocol Layer

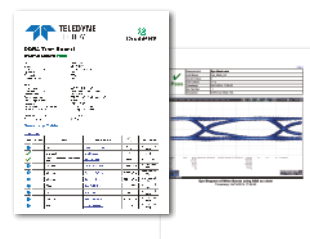
Decoders are available for over 20 low-speed and high-speed serial data buses. These fully-integrated analysis tools annotate the acquired analog waveform with the corresponding decoded data, as well as providing a comprehensive, exportable decode table.

For many standards, ProtoSync allows a view from even higher up the protocol stack, linking the physical-layer waveforms to full transaction- and protocol-layer analysis.

### Automated Compliance Testing

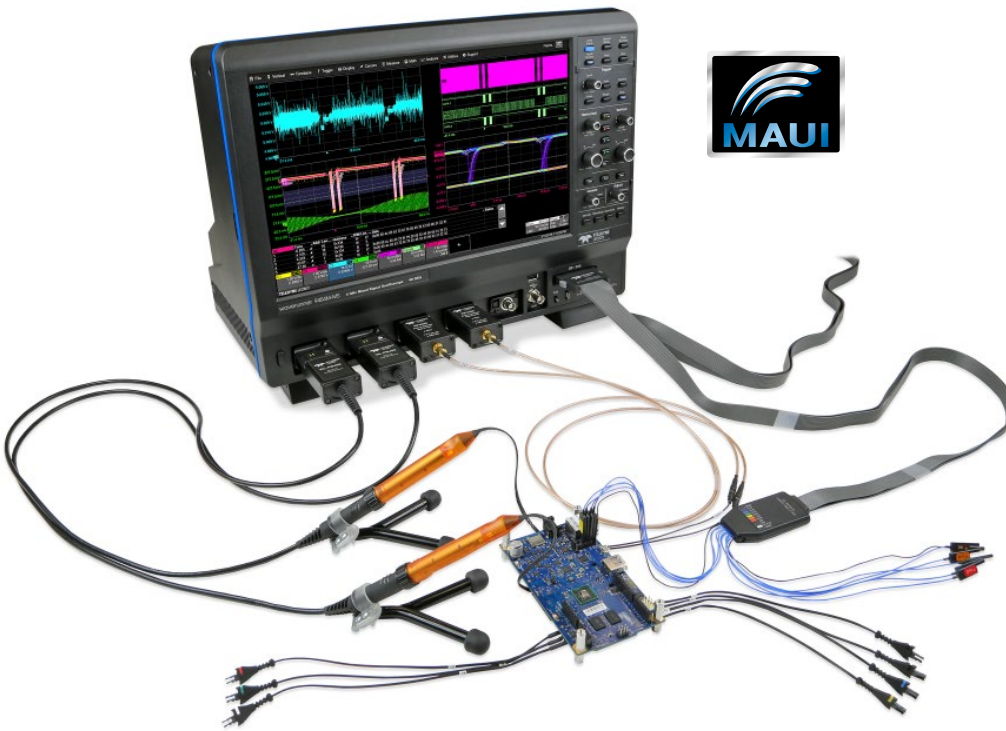
Teledyne LeCroy's QualiPHY software makes it easy to perform automated compliance tests and produce comprehensive test reports on a wide array of serial standards including:

- PCI Express (1.0, 2.0, 3.0)
- USB1, USB2, USB 3.0, USB 3.1, USB 3.2
- DDR2, LPDDR2, DDR3, LPDDR3, DDR4, LPDDR4
- SAS2, SAS3, SATA
- MIPI D-PHY, MIPI M-PHY
- 10/100/1000 BASE-T, 10GBASE-T, 10GBASE-KR, SFI
- HDMI 1.4, HDMI 2.0, DisplayPort 1.2
- MOST50, MOST150, BroadR-Reach

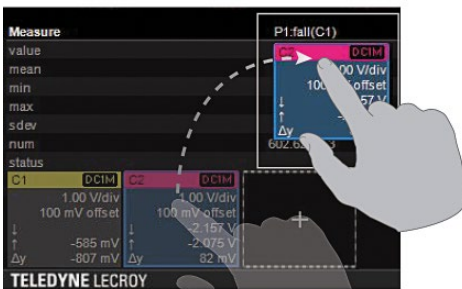


## WaveRunner 9000

### Extremely Powerful. Incredibly Easy.



The WaveRunner 9000 combines a superior oscilloscope experience with an extensive toolbox to shorten debug time. An extra large 15.4" display with MAUI with OneTouch includes the most unique touch features of any oscilloscope providing unsurpassed efficiency in oscilloscope operation. Offering 500 MHz – 4 GHz of bandwidth, 40 GS/s sample rate, long memory, MAUI – Most Advanced User Interface, and a versatile toolset makes the WaveRunner 9000 unbelievably powerful and incredibly easy to use.



### Superior User Experience

The WaveRunner 9000 with MAUI OneTouch sets the standard for oscilloscope user experience by providing the most unique touch features of any oscilloscope. Common gestures are used to intuitively interact with the

oscilloscope and dramatically reduce setup time. Convenience and efficiency are optimized – all common operations can be performed with one touch and do not require opening and closing of pop-up dialogs or menus.

### Exceptional Serial Data Tools

A wide variety of application packages are available to meet all serial data test challenges, ranging from automated compliance packages to flexible debug toolkits. A suite of protocol specific measurements and eye diagram packages are available to complement the industry's most intuitive trigger and decode packages.

### Key Features

- 500 MHz – 4 GHz bandwidths
- Up to 40 GS/s sample rate
- up to 128 Mpts/Ch of analysis memory
- 15.4" touch screen display
- MAUI with OneTouch
  - › Designed for touch
  - › Built for simplicity
  - › Made to solve
- Advanced Tools
  - › Jitter and Timing Analysis Capabilities
  - › WaveScan – Search and Find
  - › LabNotebook Documentation and Report Generation
  - › History Mode – Waveform Playback
- Optional Software Packages
  - › Advanced Customization
  - › Digital Filtering
  - › Device and Switching Power
- Supply Analysis
  - › Comprehensive set of serial data analysis, debug, validation and compliance tools
- 16 digital channels with 1.25 GS/s
  - › Analog and Digital Cross-Pattern Triggering
  - › Digital Pattern Search and Find
  - › Analog and Digital Timing Measurements
  - › Logic Gate Emulation
  - › Activity Indicators

### Powerful, Deep Toolbox

The standard collection of math, measurement, debug, and documentation tools provides unsurpassed analysis capabilities. Application-specific packages enable streamlined debugging for common design/validation scenarios. The advanced customization option (XDEV) enables user-defined parameters and math functions providing unique and limitless analysis capability.

## WaveSurfer 3000z

### Biggest Touch, Best Value

WaveSurfer 3000z oscilloscopes feature the MAUI advanced user interface with touch screen simplicity to shorten debug time. Quickly identify and isolate anomalies with WaveScan, Fast Display, and History Mode for faster troubleshooting; LabNotebook enables easy documentation and convenient collaboration. The advanced probe interface, upgradable bandwidth and multi-instrument capabilities provide maximum versatility and investment protection.



### Superior User Experience

MAUI is the most advanced oscilloscope user interface. It is designed for touch, built for simplicity, and made to solve.

### Biggest Touch Display

A large capacitive touch screen enables accessible and responsive touch operation. The 10.1" display is 30 % larger than competitive offerings, providing more waveform viewing area.

### Key Features

- 100 MHz, 200 MHz, 350 MHz, 500, and 1 GHz bandwidths
- Up to 4 GS/s sample rate
- Long memory – 20 Mpts/Ch
- 10.1" touch screen display
- MAUI – advanced user interface
  - Designed for touch
  - Built to simplify
  - Made to solve
- Advanced anomaly detection
  - Fast waveform update
  - History Mode
  - WaveScan
- Superior toolset
  - LabNotebook
  - Sequence Mode
  - Advanced active probe interface
  - Math and measure
- Multi-instrument capabilities
  - Protocol analysis – Serial trigger and decode I<sup>2</sup>C, SPI, UART/RS-232, CAN, CAN FD, I<sup>2</sup>S, LIN, FlexRay
  - Waveform generation – built-in arbitrary generator
  - Digital Voltmeter DVM
  - Logic analysis – 16 channel MSO
- Power Analyzer Package
  - Automatically and accurately analyze the performance of switched-mode power circuits
- Spectrum Analyzer Option



### Advanced Anomaly Detection

A fast waveform update rate, used in conjunction with history mode, WaveScan, sequence mode, and mask testing facilitates outstanding waveform anomaly detection.

### Powerful, Deep Toolbox

The standard collection of math, measurement, debug, and documentation tools provides unsurpassed analysis capabilities.



**LabMaster 10 Zi-A  
(SDA/DDA Models)**



**WaveMaster 8 Zi-B  
(SDA/DDA 8 Zi-B)**



**WavePro HD**

<b>Classification</b>	Modular High End Analysis	High End Analysis	High End Analysis
<b>Bandwidth</b>	20 GHz to 65 GHz	4 GHz to 30 GHz	2,5 GHz to 8 GHz
<b>Resolution</b>	8-bit ADC resolution, 11-bit with ERES	8-bit ADC resolution, 11-bit with ERES	12-bit ADC resolution, 15-bit with ERES
<b>Channels</b>	Up to 80	4	4
<b>MSO Characteristics</b>	9/18 Ch High Speed <sup>4)</sup>	18/36 Ch Low Speed <sup>1)</sup> 9/18 Ch High Speed <sup>4)</sup>	16 Ch <sup>3)</sup>
<b>Display</b>	15.3" Color Touch Screen	15.3" Color Touch Screen	15.6" Color Touch Screen
<b>Memory</b>	32 Mpts/Ch to 1024 Mpts/Ch	64 Mpts to 512 Mpts/Ch	100 Mpts/Ch to 5 Gpts/Ch
<b>Sample Rate</b>	Up to 160 GS/s	Up to 80 GS/s	Up to 20 GS/s
<b>Trigger Types</b>	Basic, SMART, Sequence, High Speed Serial Protocol, Measurement	Basic, SMART, Sequence, High Speed Serial Protocol, Measurement	Basic, SMART, Sequence, High Speed Serial Protocol, Measurement
<b>Serial Data Options</b>	40+	40+	40+
<b>Dimensions (HWD)</b>	MCM-Zi: 277 x 462 x 396 mm LabMaster 10-xxZi Acq. Module: 202 x 462 x 660 mm	355 x 467 x 406 mm	345 x 445 x 196 mm



**HDO4000A/  
HDO4000A-MS**



**WaveSurfer 4000HD**



**WaveSurfer 3000z**



<b>Classification</b>	High Definition Analysis	High Definition Analysis	Bench
<b>Bandwidth</b>	200 MHz to 1 GHz	200 MHz to 1 GHz	100 MHz to 1 GHz
<b>Resolution</b>	12-bit ADC resolution, 15-bit with ERES	12-bit ADC resolution, 15-bit with ERES	8-bit ADC resolution, 11-bit with ERES
<b>Channels</b>	4	4	4
<b>MSO Characteristics</b>	16 Ch <sup>2)</sup>	16 Ch <sup>3)</sup>	16 Ch <sup>3)</sup>
<b>Display</b>	12.1" Color Touch Screen	12.1" Color Touch Screen	10.1" Color Touch Screen
<b>Memory</b>	25 Mpts/Ch to 50 Mpts/Ch	25 Mpts/Ch	20 Mpts/Ch
<b>Sample Rate</b>	10 GS/s (12-bit)	5 GS/s (2 Ch), 2.5 GS/s (4 Ch)	Up to 4 GS/s
<b>Trigger Types</b>	Basic, SMART, Sequence	Basic, SMART, Sequence	Basic, SMART, Sequence
<b>Serial Data Options</b>	25+	25	9
<b>Dimensions (HWD)</b>	291 x 399 x 131 mm	273 x 380 x 160 mm	220 x 350 x 145 mm

<sup>1)</sup> compatible with MS-250/500 Options <sup>2)</sup> MS Models <sup>3)</sup> 16 Digital Channels with MS-Option <sup>4)</sup> HDA125 Option





**WaveRunner 9000**



**WaveRunner/  
MDA 8000HD**



**HDO6000B/  
HDO6000B-MS**

Classification	Advanced Analysis	High Definition Analysis	Advanced High Definition Analysis
<b>Bandwidth</b>	500 MHz to 4 GHz	350 MHz to 2 GHz	350 MHz to 1 GHz
<b>Resolution</b>	8-bit ADC resolution, 11-bit with ERES	12-bit ADC resolution, 15-bit with ERES	12-bit ADC resolution, 15-bit with ERES
<b>Channels</b>	4	8/16	4
<b>MSO Characteristics</b>	16 Ch <sup>3)</sup>	16 Ch <sup>3)</sup>	16 Ch <sup>2)</sup>
<b>Display</b>	15.4" Color Touch Screen	15.6" Color Touch Screen	15.6" Color Touch Screen
<b>Memory</b>	32 Mpts/Ch to 128 Mpts/Ch	50 Mpts/Ch to 5 Gpts/Ch	50 Mpts/Ch to 250 Mpts/Ch
<b>Sample Rate</b>	Up to 40 GS/s	10 GS/s	10 GS/s
<b>Trigger Types</b>	Basic, SMART, Sequence, Measurement	Basic, SMART, Sequence, High Speed Serial Protocol, Measurement	Basic, SMART, Sequence, Measurement
<b>Serial Data Options</b>	40+	40+	40+
<b>Dimensions (HWD)</b>	358 x 445 x 242 mm	345 x 445 x 196 mm	352 x 445 x 170 mm

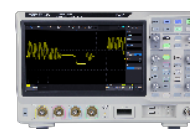
<sup>1)</sup> compatible with MS-250/500 Options   <sup>2)</sup> MS Models   <sup>3)</sup> 16 Digital Channels with MS-Option   <sup>4)</sup> HDA125 Option



**T3DSO3000**



**T3DSO2000A**



**T3DSO1000/  
T3DSO1000A**



Classification	Bench	Bench	Bench
<b>Bandwidth</b>	200 MHz to to 1 GHz	100 MHz to to 500 MHz	100 MHz to 350 MHz
<b>Resolution</b>	8-bit resolution, 11-bit with enhanced resolution	8-bit resolution, 11-bit with enhanced resolution	8-bit resolution, 11-bit with enhanced resolution
<b>Channels (Analog + Digital)</b>	2 or 4, 2 or 4 + 16	2 or 4, 2 or 4 + 16	2 or 4, 2 or 4 + 16
<b>MSO Characteristics<sup>1)</sup> (Digital Channels)</b>	1.25 GS/s, 3.3 ns min detectable pulse width	500 MS/s, 3.3 ns min detectable pulse width	250 MHz, 1 GS/s
<b>Display</b>	10.1" Capacitive Touch Screen 1024 x 600	10.1" Capacitive Touch Screen 1024 x 600	7" 800 x 480
<b>Memory</b>	125 Mpts/Ch, up to 250 Mpts <sup>1)</sup>	100 Mpts/Ch, up to 200 Mpts <sup>1)</sup>	T3DSO1000: 7 Mpts/Ch, up to 28 Mpts <sup>1)</sup> T3DSO1000A: 14 Mpts/Ch, up to 28 Mpts <sup>1)</sup>
<b>Sample Rate</b>	Up to 5 GS/s	Up to 2 GS/s	T3DSO1000: Up to 1 GS/s T3DSO1000A: Up to 2 GS/s
<b>Trigger Types</b>	Edge, Pulse, Pattern, Video, Runt, Slope, Interval, Dropout, Window / Zone	Edge, Pulse, Pattern, Video, Runt, Slope, Interval, Dropout, Window / Zone	Edge, Pulse, Pattern, Video, Runt, Slope, Interval, Dropout, Window
<b>Serial Data Options</b>	11	6	6
<b>Dimensions (HWD)</b>	370 x 144 x 231 mm	224 x 352 x 111 mm	150 x 312 x 133 mm

<sup>1)</sup> Optional



### MDA 8000HD Motor Drive Analyzer

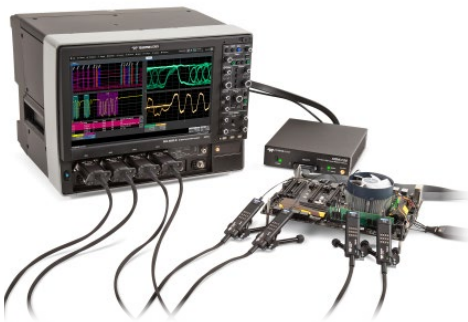
#### 3-phase Electrical and Mechanical Power Analysis

Motor drive engineers need to understand every part of drive system operation. They need to view control, sensor, device and power waveforms, they need to understand dynamic events, and they need flexibility to debug anything. The Motor Drive Analyzer does it all.

#### Key Features:

- Up to 2 GHz, 10 GS/s, 5 Gpts with 12-bit resolution
- Dynamic power analysis, from startup to overload
- Per-cycle time-correlated power Waveforms
- Comprehensive motor interface (Torque, Speed, Angle, Power)
- Unique Zoom+Gate mode
- Vector Display Option
- Two- and three-wattmeter methods supported
- Waveform Transformations option (THREEPHASEdq0)
- Harmonics calculations, displays and filtering (optional)
- Up to 6000 Vrms isolation with HVD Series differential probes
- Easily interface many different current measurement devices

[teledynelecroy.com/motor-drive-analyzer](http://teledynelecroy.com/motor-drive-analyzer) | [teledynelecroy.com/static-dynamic-complete](http://teledynelecroy.com/static-dynamic-complete)



### HDA125 High-speed Digital Analyzer

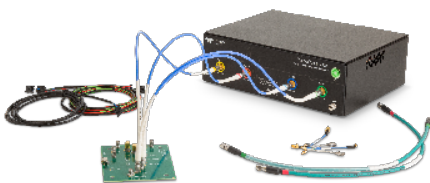
#### The Most Flexible Mixed-Signal Test Solution

The HDA125 transforms your Teledyne LeCroy oscilloscope into the highest-performance, most flexible mixed-signal solution for high-speed digital debug and evaluation. With 12.5 GS/s digital sampling rate on 18 input channels, and the revolutionary QuickLink probing solution allowing seamless transitions from digital to high-bandwidth analog acquisitions, validation of challenging interfaces such as DDR4 has never been simpler or more comprehensive.

#### Key Features:

- 12.5 GS/s sampling rate for 80 ps timing accuracy
- 3 GHz leadset for capturing digital signals up to 6 Gb/s
- Add high-speed mixed-signal capability to your Teledyne LeCroy high-bandwidth oscilloscope
- LBUS connection for precise timing synchronization
- USB 3.1 for fast data transfer
- Unique QuickLink probing system
- Differential solder-in tips with 9-inch lead simplify access to difficult test points
- Ultra low loading for superior performance
- 8 GHz bandwidth tips are compatible with both HDA digital leadset and Teledyne LeCroy WaveLink differential analog probes for unmatched acquisition flexibility

[teledynelecroy.com/logicanalyzers](http://teledynelecroy.com/logicanalyzers)



### WavePulser 40iX High-speed Interconnect Analyzer

#### Impedance Profile (TDR), S-parameters, and Deep Toolbox

WavePulser 40iX is the ideal single measurement tool for high-speed hardware designers and test engineers. The combination of S-parameters (frequency domain) and Impedance Profiles (time domain) in a single acquisition with a deep toolbox provides unmatched characterization insight of high-speed interconnects.

#### Key Features:

- S-parameters DC to 40 GHz, single-ended and mixed-mode
- Impedance Profile with <1 mm resolution, differential and common-mode
- Internal, automatic OSLT calibration
- USB-connected, small, lightweight
- Flexible display of the measurements
- Remove effects from fixtures, connectors and cables
- Emulate eye diagrams with CTLE, DFE and FFE equalization
- Advanced jitter analysis

[teledynelecroy.com/wavepulser](http://teledynelecroy.com/wavepulser)



## Electronic Test Equipment

Wide selection of equipment covering all of your measurement needs

Teledyne Test Tools is a comprehensive range of test equipment solutions to complement Teledyne LeCroy's family of oscilloscopes and analyzers. These tools provide a one-stop-shop for test engineers, developers and teaching establishments looking to satisfy ongoing testing, education and electronics validation needs efficiently, reliably and within budget.



### T3SP Time Domain Reflectometers

Teledyne Test Tools T3SP15D (15 GHz) stimulate the DUT with true differential signals. The TDRs offer fast rise times of 35 ps for fault resolution (in FR4) of 4.2 mm and 3 mm, respectively, at DUT lengths of up to 40 meters and TDR repetition rates of up to 10 MHz and uses the same open short load (OSL) calibration standards as vector network analyzers.

Thanks to their small form factors, light weight, and optional internal batteries, the instruments go anywhere in test labs or in the field at a cost-effective price point.

- 15 GHz True Differential TDR
- Small Form Factor and Battery Powered
- S Parameter – S11 Measurements
- 35 ps Rise Time
- Up to 50,000 points long memory
- Pre-Compliance for Emerging Serial Data Standards



### T3SP-D4MX-BUNDLE – Phased Matched RF Multiplexer

T3SP-D4MX-BUNDLE high frequency differential DP4T/2:8 multiplexer provides a versatile RF switch for differential and single-ended applications. USB controlled and powered with stand-alone SW programming interface or, when used in combination with the T3SP series, directly controlled by the TDR application user interface. With internal ESD protection, it includes a mated cable set (i.e. 5 pairs of phase matched and color coded cables), making it ideal in combination with the T3SP15D and WavePulsar 40IX for instant testing of cables and multi-pair connectors.



### T3AWG3K Series – High Performance 2, 4 and 8 Channel Arbitrary Waveform Generators

#### 16-bit Vertical Resolution, 12 Vpp Output Voltage, 250 MHz and 350 MHz models

Exceptional detailed waveform generation with high-performance fidelity, unmatched wide output voltage amplitude (12 Vpp) and HW baseline voltage offset ( $\pm 12$  V).

#### Waveform memory up to 1 Gpoint @Ch

Unmatched deep memory depth allows to store and reproduce complex pseudo-random waveforms for long play time testing.

#### Mixed Signal Generation

Combine 2, 4 and 8 analog channels with 8, 16 and 32 synchronized digital channels, ideal for debugging and validating digital design.



### T3AWG2K Series – 16-bit Dual Channel Function/Arbitrary Waveform Generators

#### 16 Bit Vertical Resolution, 6 Vpp Output Voltage, 150 MHz models

Exceptional detailed waveform generation with high-performance fidelity, 6 Vpp at full frequency range and excellent Harmonic Distortion.

#### Waveform memory 128 Mpoint @Ch

Deep memory for downloading and generating complex pseudo-random both analog and digital waveforms.

#### Mixed Signal Generation

Combine two analog channels with 8 synchronized digital channels, ideal for debugging and validating digital design.



## T3AFG Series – Function/Arbitrary Waveform Generator

### Deep Memory

Generate complex arbitrary waveforms with up to 20 Mpts/Ch on 200 MHz to 500 MHz models, 8 Mpts/Ch 40, 80 and 120 MHz models and 16 kpts on 5, 10, 30 and 60 MHz models.

### High Resolution, Bandwidth Models up to 500 MHz

Generate waveforms with low noise and spurious signal content with our wide choice of bandwidths.

### Smart Capabilities

Create digital waveforms, patterns and busses of up to 36 channels and output analog and digital waveforms simultaneously. IQ Modulation option available on 200 MHz, 350 MHz and 500 MHz models to support complex applications.



## T3DMM Series – Digital Multimeters

Teledyne Test Tools new T3DMM series are dual display digital desktop multimeters that provide a rich and powerful feature set.

- Available in 4.5 digit (60,000 count) and 6.5 digit (2,200,000 count) models.
- Math functions include: Max, Min, Average, Standard Deviation, dBm/dB, Relative Measurement, Pass/Fail Histogram, Trend Chart, Bar Meter etc.
- True RMS AC Voltage and Current Measurements.
- Support for remote control operation.



## T3DSO1000/1000A Series Oscilloscopes

Teledyne Test Tools new T3DSO1000/1000A Oscilloscopes feature two channel and four channel models. The two channel model is available in 100 MHz, 200 MHz or 350 MHz bandwidths, up to 2 GSa/s sample rate, and up to 28 Mpts of memory. The four channel scope is available in 100 and 200 MHz models, 1 GSa/s and 14 Mpts memory.

- 100 MHz, 200 MHz and 350 MHz bandwidths.
- Sample rates up to 2 GS/s depending on the model.
- Long Memory – up to 14 Mpts/Ch (28 Mpts interleaved) depending on the model.
- 7" Bright TFT LCD.
- Serial Bus Trigger and Decode as standard – I<sup>2</sup>C, SPI, UART, RS232, CAN, LIN.
- Optional MSO – 16 Digital Channels which adds mixed signal debugging to the Oscilloscope.
- Advanced Trigger – Edge, Slope, Pulse Width, Window, Runt, Interval, Time Out (Dropout), Pattern.
- Waveform Sequence Recorder – record and playback up to 80,000 waveforms.
- Connectivity – USB for mass storage, printing and PC control, plus LAN for fast data transfer.



## T3DSO2000A Series Oscilloscopes

Teledyne Test Tools new T3DSO2000A Oscilloscopes feature two channel and four channel models with analog bandwidths from 100 MHz to 500 MHz. Each model offers 2 GSa/s, and up to 200 Mpts.

- 100 MHz, 200 MHz, 350 MHz, 500 MHz bandwidths.
- Sample rates up to 2 GS/s.
- Long Memory – up to 200 Mpts.
- 10.1" Bright TFT LCD.
- Includes Serial Bus Trigger and Decode – I<sup>2</sup>C, SPI, UART, CAN, LIN.
- Optional Serial Bus Trigger and Decode – CAN FD, I<sup>2</sup>S, MIL-1553B, FlexRay.
- Optional MSO – 16 Digital Channels. This adds mixed signal debugging to the Oscilloscope.
- Advanced Trigger – Edge, Slope, Pulse Width, Window, Runt, Interval, Time Out (Dropout), Pattern and Video.
- Waveform Sequence Recorder – record and playback up to 80,000 waveforms.
- Connectivity – USB for mass storage, printing and PC control, plus LAN.



## T3DSO3000 Series Oscilloscopes

Teledyne Test Tools new T3DSO3000 Oscilloscopes feature four channel models with analog bandwidth options from 200 MHz to 1 GHz. Each model offers a maximum sample rate of 5 GSa/s, and a maximum memory depth of 250 Mpts

- 200 MHz, 350 MHz, 500 MHz & 1 GHz bandwidths.
- Sample rates up to 5 GS/s.
- Long Memory – up to 125 Mpts/Ch (250 Mpts interleaved).
- 10.1" capacitive color TFT-LCD touch screen (1024 x 600).
- Includes Serial Bus Decoders for I<sup>2</sup>C, SPI, UART, CAN, LIN, CAN FD, I<sup>2</sup>S, MIL-STD-1553B, FlexRay, SENT & Manchester.
- Includes Bode Plot from 10 Hz to 25 MHz using the T3DSO1000-FGMOD-A function/arbitrary waveform generator or Bode Plot measurements from 10 Hz to 120 MHz using the T3AFG120 arbitrary function generator.
- Power Analysis application included as standard, measuring power quality, current harmonics, inrush current, switching loss, slew rate, modulation, output ripple, turn on/turn off, transient response, PSRR, efficiency.
- Optional MSO – 16 Digital Channels. This adds mixed signal debugging to the T3DSO3000 Oscilloscope series.



## LCR Meters

Teledyne Test Tools range of high precision LCR meters offers three models with maximum test frequency ranging from 2 kHz to 300 kHz and basic accuracy of 0.05 %. The T3LCR series provides a wide range of measurements while maintaining a compact size. The entire series adopts 3.5-inch color LCD and features clearly displayed parameters. The T3LCR meters are well suited for the needs of R&D, production environment, MLCC testing as well as performing a full range of automated measurements.



## Data Acquisition Unit

The Teledyne Test Tools T3DAQ1-16 is a 16 channel Data Acquisition System incorporating the latest 4.3" (10.92 cm) dual-display technology which can be configured to show Data Histograms, Data fluctuation Trends, Bar Graph, Statistics or the traditional Number mode, all in an easy-to-use interface. The T3DAQ features 12 multi-purpose + 4 current channels and supports various measurement functions. It provides a convenient and versatile solution for test applications that require multiple measurement points or signals and is an ideal tool for R&D burn-in and production testing.



## T3RC Rogowski Coil Current Probes

Teledyne Test Tools Rogowski Current probes offer a broad range of products covering a wide frequency span and current measurement ranges for maximum application coverage whilst being easy to use in difficult to reach parts of the circuit.



## T3CP Series AC/DC Current Probes

Teledyne Test Tools AC/DC Current Probes are powered by an external universal power supply and work with any Oscilloscope with a high-impedance BNC input. The range of five current probes includes models with bandwidths up to 100 MHz, peak currents up to 500A and sensitivities to 1 mA/div.



## T3VNA Vector Network Analyzers

Teledyne Test Tools T3VNA family of Vector Network Analyzers consists of models with various Vector Network Analysis frequency ranges from as low as 100 kHz up to 3.2 GHz and Spectrum Analysis frequency range from 9 kHz up to 3.2 GHz depending on model. The small footprint and easy user interface is augmented by a high performance specification with many advanced measurement functions and capabilities.



## T3SA Series – Spectrum Analyzers

Teledyne Test Tools new T3SA3000 family of Spectrum Analyzers offers a frequency range of 9 kHz to either 2.1/3.2 GHz alongside many impressive features.

- All Digital IF technology.
- 10.1" WVGA (1024 x 600) Display.
- Frequency range from 9 kHz up to 3.2 GHz.
- -161 dBm/Hz Displayed Average Noise Level (Typ).
- -98 dBc/Hz @ 10 kHz Offset Phase Noise (Typ).
- Total Amplitude Accuracy < 0.7 dB.
- 1 Hz Minimum Resolution Bandwidth (RBW).
- Comes with standard Preamplifier and Tracking Generator Kits.



## T3PS Series – Power Supplies

The Teledyne Test Tools range of DC Bench & Rack Mount Power Supplies comes in non-programmable and programmable versions with one, two, three and four output configurations. Key features within the Teledyne Test Tool Power Supply range include programmability via USB or LAN, a graphical display of power waveforms, as well as high resolution numeric display of voltage and current. Typical customer applications for DC Bench Power Supplies include those in industries such as mobile, automotive, communications, defense, and manufacturing as well as those within teaching, education and research institutions.



## T3EL Series – Electronic Loads

The T3EL series is a family of single channel, 200 & 300 Watt Electronic Loads that are ideal for R&D, product validation and Q&A in a bench or automated environment for power applications starting from 60 mA. Seven operating modes: CC, CV, CR, CP, CC + CV, CR + CV, CP + CV.

- Static, Dynamic and Sequence mode support.
- Built in Application Functions: Soft Start, Battery Test Automation, OCP and OPP Test Automation.
- Provides a load of up to 300 Watts.
- Programmable and analog external control.

## Oscilloscope Probes

### Differential Probes (4 – 30 GHz)

Various  
(see [teledynelecroy.com/probes](http://teledynelecroy.com/probes) for more information)



General purpose high-bandwidth probes with high dynamic range and offset. Wide variety of tips and leads available, including solder-in, QuickLink solder-in, HiTemp solder-in, browser tip, square-pin, and SMA/SMP lead (tip availability depends on probe model).

### Differential Probes (200 MHz – 1.5 GHz)

ZD1500, ZD1000, ZD500, ZD200  
AP033, DL05-HCM, DL10-HCM



High bandwidth, excellent common-mode rejection ratio (CMRR) and low noise make these active differential probes ideal for applications such as automotive electronics and data communications. AP033 provides 10x gain for high-sensitivity measurement of series/shunt resistor voltages. 60 V Common Mode Differential Probes with up to 1 GHz at 60 V Differential and 60 V Common Mode.

### Active Voltage/Power Rail Probe

RP4030



Specifically designed to probe a low impedance power/voltage rail. The RP4030 has 30 V built-in offset adjust, low attenuation (noise), and high DC input impedance with 4 GHz of bandwidth. Featuring a wide assortment of tips and leads, including solder-in and U.FL receptacle connections.

### ZS Series High Impedance Active Probes

ZS4000, ZS2500,  
ZS1500, ZS1000



High input impedance (1 M $\Omega$ ), low 0.9 pF input capacitance and an extensive set of probe tips and ground accessories make these low-cost, single-ended probes ideal for a wide range of applications. The ZS Series is available up to 4 GHz bandwidth.

### **NEW** High Voltage Optically Isolated Probes

DL03-ISO, DL07-ISO, DL10-ISO,  
HVFO108



High Voltage Optically Isolated Probes are designed to aid in device characterization measurements. Whether it is low or high voltage signals sitting on HV busses, high bandwidth, extreme precision, and optical isolation means floating measurements are easily made with minimal DUT loading.

### High Voltage Differential Probes

HVD3102A, HVD3106A-6M,  
HVD3106A, HVD3206A,  
HVD3206A-6M, HVD3220,  
HVD3605A, AP031



Available with 1, 2 or 6 kV common-mode ratings. Excellent CMRR (65 dB @ 1 MHz) at high frequencies is combined with low inherent noise, wide differential voltage range, high offset voltage capabilities, and 1% gain accuracy. The ideal probe for power conversion system test.

### Current Probes

CP030, CP030-3M, CP030A  
CP031, CP031A, CP150,  
CP150-6M, CP500, DCS025



Available in bandwidths up to 100 MHz with peak currents of 700 A and sensitivities to 1 mA/div. Extra-long cables (3 or 6 meters) available on some models. Ideal for component or power conversion system input/output measurements.

### T3RC Series Rogowski Coil Current Probes

T3RC0060-LF, T3RC0120-UM,  
T3RC0300-UM, T3RC0600-HF,  
T3RC3000-HF, T3RC3000-LF,  
T3RC6000-LF



Teledyne Test Tools Rogowski Current probes offer a broad range of products covering a wide frequency span and current measurement ranges for maximum application coverage whilst being easy to use in difficult to reach parts of the circuit.

### T3CP Series AC/DC Current Probes

T3CP30-50, T3CP30-100,  
T3CP50-50, T3CP150-12,  
T3CP500-5



Teledyne Test Tools AC/DC Current Probes are powered by an external universal power supply and work with any Oscilloscope with a high-impedance BNC input. The range of five current probes includes models with bandwidths up to 100 MHz, peak currents up to 500A and sensitivities to 1 mA/div.

### High Voltage Passive Probes

HVP120, PPE6KV-A



High voltage single-ended passive probes are suitable for a wide range of applications where ground-referenced high-voltage measurements must be made safely and accurately. There are several fixed-attenuation probes covering a range from 1 kV to 6 kV and varying transient overvoltage ratings. All of these high voltage probes feature a spring loaded probe tip and a variety of standard accessories to make probing high voltages safe and easy. Additionally, all of the high voltage probe have a probe sense pin to automatically configure the oscilloscope for use with the probe.

## Passive Probes

PP006D, PP016, PP018,  
PP019, PP020, PP022, PP023,  
PP024, PP025, PP026,  
T3PP300, T3PP350, T3PP350A



Typical passive probes provide a /10 attenuation and feature a high input resistance of 10 MΩ. This high input resistance means that passive probes are the ideal tool for low frequency signals since circuit loading at these frequencies is minimized. Passive probes are designed to handle voltages of at least 400 V, some as high as 600 V. Teledyne LeCroy passive probes feature an attenuation sense pin for automatic probe detection and voltage scaling.

## Probe and Current Sensor Adapters

TPA10, CA10



TPA10 adapts supported Tektronix TekProbe-compatible probes to Teledyne LeCroy ProBus interface. CA10 is a programmable adapter for third-party current sensors that have voltage or current outputs proportional to measured current.

## Optical to Electrical Converters

OE695G



Teledyne LeCroy's wide-band multi-mode optical-to-electrical converters are designed for measuring optical communications signals. Their broad wavelength range and multi-mode input optics make these devices ideal for applications including Ethernet, Fibre Channel, and ITU telecom standards. Available to support optical data rates up to 11.3 Gb/s with reference receivers, or slightly higher without reference receivers.

## 60 V Common Mode Differential Probes

DL05-HCM, DL10-HCM



The 60 V Common Mode Differential Probes are the ideal probes for lower voltage GaN power conversion measurement with the highest accuracy, best CMRR, and lowest noise.

# PROTOCOL TEST SOLUTIONS

## Verify with Insight on protocol layer

Teledyne LeCroy is a leading provider of protocol analyzers, exercisers/emulators, jammers and verification tools for existing and emerging digital communications standards. Designed to generate, capture, and analyze high-speed communications traffic, Teledyne LeCroy's tools help developers to discover and correct persistent and intermittent errors and flaws in their product design.



PCI Express®, NVMe®, CXL



### Summit™ T516 Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓ 32 GT/s ✓

Teledyne LeCroy's highest performance portable protocol analyzer that fully supports up to PCI Express 5.0 and CXL protocol analysis. Captures up to a x16 link and is configurable up to 256 GB trace depth with a single unit. The product is ideal for high-performance protocol development for storage SSDs, servers and workstations, and for customers currently working on PCIe 4.0 who may upgrade to PCIe 5.0 and CXL protocol analysis.



### Summit T54 Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓ 32 GT/s ✓

Teledyne LeCroy's highest performance portable protocol analyzer that fully supports up to PCI Express 5.0 and CXL protocol analysis. Capture up to a x4 link and is configurable up to 64 GB trace depth with a single unit. Larger trace depths and link-widths can be achieved by cascading a second unit, providing up to 128 GB of trace memory and up to x8 link-width. The product is ideal for high-performance protocol development for storage SSDs, servers and workstations, and for customers currently working on PCIe 3.0 or 4.0 who may upgrade to PCIe 5.0.



### Summit M5x Analyzer /Jammer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓ 32 GT/s ✓

Unparallel combination of error injection (jamming) for PCIe 4.0 and Gen-Z testing and full protocol analysis for PCIe 5.0 (32 GT/s) specification, CXL, and the Gen-Z Specification. The Summit M5x protocol analyzer/jammer features PCIe 4.0 "RAS" Error and Gen-Z jamming test capability.



### Summit Z516 Exerciser

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓ 32 GT/s ✓

Teledyne LeCroy's highest performance PCI Express and CXL protocol exerciser supports PCI Express 5.0; data rates of 2.5 GT/s, 5 GT/s, 8 GT/s, 16 GT/s and 32 GT/s, bidirectional lane widths of x1, x2, x4, x8 and x16.



### Summit Z58 Exerciser Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓ 32 GT/s ✓

PCI Express 5.0 full exerciser and analyzer for bidirectional lane widths of x1, x2, x4, and x8; includes 8 GB of trace memory for data rates of 2.5 GT/s, 5 GT/s, 8 GT/s, 16 GT/s and 32 GT/s; The system offers advanced features such as performance monitoring, LTSSM, equalization decodes and much more.



### Summit T416 Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓

Advanced features such as: support for PCI Express Spec 4.0; data rates of 2.5 GT/s, 5.0 GT/s, 8.0 GT/s, and 16.0 GT/s; full data capture on bidirectional link widths of x1, x2, x4, x8 and x16; and up to 128 GB of trace memory. The product is ideal for high-performance protocol development for add-in boards, servers and workstations, and for customers currently working on PCIe 3.0 or who wish to support PCIe 4.0 at up to 16 lanes.



### Summit T48 Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓

Advanced features such as: support for PCI Express 4.0 Specification; data rates of 2.5 GT/s, 5.0 GT/s, 8.0 GT/s, and 16.0 GT/s; full data capture on bidirectional link widths of x1, x2, x4, and x8; and up to 64 GB of trace memory. The product is ideal for high-performance protocol development for add-in boards, servers and workstations, and for customers currently working on PCIe® 3.0 or who wish to support PCIe 4.0 at up to 8 lanes.



### Summit Z416 Exerciser

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓

PCI Express protocol exerciser and analyzer with full support for PCI Express 4.0; data rates of 2.5 GT/s, 5 GT/s and 8 GT/s; full data capture on bidirectional lane widths of x1, x2, x4, x8 and x16; and a full 8 GB of trace memory. The system offers advanced features such as performance monitoring, LTSSM, equalization decodes and much more. It is approved by the PCI-SIG as a protocol compliance tool for PCIe 4.0.



### Summit T3-16 Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓

High-end analyzer that offers all of the features needed for PCI Express 3.0 application development. While sharing application compatibility with the previous analyzer platforms, the Summit can record traces on SSC supported lanes at speeds of 2.5, 5 and 8 GT/s. Users acquainted with Teledyne LeCroy's multiple probing accessories will find the right probing required to do the job.



### Summit T3-8 Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓

Supports PCI Express 3.0 in a smaller package designed for lane widths up to x8. Features include data rates of 2.5 GT/s, 5 GT/s and 8 GT/s; full data capture on bidirectional lane widths of x1, x2, x4 and x8 (x16 is available using two units); and 4 GB of trace memory. The system offers performance monitoring, LTSSM, equalization decodes and much more.





## PCI Express – continued



### Summit T34 Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓

Extremely portable and cost-effective analyzer that fully supports PCI Express 3.0 protocol analysis. It can capture up to 4 lanes of traffic and is configurable up to 32 GB trace depth with a single unit. Larger trace depths can be achieved by cascading a second unit, providing up to 64 GB of trace memory.



### Summit Z3-16 Exerciser and Analyzer

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓

This protocol exerciser with support for PCI Express at the Gen3 data rates of up to 8 GT/s is approved by the PCI-SIG as a protocol verification tool for PCIe 3.0. It provides a complete test and development system for engineers working on PCI Express 3.0 designs.



### Summit T28 Analyzer

2.5 GT/s ✓ 5 GT/s ✓

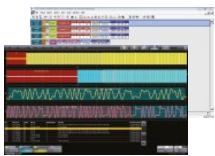
Supports PCI Express 2.0 designs in a compact and economical package. Features include data rates of 2.5 GT/s and 5 GT/s; full data capture on bidirectional lane widths of x1, x2, x4 and x8; and 4 GB of trace memory. The system offers performance monitoring, LTSSM, equalization decodes and much more.



### Summit T24 Analyzer

2.5 GT/s ✓ 5 GT/s ✓

With advanced features such as support for PCI Express 2.0, data rates of both 2.5 and 5 GT/s, lane widths from x1 to x4, and a full 2 GB of trace memory, the Summit T24 provides all of the capability and flexibility needed and desired by developers and users of advanced PCI Express products. The Summit T24 is the most cost effective PCI Express Analyzer available in the market today.



### ProtoSync® PE Oscilloscope Decode

2.5 GT/s ✓ 5 GT/s ✓ 8 GT/s ✓ 16 GT/s ✓

Provided as an option to Teledyne LeCroy's LabMaster, WaveMaster, and WavePro Series of oscilloscopes, ProtoSync PE goes beyond simple decode annotation and provides the intuitive CATC Trace and BitTracer views of the captured waveform, with a time and zoom correlation of physical layer signals, protocol packets, and logic analyzer byte views on a single instrument.

## Adapters, Interposers, and Probes for PCI Express, NVMe and CXL

Teledyne LeCroy offers the industry's widest range of PCI Express adapters, interposers and probes, including a wide variety of specialty probes designed to make it simple and easy to probe sophisticated high-speed serial designs.



PCIe 5.0 U.2/U.3 Interposer



PCIe 5.0 U.2/U.3 Adapters



PCIe 5.0 CEM Interposer



PCIe 5.0 EDSFF Interposer



PCIe 5.0 EDSFF Adapter



Gen4 OCuLink Host Adapter



OCuLink Cable Interposer



PCIe 5.0 M.2 Adapter



PCIe 5.0 M.2 Interposer



PCIe 4.0 M.2 Interposer



PCIe 4.0 x16 OCP NIC 3.0 Interposer



VPX Interposer



XMC Interposer



AMC Interposer



Multi-lead Probe (solder down)



Mid-bus Probe



Active Slot Interposer



Passive Slot Interposer



G4x8 OCuLink Cable Interposer

## Serial Attached SCSI (SAS) and Serial ATA (SATA)



### Sierra T244 Protocol Verification System

**3G ✓ 6G ✓ 12G ✓ 24G ✓**

The Industry's first SAS 4.0 protocol analyzer provides accurate and reliable capture of up to four SAS 24 Gb/s physical links for efficient test and debug of next generation storage systems. Featuring the industry's highest-fidelity TAP4™ probe design, the Sierra T244 seamlessly locks on 24G signaling without distorting the dynamic link training sequence for fast debug of link bring up issues.



### Sierra M244 Protocol Verification System

**3G ✓ 6G ✓ 12G ✓ 24G ✓**

Industry's first SAS 4.0 protocol analyzer / jammer / exerciser system for testing next generation storage systems, devices and software. The Sierra M244 operating as an analyzer can record "4-wide" links. When licensed with the Infusion™ Jammer option, the M244 provides a "real-time" jammer capability to modify or corrupt traffic on 1, 2, or 4 ports simultaneously. The exerciser option supports initiator and target traffic generation allowing users to meticulously test low-level functionality at full 24G line rate.



### Sierra M124A Protocol Verification System

**1.5G ✓ 3G ✓ 6G ✓ 12G ✓**

Industry-leading SAS 3.0 protocol test system for SAS and SATA protocol validation. The four port analyzer, exerciser and error injection system provides the most accurate and reliable capture of SAS 12 Gb/s protocol for fast debug, analysis and problem solving. The Sierra M124 is the first platform to implement linear probing technology and a non-retimed pass-through signal.



### Sierra M122A Protocol Verification System

**1.5G ✓ 3G ✓ 6G ✓ 12G ✓**

A two-port version of the industry-leading Sierra M124 SAS 3.0 and SATA protocol test system. Featuring Teledyne LeCroy's most advanced linear probing technology, the Sierra M122 provides unmatched accuracy while simultaneously analyzing up to two 12 Gb/s SAS ports.

## Ethernet and Fibre Channel



### SierraNet™ M648 Protocol Verification System

**Ethernet 10/25/40/50/100 Gb (NRZ) ✓ Ethernet 50/100/200/400 Gb (PAM4) ✓ Fibre Channel 16/32/64 Gb ✓**

The industry's first protocol verification system for PAM4 Ethernet and Fibre Channel from Teledyne LeCroy, provides best in class traffic capture, analysis, generation, and manipulation for testing Ethernet and Fibre Channel. The test platform supports examination of Ethernet and Fibre Channel links utilizing both Pulse Amplitude Modulation 4 (PAM4) and legacy Non-Return to Zero (NRZ) technologies.



### SierraNet T328 Protocol Verification System

**Ethernet 1/2.5/5/10/25/40/50/100 Gb ✓ Fibre Channel 8/16/32 Gb ✓**

Provides 10/25/40/50/100 Gbp/s Ethernet and 8/16/32 Gb Fibre Channel data capture and protocol verification for developers & protocol test engineers in LAN, SAN, NAS and other Ethernet and Fibre Channel applications. Available with eight SFP28 FlexPorts™ for maximum configuration and utility, the SierraNet T328 offers world-class protocol analysis capabilities with an easy to use, customizable hardware & software interface, large capture buffers, and the most advanced T.A.P3 capture, triggering and filtering capabilities in the industry.



### SierraNet M328 Protocol Verification System

**Ethernet 1/2.5/5/10/25/40/50/100 Gb ✓ Fibre Channel 8/16/32 Gb ✓**

The SierraNet M328 system provides users with traffic capture, data analysis, protocol verification and introduces error injection capabilities for 10/25/40/50/100 Gb Ethernet and 8/16/32G Fibre Channel LAN, SAN, NAS and other high-speed fabric applications. Available with eight SFP28 FlexPorts™ for maximum configuration and utility, the SierraNet M328 offers world-class protocol analysis capabilities with an easy to use, customizable hardware & software interface, large capture buffers, and the most advanced triggering and filtering capabilities in the industry.



### SierraNet M328-Q Protocol Verification System

**Ethernet 25G/50G/100G ✓ Fibre Channel 32 Gb ✓**

The SierraNet M328-Q system provides users with traffic capture, data analysis, protocol verification and introduces error injection capabilities for 10/25/40/50/100 Gb Ethernet and 8/16/32G Fibre Channel LAN, SAN, NAS and other high-speed fabric applications. Available with two QSFP28 FlexPorts™ for maximum configuration and utility, the SierraNet M328-Q offers world-class protocol analysis capabilities with an easy to use, customizable hardware & software interface, large capture buffers, and the most advanced triggering and filtering capabilities in the industry.



### SierraNet M168 Protocol Verification System

**Ethernet 10G ✓ FibreChannel 1/2/4/8/16 Gb ✓**

The SierraNet M168 system provides up to 10 Gbps Ethernet and 16G Fibre Channel data capture and protocol verification for developers & protocol test engineers in LAN, SAN, other Ethernet and Fibre Channel applications. Available with eight SFP+ FlexPorts™ for Ethernet and Fibre Channel, the SierraNet offers world-class protocol analysis capabilities with an easy to use, customizable hardware & software interface, large capture buffers, and the most advanced triggering and filtering capabilities in the industry.



## Universal Serial Bus (USB®)



### Voyager™ M4x Analyzer Exerciser System

1.5M ✓ 12M ✓ 480M ✓ 5G ✓ 10G ✓ 20G ✓ 40G ✓

The industry's most accurate and trusted USB analyzer platform supports USB4™, USB 3.2, Thunderbolt™ 4, and Thunderbolt™ 3 testing and verification. The legendary Voyager family combines best-in-class probe technology with industry-leading analysis software allowing designers and validation teams to debug problems and verify interoperability for next-generation USB systems.



### Voyager M310e Analyzer Exerciser System

1.5M ✓ 12M ✓ 480M ✓ 5G ✓ 10G ✓

Most comprehensive protocol verification system for USB 2.0, USB 3.1, Gen2x1, Type-C, and Power Delivery 3.1 including EPR testing. The non-intrusive probing and a range of turnkey Compliance packages make the Voyager M310e the intelligent choice for USB protocol analysis.



### Voyager M3x Analyzer Exerciser System

1.5M ✓ 12M ✓ 480M ✓ 5G ✓

USB protocol verification system designed SuperSpeed USB. Leveraging Teledyne LeCroy's extensive expertise in high-speed serial data analysis, the Voyager provides traffic generation and recording of both USB 2.0 and 3.0 at data rates up to 5 Gb/s.



### Advisor™ T3 Analyzer

1.5M ✓ 12M ✓ 480M ✓ 5G ✓

Cost-effective, small form-factor and still full featured protocol analyzer for those testing USB 3.0 and USB 2.0 devices. It captures, displays, and analyzes bus traffic using the CATC Trace™ display software. It automatically highlights protocol errors while displaying a chronological list of packets with full decoding of USB device classes.



### Mercury™ T2C / Mercury T2P Analyzer

1.5M ✓ 12M ✓ 480M ✓

The pocket-sized analyzer that capture and decode the widest range of USB 2.0 device classes plus Type-C link states and Power Delivery 3.0 messages. Both the Mercury T2C and T2P utilize the industry leading CATC Trace™ analysis software for verifying and debugging USB and PD protocol issues. The Mercury T2P adds to the Mercury T2C rich functionality, also Power Tracker™ graphical view of VBUS and CC voltages. The Mercury T2C / T2P analyzers include adapters allowing developers to utilize the type-C connection with their existing legacy devices and hosts, creating an analyzer which is both backward-compatible and future-safe.



### Mercury T2 Analyzer

1.5M ✓ 12M ✓ 480M ✓

The original Mercury T2 is the small and affordable USB 2.0 protocol analyzer that combines the de facto standard CATC Trace display with the very latest USB class decoding. This low-cost solution is bus powered and includes real time hardware triggering allowing the Mercury T2 to tackle sophisticated analysis tasks in a surprisingly small package. It features legacy Type A & B connectors for USB developers that do not require Type-C analysis capabilities.

## MIPI® Protocol Analyzers



### Eclipse M52 UniPro/UFS Analyzer/Exerciser

GEAR1 ✓ GEAR2 ✓ GEAR3 ✓ GEAR4 ✓ GEAR5 ✓

Implementing a new high speed front end, supporting MIPI M-PHY™ HS-Gear5 at speeds up to 23 Gbps, the Eclipse M52 stands as the market's most complete analyzer/exerciser. The Eclipse M52 is the right tool for engineers and developers who need to ensure the correct and efficient operation of technologies employing the high data transfer speeds of the UniPro/UFS specifications.



### Envision X84 CSI & DSI Protocol Generator

GEAR1 ✓ GEAR2 ✓ GEAR3 ✓ GEAR4 ✓

With comprehensive support for MIPI CSI-2v2 and DSI-2 specifications, Teledyne LeCroy's Envision X84 generator platform provides the industry's most accurate and reliable generation of MIPI camera and display protocols for fast debug, analysis and problem solving. The Envision X84 exerciser is loaded with innovative features that help uncover elusive protocol errors and is the intelligent choice for any camera and display validation needs. Using the same hardware platform as the Envision X84 C/D-PHY protocol analyzer, the Envision X84 offers the most flexible solution for MIPI Camera and Display validation and debug.

## Wireless: Bluetooth®, 802.11, 802.15.4



The Frontline® family of Wireless protocol analyzers and tools support a wide variety of protocol standards, including the Bluetooth, 802.11 and 802.15.4. From Bluetooth “classic” (BR/EDR) to Bluetooth low energy (LE) technology, Frontline protocol analyzers make it easier to get products to market faster by helping troubleshoot, debug, and decode these complex communication streams.



### Frontline X500 Wireless Protocol Analyzer

**Bluetooth BR/EDR & LE (v2.0 to v5.3) ✓ 802.11 a/b/g/n ✓ 802.11 ac ✓ 802.11 ax (Wi-Fi 6/6E) ✓ 802.15.4 ✓**

Teledyne LeCroy's Frontline X500 Wireless Protocol Analyzer is the most versatile wireless analysis tool in the industry, boasting support for concurrent time-correlated captures of all the adopted Bluetooth BR/EDR and Low Energy profiles and protocols, 802.15.4-based protocols like Zigbee and Thread and the latest Wi-Fi technologies including Wi-Fi 5, Wi-Fi 6 and Wi-Fi 6E. Add to that RF spectrum analysis, mesh analysis and antenna diversity capability, the X500 is truly the right tool for every wireless analysis job.



### Frontline X240 Wireless Wideband Analyzer

**Bluetooth BR/EDR & LE (v2.0 to v5.3) ✓ 802.11 a/b/g/n ✓ 802.11 ac ✓ 802.15.4 ✓**

Teledyne LeCroy's Frontline X240 Wireless Wideband Analyzer, featuring flexible technology-based licensing and exceptional portability, brings 2.4 GHz ISM band analysis to every lab and every environment efficiently and affordably. Coupled with Teledyne LeCroy's Wireless Protocol Suite software's streamlined UI and superior decoding engine, the X240 can be configured via licensing to decode Bluetooth BR/EDR and Low Energy, 802.11, and 802.15.4 traffic for more rapid, robust, and cost-effective wireless development, testing and troubleshooting.



### Frontline BPA low energy Bluetooth Protocol Analyzer

**Bluetooth Low-Energy 4.0 ✓ 4.1 ✓ 4.2 ✓**

The Frontline BPA low energy Protocol Analyzer is a USB powered tool designed to capture, decode, analyze and debug Bluetooth low energy communications with minimal setup. Decodes all Bluetooth low energy traffic including advertising packets, data packets and LL control packets, and providing visibility into all three advertising channels concurrently, even before the connection is established. Supports all Bluetooth low energy specifications through 4.2\*.

\* Except optional extended packet length.

## Conformance, Radio Frequency Physical Layer (RF PHY), and Expert System Modules for Bluetooth



### conformanceHarmony LE Tester

**Bluetooth Low-Energy 4.0 ✓ 4.1 ✓ 4.2 ✓ 5 ✓ 5.1 ✓ 5.2 ✓ 5.3 ✓**

The *conformanceHarmony* LE Tester is a robust testing solution recognized by the Bluetooth SIG as a validated test platform for HCI and Link Layer CAT A test cases, focused on the qualification testing of products to the Bluetooth low energy specification. It is an integrated software/hardware test platform for Bluetooth protocol qualification testing. The *conformanceHarmony* Low Energy Tester performs complete Bluetooth LE controller qualification testing for Link Layer and HCI test specifications.



### testHarmony LE Tester

**Bluetooth Low-Energy 4.0 ✓ 4.1 ✓ 4.2 ✓ 5 ✓ 5.1 ✓ 5.2 ✓ 5.3 ✓**

The *testHarmony* LE Exerciser is a highly flexible test solution designed to provide pre-compliance, debugging, regression and robustness testing for chipset vendors and product manufacturers during the development cycle and post release. The tester supports test case package licenses based on Bluetooth feature group functionality and are available either individually or as a complete package. *testHarmony* supports a subset of test cases that enable the user to change specific test case parameters to test above and beyond the Bluetooth SIG LE specification. With the purchase of *testHarmony* and at least one test case package the user will also get access to a set of custom test cases that are not part of the specification.



### TLF3000 RF PHY Tester

**Bluetooth BR/EDR & LE (v2.0 to v5.3) ✓ 802.15.4 ✓**

TLF3000 RF PHY tester is a wideband, ultra-high dynamic range 2.4 GHz software-defined receiver, signal analyzer and signal generator. It captures and analyses the entire 2402-2480 MHz band simultaneously providing RF PHY testing, signal generation, signal analysis in one powerful package. The TLF3000 is a flexible scalable solution that offers 3 technology licenses (Bluetooth Low Energy, BR/EDR and 802.15.4) and 2 key market use cases (Developer and Production). The Developer configuration is a fully featured solution for lab use and the Production configuration is a stripped back solution designed for repetitive testing in a production line environment. Both Bluetooth LE and BR/EDR licenses have embedded test scripts to execute all of the test cases in the Bluetooth SIG RF Test Specifications.



### FRVS Bluetooth RF Test System

**Bluetooth BR/EDR & LE (v2.0 to v5.3) ✓**

FRVS is recognized by the Bluetooth SIG as a validated test system for qualification testing of products to Bluetooth BR/EDR and low energy RF test specifications. At the core of the system is the Teledyne LeCroy TLF3000 RF Tester. The FRVS system is a highly portable and flexible qualification testing solution that, due to its unique parallel architecture, can execute testing much faster than traditional RF test systems. This compact yet powerful system is significantly smaller than comparable solutions, and can easily be accommodated on the test bench.

## HDMI® / DisplayPort™



### quantumdata M4 Series

The Teledyne LeCroy quantumdata M4 series test instruments are versatile test instruments that offer entry level functional testing that can be upgraded to support sophisticated analysis, diagnostics and full compliance testing. The M4 series instruments are compact in size and can be controlled either through an API for remote or automated testing applications, or locally using an external monitor, keyboard and mouse. They can be stacked on a benchtop or rack mounted. The test functions supported provide development engineers in R&D with quick Time-to-Insight to help them identify and resolve problems early in the product development cycle.

#### quantumdata M41h 48G Video Analyzer/Generator for HDMI Testing



Video Analyzer/Generator for 8K HDMI Testing supports protocol analysis of incoming HDMI 2.1 Fixed Rate Link (FRL) or TMDS video streams at data rates up to 48 Gb/s from sources outputting the higher video resolutions. The instrument's analyzer feature provides visibility into the underlying protocol elements and structures necessary for transporting HDMI video streams at the new 48 Gb/s rate. The M41h's FRL video generation function enables users to select 8K, 4K, 1080p and lower resolution formats with varying bit depths and frame rates for transmission. The Aux Channel Analyzer (ACA) utility enables monitoring of the DDC channel to provide a transaction log of the EDID exchange, SCDC register reads/writes, HDCP authentication transactions and FRL link training. A complete set of Fixed Rate Link (FRL) and TMDS protocol compliance tests are supported as well for both sources and sinks. The M41h also supports functional testing and compliance testing for HDMI products and devices that support enhanced Audio Return Channel (eARC)--both eARC Tx and eARC Rx.

#### quantumdata M42d 80G Video Analyzer/Generator for DisplayPort 2.0 Testing



Video Analyzer/Generator for DisplayPort 2.0 Testing provides an unprecedented combination of functional and compliance testing for video, audio and protocol of DisplayPort 2.0 and DisplayPort 1.4. The M42d supports legacy DisplayPort lane rates of 1.62, 2.7, 5.4, 8.1 Gb/s and the new DP 2.0 higher speed lane rates and new line coding--128b/132b--for 10.0, 13.5, & 20.0 Gb/s data rates up to 4 lanes. The protocol analyzer provides a snapshot status view and deep analysis using captures of incoming DisplayPort 2.0 (and DP 1.4) streams from source devices including DSC/FEC compressed streams. The M42d's video generator can be used for testing displays, USB-C adapters, extenders, etc. The video generator offers a large library of standard video timings and test patterns necessary for testing next generation high resolution displays. The M42d supports a full suite of DP 1.4 compliance tests for link layer, forward error correction (FEC) and display stream compression (DSC) for both sources and sinks. Compliance tests for DP 2.0 are being rolled out now. The Passive Probe feature enables full monitoring of the DisplayPort Main Link and the Aux Channel between two DisplayPort devices up to 20 Gb/s lane rates. Support for testing advanced features such as Panel Replay, Adaptive Sync and LTTTPR are also supported.

#### quantumdata M41d DisplayPort 1.4 USB-C/eDP Video Generator / Analyzer



USB-C/eDP Video Generator/Analyzer supports video, audio and protocol functional testing of high-end DisplayPort displays and sources at HBR3 lane data rates up to 8.10 Gb/s on 1, 2 & 4 lanes including tests for multi-stream transport (MST). All the DisplayPort features and functions available in the instrument are provided through both standard DP ports and USB-C ports which support DisplayPort USB-C DP Alt Mode. The capture and store analysis function provides deep visibility into the DisplayPort protocol elements, including Display Stream Compression (DSC), to help identify complex protocol related problems early in the development cycle. The M41d instrument also supports DP 1.4 Link Layer, Display Stream Compression (DSC), Forward Error Correction (FEC) compliance testing for sources, sinks and repeaters. The Aux Channel Analyzer utility (ACA) enables monitoring of the DisplayPort Aux Channel and USB-C Configuration Channel (CC) to provide a transaction log of the EDID exchange, link training, HDCP authentication and PD negotiations into and exit out of DP Alt Mode. The instrument supports eDP test features for eDP-capable source devices.

### quantumdata 980 Series

The Teledyne LeCroy quantumdata 980B Advanced Test Platform is a module based system that can accommodate multiple 980 series modules. The 980B system modules support test solutions for HDMI and DisplayPort. Both video generation (transmitter) functions for testing sink devices (displays) and video and protocol analysis (receiver) functions for testing source devices are supported. The 980 modules offer a rich set of test features, including functional testing, deep analysis, interoperability testing and compliance testing. These test functions provide development engineers in R&D with fast Time-to-Insight to help them identify and resolve problems early in the product development cycle. The 980B system has an embedded touch screen display to control the instrument.

#### quantumdata 980 48G Protocol Analyzer/Generator module for HDMI Testing



Protocol Analyzer/Generator module for HDMI Testing supports protocol analysis of incoming HDMI 2.1 Fixed Rate Link (FRL) and TMDS video streams at data rates up to 48 Gb/s from sources outputting the higher video resolutions. The module's analyzer feature provides visibility into the underlying protocol elements and structures necessary for transporting HDMI video streams at the new 48 Gb/s rate. The module's FRL and TMDS video generation function supports up to 8k formats at 48 Gb/s. Users can select 8K, 4K, 1080p or lower resolution formats with varying bit depths and frame rates for transmission. The Aux Channel Analyzer (ACA) utility enables monitoring of the DDC channel to provide a transaction log of the EDID exchange, SCDC register reads/writes, HDCP authentication transactions and FRL link training. A complete set of Fixed Rate Link (FRL) and TMDS protocol compliance tests are supported as well for both sources and sinks. The module also supports functional testing and compliance testing for HDMI products and devices that support enhanced Audio Return Channel (eARC)--both eARC Tx and eARC Rx.



## quantumdata 980 Series (cont'd)



### quantumdata 980 DisplayPort 1.4 USB-C/eDP Video Generator / Analyzer module

DisplayPort 1.4 USB-C/eDP Video Generator/Analyzer module supports video, audio and protocol functional testing of high-end DisplayPort displays and sources at HBR3 lane data rates up to 8.10 Gb/s on 1, 2 & 4 lanes including tests for multi-stream transport (MST). All the DisplayPort features and functions available in the module are provided through both standard DP ports and USB-C ports which support DisplayPort USB-C DP Alt Mode. The capture and store analysis function provides deep visibility into the DisplayPort protocol elements, including Display Stream Compression (DSC), to help identify complex protocol related problems early in the development cycle. The module also supports DP 1.4 Link Layer, Display Stream Compression (DSC), Forward Error Correction (FEC) compliance testing for sources, sinks and repeaters. The Aux Channel Analyzer utility (ACA) enables monitoring of the DisplayPort Aux Channel and USB-C Configuration Channel (CC) to provide a transaction log of the EDID exchange, link training, HDCP authentication and PD negotiations into and exit out of DP Alt Mode. The module supports eDP test features for eDP-capable source devices.

## quantumdata 780 Series

**The Teledyne LeCroy quantumdata 780E handheld test instrument is a portable, feature rich, video/audio generator and protocol analyzer that supports quick verification testing and troubleshooting of digital video systems and analog video displays on-site or in the R&D lab. The 780E instrument is equipped with both digital video transmitter (output) ports and receiver (input) ports to support testing of audio, video and protocols of various digital video source and sink (display) devices as well as cables and distribution equipment.**



### quantumdata 780E Video Generator / Analyzer – for HDMI, DisplayPort and HDBaseT Testing

Portable handheld Multi-Interface video/audio Protocol Analyzer and Generator for HDMI, DisplayPort and HDBaseT. The 780E is the only portable test instrument equipped with HDMI and DisplayPort ports while also offering HDBaseT ports. The 780E supports testing video, audio and protocols—including HDCP 2.3 on HDMI and DisplayPort—on source and sink devices as well as cables and distribution equipment up to 600 MHz for HDMI and up to 5.4 Gb/s link rates on DisplayPort. The instrument is operated through the convenient 7 inch touch screen. A status bar on the bottom of the display provides at-a-glance status of the output and input ports.

## quantumdata 804 Series

**The Teledyne LeCroy rack mountable 804 and 804B series Video Generators are optimized for testing modern HDMI flat panel TVs. The 804 series instruments feature four (4) HDMI outputs—all active simultaneously—for testing HDTVs with multiple HDMI inputs. This eliminates the need for splitters often required for testing each HDMI input on an HDTV. The 804 series instruments can output component analog and composite analog video as well as HDMI. The 804 instruments are equipped with all the standard video timings, test patterns and audio formats necessary for testing HDTVs including tests for HDMI protocols such as HDCP, EDID and CEC.**



### quantumdata 804 225 MHz HDMI Video Generator

Video Test Generator for testing of HD and UHD TVs and displays at pixel rates up to 225 MHz on its HDMI outputs. This enables testing of high end 1080p resolutions at 50/60Hz with HDMI 1.4 4:4:4 pixel encoding and deep color. The instrument's four (4) HDMI outputs and attractive price make it ideal for testing TVs in manufacturing production line facilities. The 804 instrument supports functional protocol tests such as HDCP and EDID including new data elements related to HDMI 1.4. The 804 also supports video generation capabilities for analog including composite, component and VGA video formats.

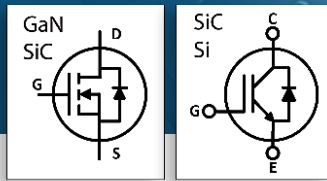


### quantumdata 804B 600 MHz HDMI Video Generator

Video Test Generator for testing of HD and UHD TVs and displays at pixel rates up to 600 MHz on its HDMI outputs. This enables testing of high end 4K resolutions at 50/60Hz with HDMI 2.0 4:4:4 pixel encoding. The instrument also supports testing of 21:9 format resolutions at or below 600 MHz pixel rate. The instrument's four (4) HDMI outputs and attractive price make it ideal for testing TVs in manufacturing production line facilities. The 804B instrument supports functional protocol tests such as HDCP (versions 1.4 & 2.2) and EDID including new data elements related to HDMI 2.0. The 804B also supports video generation capabilities for analog including composite, component and VGA video formats.



# DL-ISO Series – up to 1 GHz HIGH VOLTAGE OPTICALLY ISOLATED PROBE



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