

Infiniium V-Series Oscilloscopes

8 to 33 GHz High-Performance Oscilloscope

Introduction

Infiniium V-Series oscilloscopes incorporate innovative technology designed to deliver superior measurements. Industry's longest 160-bit hardware serial trigger and the world's fastest 20 GSa/s digital channels will provide timely validation and debug.



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For the detail specification, see the [Infiniium V-Series Oscilloscopes Datasheet](#).

For ordering information, see the [Infiniium V-Series Oscilloscopes Configuration Guide](#).

For one page overview and specification, see the [Infiniium V-Series Product Fact Sheet](#)

Achieve Clarity Faster with Infiniium V-Series Oscilloscopes

Groundbreaking oscilloscope technology

The Keysight Technologies, Inc. Infiniium V-Series oscilloscopes incorporate innovative technology designed to deliver superior measurements. Whether you are testing multiple high-speed serial lanes or a massive parallel bus, the new 12.5 Gb/s, industry's longest 160-bit hardware serial trigger and world's fastest 20 GSa/s digital channels will provide timely validation and debug. Our oscilloscope's low-noise front end technology, advanced InfiniiMax Ultra probe delivers up to 25 GHz bandwidth with an RC input impedance profile, providing the extremely low mid-band loading necessary to address modern high-speed probing requirements. It also supports InfiniiMode and has a user-defined AC calibration mode, a wider input voltage range, more accuracy with unique S-parameter characterization, lower capacitive loading, a wider input voltage range, micro / socketed probe heads for smaller density probing, and more bandwidths. Together with the broadest software solution coverage, the V-Series helps you achieve clarity faster in your design characterization to ensure your product ships on time.

Fastest analysis and enhanced usability

We put the groundbreaking oscilloscope technology in an innovative industrial design frame with a standard removable solid state drive and high-powered motherboard for fastest analysis, capacitive 12.1" display for multi-touch usability and USB ports for fast data offload speed. Coupled with the next-generation Infiniium user interface, the V-Series makes displaying, analyzing and sharing information much easier. It is the first user interface to take advantage of multiple displays and touch screens. It features up to 8 waveform windows with up to 16 grids in each of them, allowing 128 simultaneous viewing spaces.

DSO models	DSA models	MSO models	Analog bandwidth/Sample Rate		Max memory
4 analog channels	4 analog channels	4 analog/16 digital channels	2 channels	4 channels	4 channels
DSOV334A	DSAV334A	MSOV334A	33 GHz/80 GSa/s	16 GHz/40 GSa/s	2 Gpts
DSOV254A	DSAV254A	MSOV254A	25 GHz/80 GSa/s	16 GHz/40 GSa/s	2 Gpts
DSOV204A	DSAV204A	MSOV204A	20 GHz/80 GSa/s	16 GHz/40 GSa/s	2 Gpts
DSOV164A	DSAV164A	MSOV164A	16 GHz/80 GSa/s	16 GHz/40 GSa/s	2 Gpts
DSOV134A	DSAV134A	MSOV134A	13 GHz/80 GSa/s	13 GHz/40 GSa/s	2 Gpts
DSOV084A	DSAV084A	MSOV084A	8 GHz/80 GSa/s	8 GHz/40 GSa/s	2 Gpts

Each model is upgradable to each higher bandwidth step or the max bandwidth of 33 GHz.

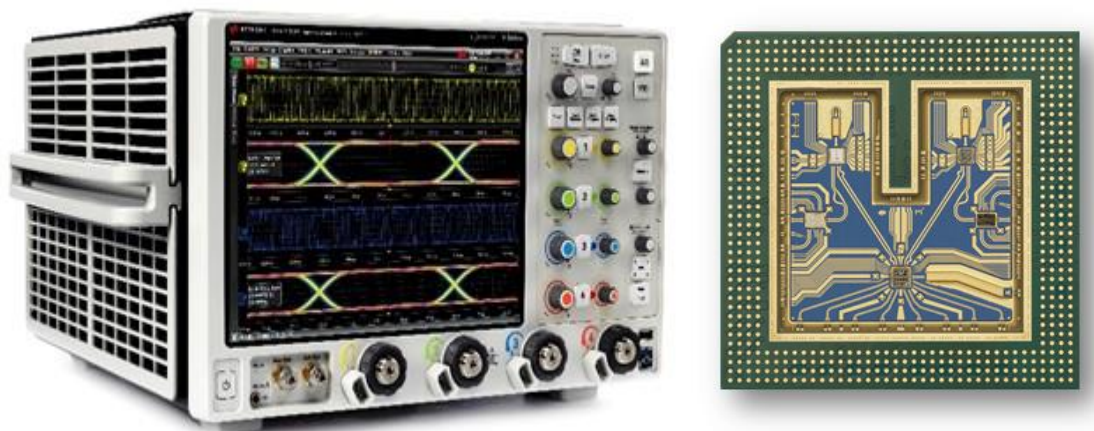


Figure 1. Infiniiium V-Series' low-noise front end and the revolutionary voltage termination adapter provide the industry's best signal integrity. Keysight's proprietary and custom front-end technology yields the industry's lowest noise floor and jitter measurement floor of real-time oscilloscope hardware available today.

Industry's most advanced probing system

InfiniiMax Ultra probes have three attenuation ranges — 1:1, 4:1, and 8:1 — giving you superior noise performance and large voltage ranges, all while maintaining maximum bandwidth. The input range automatically configures depending on the size of the input signal and vertical scale of your oscilloscope. Choose from the three flexible input dynamic ranges from 600 mVpp at 1:1, 2.5 Vpp at 4:1, and 5 Vpp at 8:1. Clearly see and know when your design is satisfactory, keep up with standards, easily probe small devices, and reduce test complexity with the InfiniiMax Ultra Series probes.

MX002xA InfiniiMax Ultra Probe System

- 25 GHz bandwidth – when used with MX0100A
- “RC” input impedance architecture – 25 k Ω SE, 50 k Ω diff @DC, 170 fF with MX0100A micro probe head
- Attenuation range: 1:1, 4:1 or 8:1, auto switchable
- ± 16 V offset range
- Probe Amp specific S parameter correction filter ensures flat frequency response
- Compatible with new probe heads and most of InfiniiMax I/II probe heads
- Easier to choose probe response correction method - True View (V_{out}/V_{in}) or Source Estimate (V_{out}/V_{source})





Industry's leading signal integrity for superior measurement accuracy

- True analog bandwidth to 33 GHz
- Lowest noise floor (2.10 mV at 50 mV/div, 33 GHz)
- Lowest intrinsic jitter (100 fs)
- Highest Effective Number Of Bits (ENOB) values in excess of 5.5
- Flattest frequency magnitude and phase response
- Spurious Free Dynamic Range (SFDR) exceeding 50 dBc

Industry's most comprehensive software solution

The V-Series has the deepest and broadest range of software solutions to accelerate understanding of your signal performance from fundamental analysis to debug and compliance.

- Analysis tools including jitter separation (Dual-Dirac, tail-fit, BUJ), eye-diagram, advanced de-embedding, FFE/CTLE/DFE equalizations and crosstalk analysis
- World's fastest digital channels, ideal for DDR4/LPDDR4 trigger and decode as well as parallel bus validation
- Debug with industry's longest 160-bit, 12.5 Gb/s hardware serial trigger, PRBS error detector and zone touch trigger
- Compliance software and technical expertise for high-speed standards (USB 3.1, PCIe® Gen 4, HDMI 2.0, MIPI®, Ethernet 100G, PAM-4, etc.) for highest measurement confidence

Achieve Clarity Faster with the Best-in-class Infiniium V-Series Oscilloscopes

33 GHz true analog bandwidth and 80 GSa/s sample rate with ultra low-noise, intrinsic jitter and highest ENOB.

Find rare events with the industry's longest 160-bit, 12.5 Gb/s hardware serial trigger and PRBS error detector.

Increase your productivity with the next-generation Infiniium user interface, optimized for multiple displays and up to 128 simultaneous viewing spaces.

Enhance your visual and touch experience with a 12.1" XGA (1024 x 768) high resolution capacitive touch screen.

Identify anomalies easily with a 256-level intensity-graded or color-graded persistence display that provides a three-dimensional view of your signals.

Support remote control over Ethernet, GPIB and USB interfaces. Remote programming allows oscilloscope and software automation. LXI class C compliant, Web-interface and MATLAB enabled.

Correct insertion loss and skew of your test setup with PrecisionProbe. The oscilloscope generates an edge of 12 ps rise time to enable TDT calibration.

Capture the longest signal trace of up to 25 ms at 80 GSa/s sample rate using highest 2 Gpts of acquisition



Trigger, analyze and debug your parallel bus with world's fastest digital channels. Decode cutting-edge DDR4 and LPDDR4 protocol memory buses.

External 10-MHz reference clock input and output for precise timebase synchronization with more than one oscilloscope, RF instruments or logic analyzers.

New industrial design and front panel layout that enhances user experience and operation of the oscilloscope.

Save Screen button provides quick access to capture oscilloscope waveform and analysis screenshots.

Customizable multipurpose key allows you to customize its function to make your favorite measurements, execute a script, save waveforms or load a setup.

Access the marker and change the positions quickly through the dedicated marker controls.

Quick access to fine control by pressing the horizontal and vertical knobs.

Five USB 3.0 host and device ports at the front and back panel for data offload speed. Additional USB 2.0 ports provide connectivity to your USB keyboard, mouse and other peripherals.



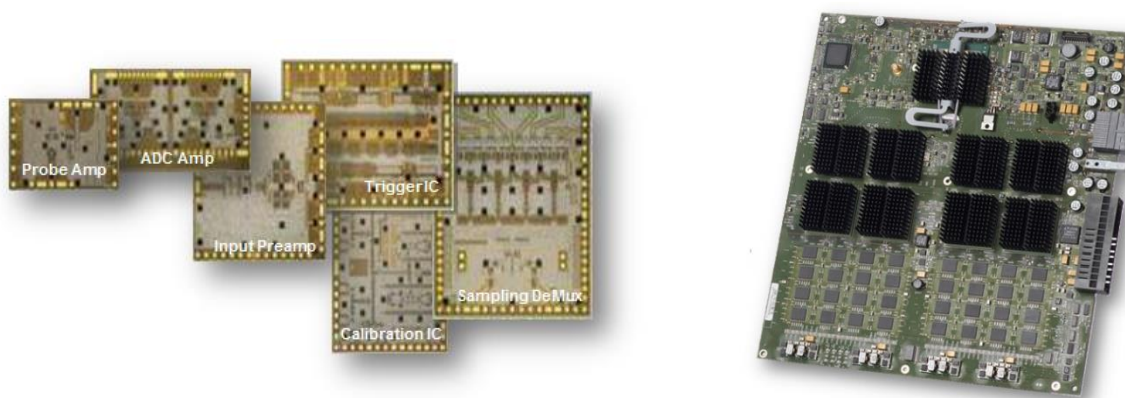
Threaded 3.5 mm RF connectors with convenient torque mechanism ensures the most reliable signal integrity and consistent 8 in. lbs. connection. The AutoProbe II interface provides a robust interface for the InfiniiMax Ultra probing system.

Standard removable solid state drive improves processing speed and enhances data security.

Industry's Leading Signal Integrity

Groundbreaking oscilloscope technology for highest measurement accuracy

Whether you are deploying emerging high-speed bus technology, identifying spectral content of wideband RF signals or analyzing transient physical phenomena, you need the truest representation of your signal under test. Keysight invests in leading-edge technology to bring you the highest real-time oscilloscope measurement accuracy available today.



Keysight utilizes a proprietary Indium Phosphide (InP) integrated circuit process to design the key technology blocks to deliver high-bandwidth performance, ultra-low noise and high-voltage signal input. This process is used in the pre-amplifier, trigger, sampling, ADC, and probe amplifier integrated circuit design. Not only does this mean you are purchasing the best oscilloscope on the market today, but you can also count on technology leadership from Keysight in the future.

Infiniium V-Series' front-end multi-chip module integrates the pre-amplifier, trigger and sampling technology blocks using a proprietary cutting-edge packaging technology. Based on fine-line microcircuit processes and extensive experience with RF design, Keysight developed a front-end that provides excellent high-frequency electrical properties along with superior heat dissipation. The unique technology includes a quasi-coaxial path in the packaging to ensure signal shielding and delivers a high-speed clock to the sampler chip for the most accurate sampling time base.

All technology blocks, including the front-end, analog-to-digital converter (ADC), memory controller, digital channels and hardware serial trigger, are meticulously laid out on the acquisition board with outstanding noise and coupling isolation. Time scale accuracy of 0.1 parts per million after calibration is achieved through precise clock synchronization and distribution, as well as the use of a 10-MHz oven-controlled crystal oscillator (OCXO) with ± 0.1 ppm of accuracy.

Oscilloscope bandwidth allows signal rise times to be more accurately depicted. The oscilloscope noise floor directly impacts the Y-axis voltage placement of each signal data point. The V-Series combines superiority in these characteristics with extremely low sample clock jitter (< 100 fs). This ensures the lowest possible contribution to jitter measurements. In addition, the V-Series has the industry's deepest memory of up to 2 Gpts, allowing you to resolve low frequency jitter components in a single measurement.



Figure 2. Infiniium V-Series ultra-low noise at 33-GHz full bandwidth and Jitter measurement floor of less than 100 fs (80 fs with 30 GHz input sine wave).

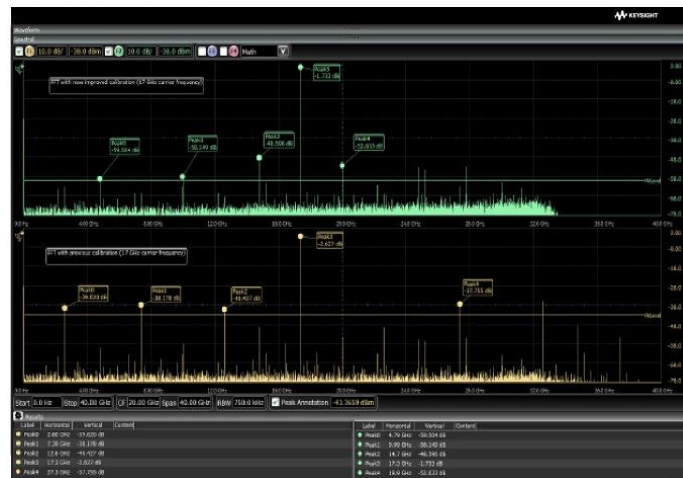


Figure 3. Keysight's oscilloscopes are constantly improving in measurement accuracy. The improved calibration routine that better aligns the sample points of the analog-to-digital converter. The improved calibration results in a higher spurious free dynamic range (SFDR) and the effective number of bits (ENOB). The SFDR is improved as much as 15 dBc depending on the carrier frequency.

Industry's Fastest Mixed Signal Oscilloscope

World's fastest 20 GSa/s digital channels, delivering best analog and digital performance

Today's designs require access to complex triggers and multiple instruments. A mixed signal oscilloscope (MSO) integrates traditional analog channels with 16 digital channels, providing up to 20 channels you can use at once. Keysight MSOs seamlessly integrate the familiar controls of an oscilloscope with the additional digital data acquisition and pattern recognition of a logic analyzer. You can trigger across any combination of analog and digital channels, as well as decode the acquired data. The MSO has the ability to label each individual channel as part of a bus for decoding, saving hours of manual work. With the fastest 20 GSa/s sample rate, it provides superior insight into low-speed serial and high-speed parallel bus interfaces.

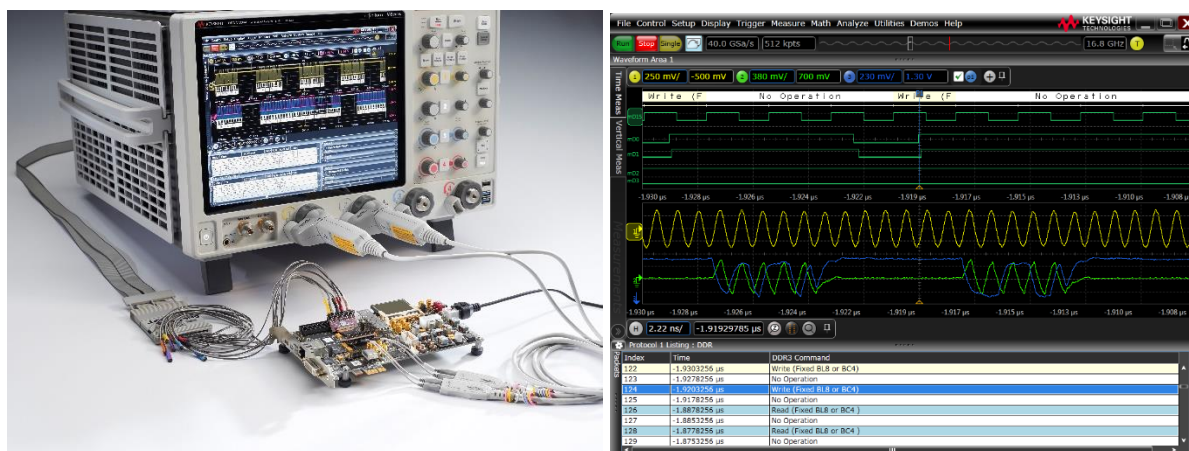


Figure 4. DDR3 test setup with mixed signal oscilloscope and DDR3 protocol decode and write command trigger.

MSO optimized for DDR/LPDDR2, 3, and 4 protocol triggering and decode

The MSO is specially targeted at DDR/LPDDR2, 3 and 4 memory technologies, simplifying the complicated task of triggering, analyzing, and debugging the parallel buses. The additional digital channels mean you can probe at the various command signals to easily trigger on the different DDR commands such as read, write, activate, precharge and more. DDR triggering makes read and write separation easy, providing fast electrical characterization, real-time eye analysis and timing measurements. The DDR protocol decoder can decipher the DDR packets and provide a time-aligned listing window to search for specific packet information.

Industry's Leading Hardware Serial Trigger

Challenges identifying and debugging high-speed serial buses

In today's high-speed serial application debug, it is not always easy to find errors that happen rarely or occasionally. Conventional oscilloscopes usually have limitations because of the long dead time between acquisitions, which cause infrequent errors or events to be missed. Furthermore, it is becoming more difficult to identify and debug the root cause of design problems, whether it is physical, or protocol layer related.

Industry's longest 160-bit sequence and sixteen-8b/10b symbols hardware serial trigger

The Infiniium V-Series' 12.5 Gb/s hardware serial trigger with the industry's longest 160-bit sequence provides an effective event trigger to find and debug the most challenging problems in your design. You can specify to trigger on bit 1 (high), 0 (low) and X (don't care) conditions when searching for a specific event. The 160-bit sequence length is critical to trigger at the longest symbol in an application such as USB 3.1 and PCI Express® Gen 3 symbols that are 132-bit and 130-bit long. If the trigger bit sequence is insufficient, you will not be able to reliably trigger on an event you want to identify, making the debug process more challenging.

The hardware serial trigger also provides 8b/10b triggering of up to 16 symbols of "K" and "D" codes. Since the 8b/10b symbols can be transmitted with either disparity to maintain the DC-balanced on the line, the hardware serial trigger is designed to trigger on both disparities, so you do not miss an event. In addition, the V-Series can decode the data packet at the application level such as PCIe Gen 3, USB 3.0 and SATA packets, providing deeper protocol insight into the application. When there is an error, you can now go in and debug the issue whether it is related to the physical layer, where the signal integrity is corrupted, or protocol layer, where the data is incorrectly transmitted.

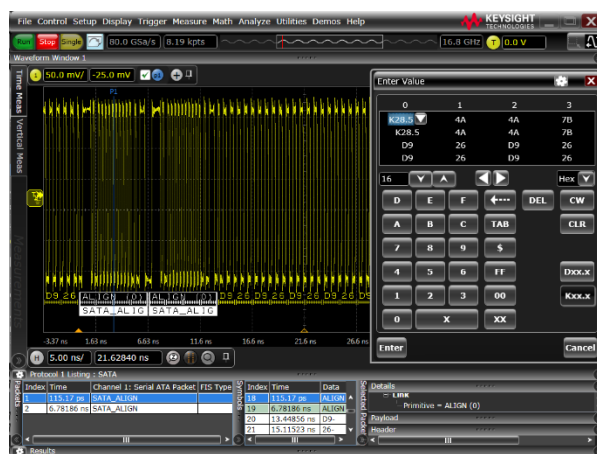


Figure 5. V-Series' hardware serial trigger finds a PCI Express Gen 3 compliance ordered set symbol that is 130-bit long (PCIe Gen 3 uses 128b/130b encoding).

Industry's only 12.5 Gb/s hardware serial trigger with SSC tracking at oscilloscope channel

The Infiniium V-Series hardware serial trigger's speed covers most common high-speed serial bus rates starting from 480 Mb/s up to 12.5 Gb/s, which include USB 2.0, USB 3.1, PCI Express Gen 3, HDMI 2.0 and SAS-3 applications. Most of these applications also support spread spectrum clocking (SSC) where the high-speed signal is modulated, and the V-Series' hardware serial trigger is able to track the SSC at the oscilloscope input channel or with the use of an external reference clock input. The hardware serial trigger will recover and generate a sub-rate clock when locked to the signal.



Figure 6. External reference clock input is one of the methods to enable SSC tracking by the hardware serial trigger.

Industry's first PRBS error detector

The PRBS error detector can trigger and display the bit error of the PRBS-7, 15, 23, and 31 signals. It identifies the error when the pattern does not match the expected PRBS pattern that has been set in the oscilloscope. When the next error happens, the oscilloscope will replace the display with the next bit error. This allows you to discover if the error is related to the bit pattern, which is related to inter-symbol interference (ISI). The hardware serial trigger provides an eye view plot to show the signal quality of the signal received.

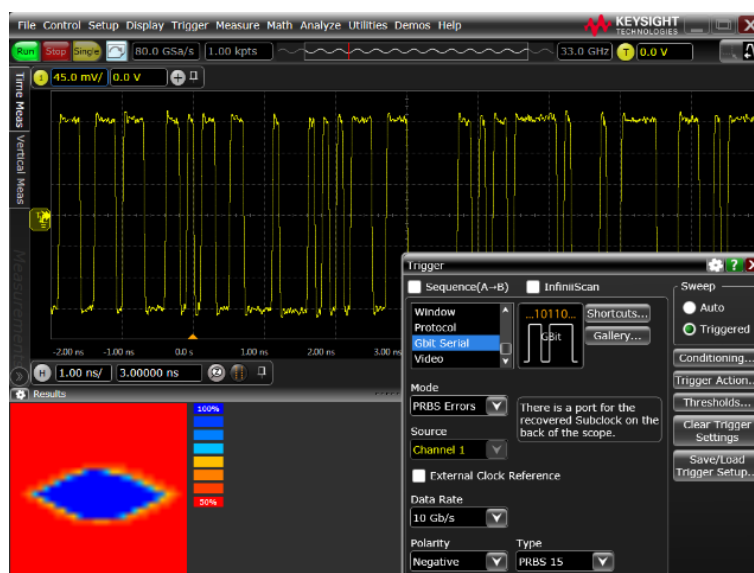


Figure 7. PRBS error detector triggers on a bit error in the PRBS-15 signal. An eye view plot (bottom left) is provided to show the quality of the signal received by the hardware serial trigger. The hardware serial trigger works when there is enough eye opening (blue area) to discern the bit value.

Use with InfiniiScan's software serial trigger for up to 240-bit sequence trigger

The hardware serial trigger can be combined with InfiniiScan's software event trigger to provide a two-stage trigger for up to 240-bit sequence. This is particularly powerful for the V-Series with its deep acquisition memory (up to 2 Gpts), providing long trace capture of 25 ms at the high resolution sampling rate of 80 GSa/s. The hardware first finds the 160-bit event condition and then uses InfiniiScan for an additional 80-bit event trigger. The InfiniiScan event trigger is not limited to bit sequence search. Other search functions such as zone touch trigger allow you to visually draw zones on the oscilloscope display as a second-stage trigger.

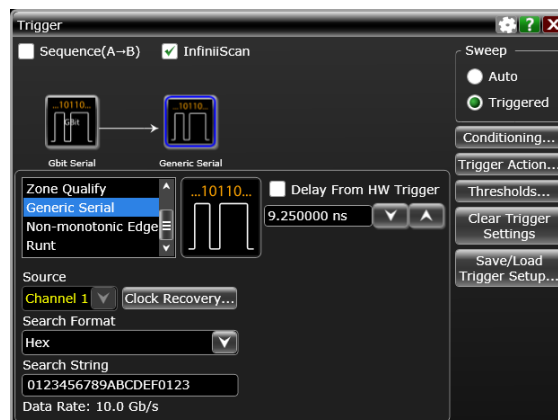


Figure 8. Hardware serial trigger and InfiniiScan's software serial trigger provide up to 240-bit sequence trigger.

Industry's Most Advanced and Flexible Probing System

To take advantage of your investment in a high-bandwidth oscilloscope, you must have a diverse probing system that delivers high-performance measurements. The InfiniiMax Ultra, III and III+ probing system is unmatched by any product in the market for measuring differential and single-ended signals – with flexible connectivity solutions for today's high-density ICs and circuit boards. It uses a proprietary indium phosphide IC process and advanced thick-film technology to accommodate even your highest-performance needs.

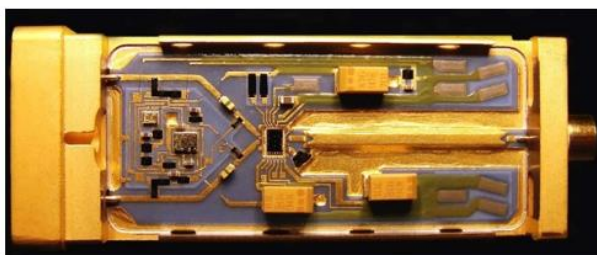


Figure 9. The InfiniiMax probing system uses the same InP technology that enables high-bandwidth and low-noise oscilloscope measurements.

Industry's Most Advanced Probing Solution

InfiniiMax probe amplifiers ranging from 1.5 GHz to 30 GHz of low noise bandwidth, deliver unrivaled performance and real-world usability for a completely new level of signal fidelity and accuracy.



MX0100A
25 GHz
Micro Probe
Head



MX0106A
23 GHz
Solder-In Probe
Head



N5425B
18 GHz
ZIF Probe
Head



MX0105A
20 GHz
SMA Probe
Head



N2839A
21 GHz
Browser Probe
Head



E2678B
12 GHz
Socketed Probe
Head

The new InfiniiMax Ultra probe delivers up to 25 GHz bandwidth with an RC input impedance profile, providing the extremely low mid-band loading necessary to address modern high-speed probing requirements. It also supports InfiniiMode and has a user-defined AC calibration mode, a wider input voltage range, more accuracy with unique S-parameter characterization, lower capacitive loading, a wider input voltage range, micro / socketed probe heads for smaller density probing, and more bandwidths.

Industry's only fully-integrated probe amplifier with unique S-parameter correction

Each individual InfiniiMax probe amplifier stores its unique S-parameters and is automatically downloaded to the oscilloscope when connected for probe response correction. The S-parameters of the various probe heads are also applied to further flatten the probe's magnitude and phase response for better measurement accuracy. Traditionally, probe correction uses a nominal model based on a typical probe amplifier instead of the specific amplifier. Generally, the biggest variations between probing systems are a result of the probe amplifier. The ability to correct a specific probe amplifier's response results in a more accurate probe correction, which yields a more accurate measurement.

Lowest-noise active voltage termination adapter



The N7010A active termination adapter provides a low noise single-ended cabled measurement solution with 50 Ω voltage termination (VTERM) up to 30 GHz bandwidth. The adapter is optimized for low amplitude signal measurements with its high signal-to-noise-ratio and low noise performance. The range of the VTERM can be set to ± 4 V, which is ideal for applications such as HDMI, DisplayPort, MHL and MIPI M-PHY®, which require voltage termination.

Turn your V-Series into a Time-Domain Transmission (TDT) instrument to quickly characterize and compensate any probes, cables or measurement setup

PrecisionProbe technology turns your oscilloscope into the ultimate characterization tool. It provides quick characterization of your entire measurement setup (including probes, cables and switches) without the need for extra equipment. PrecisionProbe takes advantage of the Infiniium V-Series' 12 ps edge to characterize and compensate for loss on the measurement system.

PrecisionProbe compensation technology:

- Creates custom probe transfer function (V_{out}/V_{in})
- Characterizes probed system transfer function ($V_{out}/V_{in} = V_{out}/V_{src}$)
- Removes unwanted cable insertion loss (S_{21})



Figure 10. The magnitude and phase response of a cable corrected using PrecisionProbe.

Now every probe and cable in the system can have the exact same frequency response without measurement variation caused by probe or cable difference. You can properly characterize custom probes as well.

When you combine InfiniiMax probes with switches between the amplifier and the probe head, PrecisionProbe allows full correction for each probe's path.

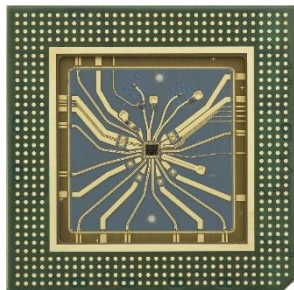


Figure 11. Keysight uses Indium Phosphide process to produce a 12 ps edge step response, ideal for characterizing cable and probe frequency response

Industry's Most Comprehensive Software

EZJIT Complete D9120JITA

Gain insight into the causes of signal jitter

With faster edge speeds and shrinking margins in today's high-speed digital designs, insight into the causes of jitter has become critical for success. Using EZJIT Complete analysis software, the V-Series oscilloscopes help you identify and quantify jitter margins that affect the reliability of your design. Time correlation of jitter to the real-time signal makes it easy to trace jitter components to their sources. Additional compliance views and a measurement setup wizard simplify and automate RJ/DJ separation for testing against industry standards. EZJIT Complete automatically detects embedded clock frequencies and repetitive data patterns on the oscilloscope inputs and calculates the level of data-dependent jitter (DDJ) that is contributed to the total jitter (TJ) PDF by each transition in the pattern, a feature not available on any other real-time oscilloscope today.

Measurement trends and jitter spectrum. EZJIT's simple tools help you quickly analyze the causes of jitter. Measurement trends allow you to see deeper views of factors affecting measurements. Jitter spectrum is a fast method to find the causes of jitter.

Two ways to separate jitter. EZJIT comes with two ways to separate jitter: the spectral method and the emerging tail fit method. Both methods allow for simple separation of RJ and DJ, but the tail fit method provides proper jitter separation in the unique case of bounded uncorrelated jitter.

Unique RJ/DJ threshold view. EZJIT Complete also provides a unique threshold view of the jitter spectrum with the threshold drawn on the chart. The spectral view provides insight into the decision point of the separation and works with both narrow and wide spectral separation.

Real-time eye and clock recovery. Serial data analysis (SDA) software provides flexible clock recovery including 1st and 2nd-order PLL and constant algorithms. With a stable clock, you can look at real-time eyes of transition and non-transition bits. V-Series scopes with SDA software also provide a new unique view of bits preceding an eye.

Flexible charts. EZJIT Complete displays up to 10 graphs with unique information. Use them all to maximize your jitter analysis

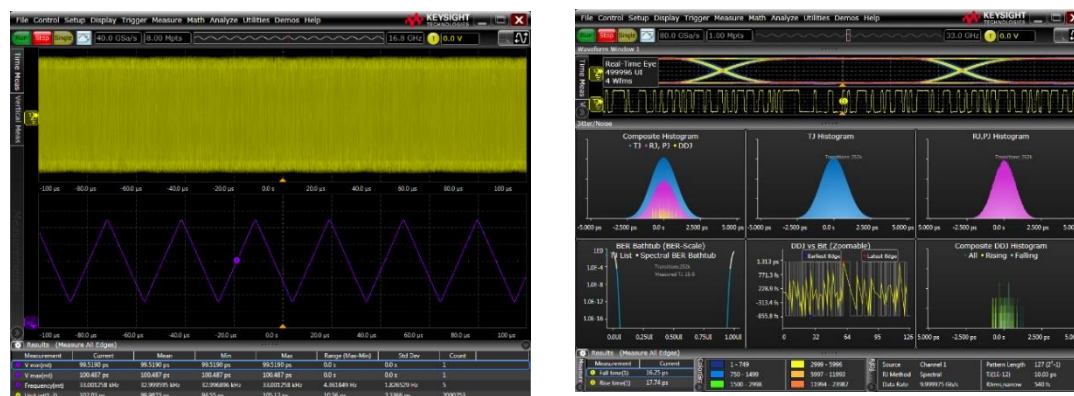


Figure 12. SSC measurement and other jitter analysis tools for enhanced visualization

More than your standard jitter package

To efficiently determine root cause for any type of signal degradation in the amplitude domain, you must first determine whether the problem is caused by random or deterministic sources. To help you accomplish this task, EZJIT Complete takes analysis techniques used in the time domain (jitter analysis) and extends them into the amplitude domain.



Figure 13. Noise analysis with EZJIT Complete software for insight into the sources of noise in the signal.

More than just an eye contour

EZJIT Complete is an in-depth view into impairments related to signal levels – either logic ones or logic zeroes – deviating from their ideal positions. Some tools simply provide a view of an eye contour but provide no real measurement data other than nice graphics.

EZJIT Complete uses separation techniques to allow each bit to be examined to determine correlated effects and to make multiple measurements on individual bits to determine uncorrelated effects. Use FFTs to analyze the frequency domain and extract random components. Dual-Dirac modeling techniques are also carried from the jitter domain and used in the interference domain.

D9120ASIA Advanced Signal Integrity Software

The most advanced waveform transformation software helps you render waveforms anywhere in a digital serial data link

InfiniiSim waveform transformation toolset provides the most flexible and accurate means to render waveforms anywhere in a digital serial data link. The highly configurable system modeling enables you to remove the deleterious effects of unwanted channel elements, simulate waveforms with channel models inserted, view waveforms in physically improbable locations, compensate for loading of probes and other circuit elements, and do so simply and quickly on your tool of choice.



Figure 14. InfiniiSim renders the waveform through hardware acceleration

Circuit models to define your setup

The InfiniiSim waveform transformation toolset provides a graphical user interface for you to define your system as you understand it and even make it arbitrarily complex. You do this by selecting topologies and defining circuit blocks.

Model reflections

With the InfiniiSim waveform transformation toolset, you can transform signals with confidence, whether you are inserting or removing channel elements or relocating the measurement plane. InfiniiSim's advanced toolset lets you model up to 27 different elements at once and model the interaction between elements. Only toolsets with the ability to model more than one element will properly reflect a model including the oscilloscope's input.

Model your system with as much detail as you need

InfiniiSim features the model setup that best matches your design. Whether it is a simple single-element model or an advanced general-purpose model with up to 27 elements in the link, you can perfectly model your design and simulate the exact probing point you want.

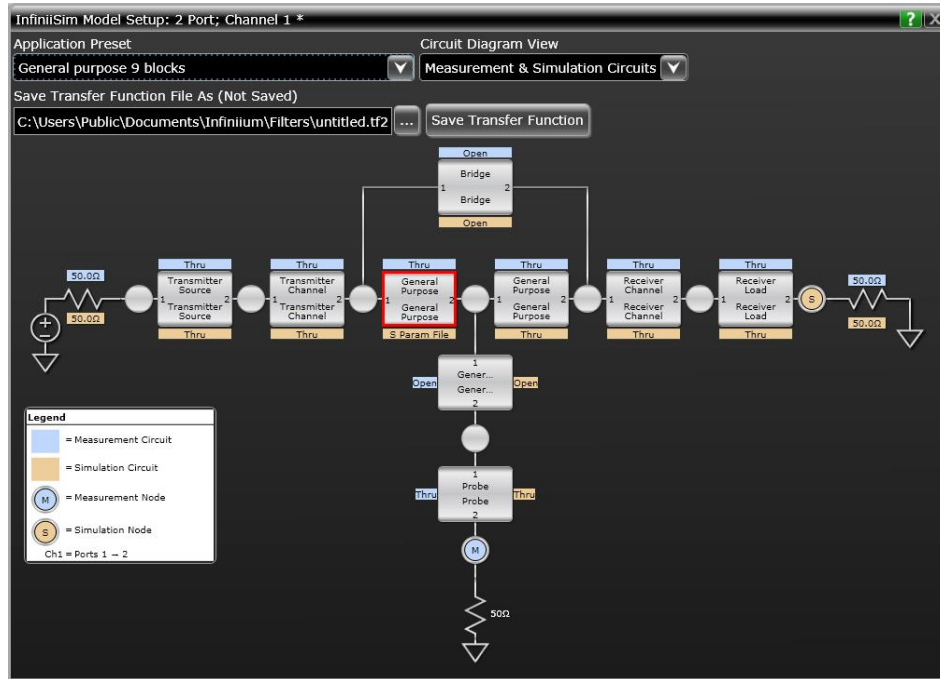


Figure 15. InfiniiSim allows embedding and de-embedding of up to 27 different Elements or S-parameter models at once to meet your most demanding requirements.

Significantly reduce receiver errors by opening even tightly shut eyes through equalization emulation

Serial data equalization for the Infiniium V-Series provides fast and accurate equalization using feed-forward equalization (FFE), continuous time linear equalization (CTLE) and decision feedback equalization (DFE) modeling in real time. The tool allows you to use a combination of the equalization, which is found in actual designs.

Serial data equalization software allows you to input your own equalizer settings and tap values that are used in your design, allowing you to simulate the eye opening in your receiver. If you prefer, the software can find the optimal tap values for you as well, which you can use as reference for your designs.

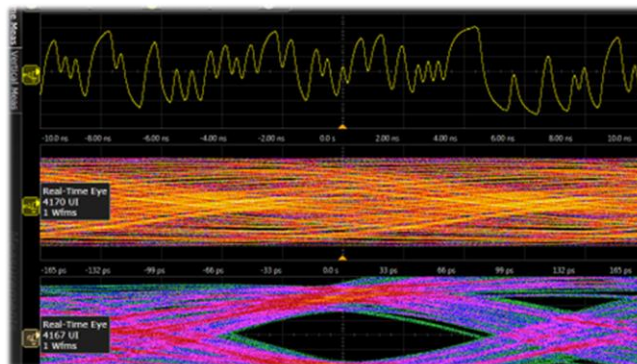


Figure 16. Serial data equalization opens the closed eye using CTLE and DFE methods.

InfiniiScan D9120SCNA

Quickly and easily identify waveform anomalies

Today's digital signals are increasingly complex. Designers of serial links and parallel buses want to quickly identify signal anomalies in their designs. Engineers have traditionally relied on hardware triggering and deep memory to capture such illusive events. However, these classic methods fall short in some key areas.

Trigger on events that hardware triggers can't handle

InfiniiScan software allows you to use an oscilloscope to identify signal integrity issues that hardware triggering is unable to find in your electronic designs. This innovative software scans through thousands of acquired waveforms per second to help you isolate signal anomalies, saving you time and improving designs.

Innovative triggers

The zone qualify finder allows you to draw a “must intersect” or “must not intersect” zone on the oscilloscope screen to visually determine the event identify condition. If you can see the event of interest on the screen, you can create a trigger that will isolate it, saving significant time over some complicated hardware triggers. Other triggers include non-monotonic edge, measurement limit search, runt, and pulse width.



Figure 17. Draw zones on your screen for a unique triggering experience

Infiniium Offline Oscilloscope Analysis Software D9010BSEO

View and analyze away from your oscilloscope and target system

Ever wish you could do additional signal viewing and analysis away from your scope and target system? Now you can. Capture waveforms on your scope, save to a file, and recall into Keysight's Infiniium Offline application.



Figure 18. Infiniium Offline software works with all Infiniium applications

It goes anywhere your PC goes

Take advantage of large high-resolution and multiple displays found in your office. Use familiar scope controls to quickly navigate and zoom in to any event of interest. Use auto measurements and functions for additional insight.

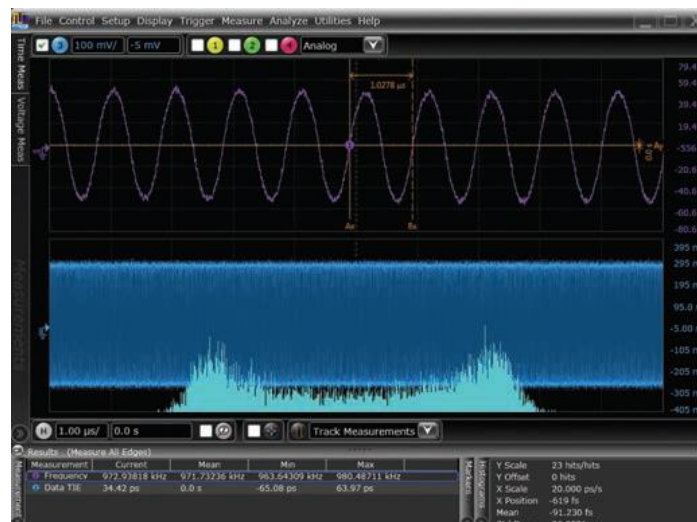


Figure 19. Find signal anomalies, such as power supply coupling

Share scope measurements more easily across your team

You can share entire data records instead of being limited exclusively to static screen shots.

Create more useful documentation

Use features such as right-click cut-and-paste to move screen images between applications, without ever having to save the image to a file. Add up to 100 bookmark annotations and up to 20 simultaneous measurements.

Need advanced analysis capability?

Infiniium Offline includes a variety of upgrade options including serial decode upgrades for a variety of serial buses, jitter analysis, and serial data analysis.



Figure 20. Peak search capability makes Infiniium Offline a frequency domain tool

User-Defined Function Software (Standard)

Combine Infiniium and MATLAB for even more analysis

Enhance the V-Series with a seamless gateway to powerful MATLAB analysis functionality. User-defined function software adds new analysis capabilities to the V-Series, beyond traditional math/analysis features. Now you have the freedom to develop your own math functions or filters using MATLAB and its Signal Processing Toolbox. With a seamless integration to MATLAB, Infiniium oscilloscopes allow you to display your math and analysis functions live on the oscilloscope screen, just like any other scope's standard functions.

Automation Testing: Switch Matrix Support

Comprehensive testing, easily achieved



Figure 21. Test automation for multilane interface testing with no compromise on accuracy, which reduces test time and effort. An Infiniium 90000 X-Series oscilloscope is shown above.

Compliance applications on the V-Series support a switch matrix, making testing simple by automating tests for each lane of a multi-lane bus. Typical testing requires reconnecting the oscilloscope each time you switch a lane, which causes wasted time and inaccuracies. The V-Series solves this problem by supporting switch matrix through its compliance test. Simply connect the switch to the oscilloscope and all the lanes, and then click Run to complete full testing of your entire device.

Maintain accuracy

The framework fully supports Keysight's D9110DMBA De-embedding Software (PrecisionProbe, InfiniSim Basic). This gives you the ability to characterize every switch path to the device under test (both magnitude and skew) and ensure that all of them maintain the same level of accuracy.

Customize your testing

Use the remote programming interface and D9110UDAA User-defined Application for device control, instrument control and test customization.

Compliance and Automated Testing

Today's demanding environment means you have much less time to understand the intricacies of the technologies you are testing. You also have less time to develop and test automation software that is designed to increase measurement throughput and decrease time to market. Compliance applications save you time and money with measurement automation built into the compliance application. No longer do valuable resources need to be exclusively tied to writing automation software. Instead they can be deployed to designing the next big project.

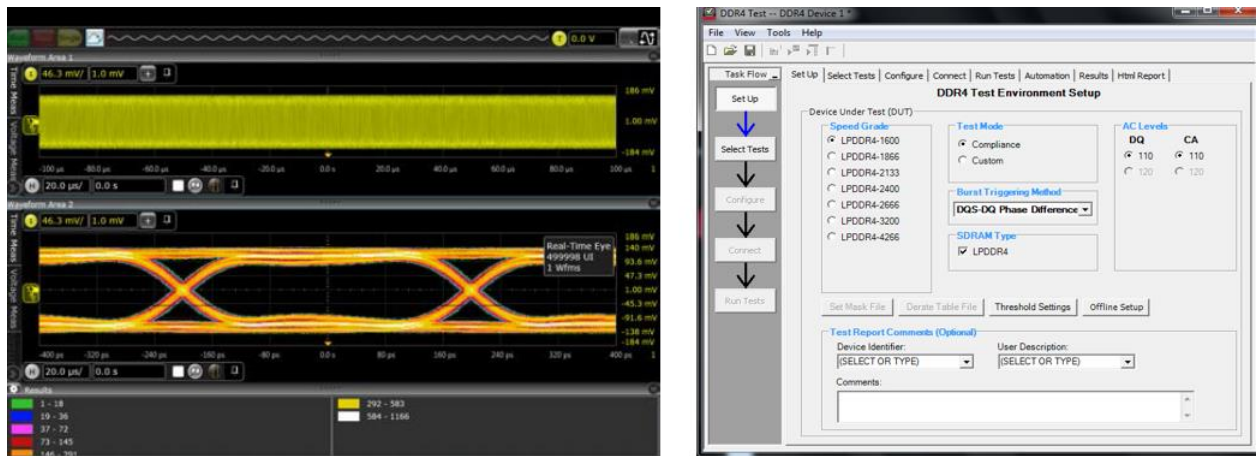


Figure 22. Compliance applications make testing technologies standards easy and remote interface makes it easy to control automation

Infiniium's compliance applications are fully functional with design tools such as ADS. Imagine running your waveforms at design through the entire suite of compliance tests, giving more insight earlier than was previously possible. As the design moves to silicon and then to validation, the same suite of tests can be run live on your device.

Compliance applications that run on V-Series oscilloscopes are certified to test to the exact specifications of each technology standard. If a test passes on the V-Series scope in your lab, you can be assured that it will pass in test labs and at plug fests worldwide. Keysight experts on technology boards and industry standards committees help define compliance requirements. As a result, you can be sure that V-Series oscilloscope tools deliver to critical specifications. Setup wizards combined with intelligent test filtering give you confidence you're running the right tests. Comprehensive HTML reports with visual documentation and pass/fail results guarantee that critical information is retained on each test.

Quick and easy automated switching

Only Keysight's V-Series oscilloscopes feature compliance applications with both the user-defined application's add-in capability and integrated PrecisionProbe compensation. Switch paths can vary in their characteristics and have unwanted loss. By enabling PrecisionProbe in its compliance applications, V-Series scopes allow you to characterize and compensate for every path in the switch, making every path's frequency response identical in both magnitude and phase. These tools make switch automation quick and painless. The V-Series and its compliance applications make automation more automated than ever. Your technicians no longer need to spend valuable time physically changing connections.

User-Defined Application D9110UDAA

Custom automation for your V-Series oscilloscope

The user-defined application is the only fully customizable automated environment made for an oscilloscope by an oscilloscope designer. It provides full automation, including the ability to control other Keysight instruments, external applications such as MATLAB and your DUT software.

Simplify your automation

The user-defined application (UDA) makes automation simple. The application takes the Infiniium compliance application framework and gives you full access to its interface. UDA allows for automation testing in as little as one minute. Use UDA to control other Keysight instruments such as signal generators and network analyzers to create a full suite of measurements.

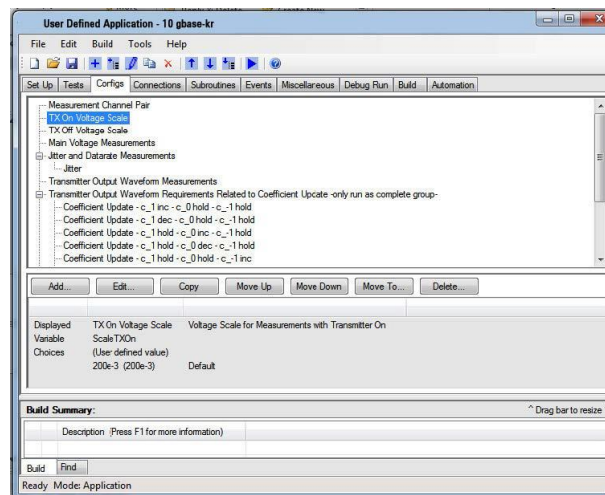


Figure 23. Customize your own tests with user-defined application in the familiar Keysight framework

Full measurement report

No automation would be complete without a simple-to-view and easy-to-understand report. UDA provides a full report of the pass/fail criteria you have provided.

Add-in capability

Ever wanted to add testing to your compliance applications? All Infiniium compliance applications support the industry's most flexible testing mechanism with UDA add-in capability. Create the custom testing you need and then plug it into your compliance application to expand the application to your testing needs. UDA add-in capability is available only on Infiniium oscilloscopes.

PrecisionProbe and switch compatibility

UDA makes automation of switches in your system simple and accurate. Use PrecisionProbe to characterize the path of the switch and then let UDA's unique GUI switch between every input in your switch system. Every input can look identical in its frequency response thanks to this advanced technology.

Protocol Analysis

The Infiniium V-Series oscilloscopes come with more than 20 protocol decoders for decoding high-speed serial bus and low-speed serial interface protocols. The list includes the industry's only 64b/66b decoder used by Ethernet 10GBASE-KR standard and multilane MIPI decode. The V-Series protocol decoders feature time-correlated markers that let you easily move between the listing window and the waveform. It generates CRC value from the payload and compares the value with the embedded CRC to verify if any bit error has occurred. Once an error is detected, you can further debug the problem, whether it is caused by physical or protocol issues.

Multiple protocol decoders can be used at the same time with analog and digital channels. They feature search and trigger capability that lets you scan through the waveform to find the trigger condition that interests you. Protocol decoders are available in the Infiniium Offline tool as well. Check the V-Series ordering configuration for supported protocols.

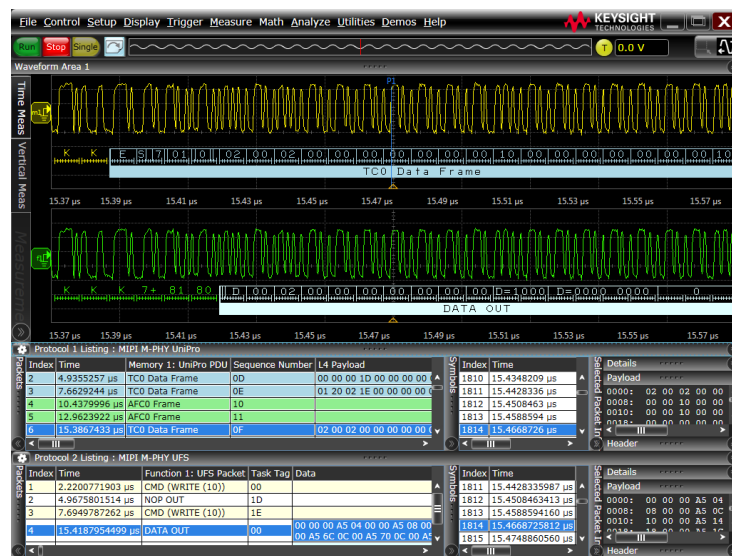


Figure 24. Packet decode and CRC verification through the oscilloscope MIPI UniPro and UFS protocol decoders.

More Information

Thank you for choosing a Keysight Infiniium V-Series Oscilloscope. The Keysight Infiniium V-Series oscilloscopes set a new standard for real-time oscilloscope accuracy, with models ranging from 8 to 33 GHz. Extreme signal integrity, and ultra-low noise floor specifications allow for the truest representation of signals. Invest with confidence today, knowing you have the ability to meet the needs of technology advancements tomorrow. For more information on the Infiniium V-Series, check out the following:

- [Infiniium V-Series Oscilloscopes Datasheet](#)
- [Infiniium V-Series Oscilloscopes Configuration Guide](#)
- [Infiniium V-Series Product Fact Sheet](#)



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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