

Infiniium XR8 Oscilloscopes

Where Modern Software Meets Uncompromised Signal Integrity: Infiniium XR8

Introduction

Smarter Analysis. Faster Answers. Powered by Infiniium 2026 software and multicore CPU acceleration, the XR8 delivers up to 5 times faster PAM analysis and up to 12 times faster jitter analysis—so engineers spend less time waiting and more time debugging.

Smaller Footprint. Better Efficiency. The XR8's compact, low-power design with advanced thermal control reduces heat and acoustic noise, making it easy to deploy across modern labs without infrastructure upgrades.

Superior Signal Integrity by Design. With a highly consolidated front end, single-chip ADC and DSP integration, and native 12-bit ADC resolution, the XR8 delivers cleaner measurements and higher confidence in every result.



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NOTE:

For ordering information, see the [Infiniium XR8 Oscilloscopes Configuration Guide](#).

For a detail of specification, see the [Infiniium XR8 Oscilloscopes Data Sheet](#).

The XR8: Built for How Engineers Measure Today

The pace of high-speed design has changed. Data rates are increasing, debug windows are shrinking, and engineering teams are expected to move faster — with fewer compromises and less tolerance for inefficiency. That is why the XR8 exists.

The XR8 is a next-generation oscilloscope platform designed not just to capture signals, but to accelerate engineering decisions. With Infiniium 2026 software, a modern and intuitive user interface, and multicore CPU-accelerated processing, the XR8 delivers dramatically faster insight — up to 5 times faster PAM analysis and up to 12 times faster jitter analysis — so engineers spend less time waiting and more time solving problems. Standard 1 Gpt memory, expandable to 8 Gpts, ensures deep visibility without sacrificing speed.

Beyond software, the XR8 is engineered for superior signal integrity. A highly consolidated front-end architecture, single-chip integration of ADC and DSP, and native 12-bit ADC resolution deliver cleaner measurements and higher confidence, especially for today's demanding SI/PI and high-speed digital applications.

The XR8 is also smaller and more efficient by design. Its compact form factor, lower power consumption, and improved thermal control make it ideal for modern labs that need to scale capability without scaling complexity.

The XR8 isn't just a new oscilloscope — it's a smarter, faster way to measure.

The XR8 is

<p>Smarter.</p> 	<p>Smaller.</p> 	<p>Superior.</p> 
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Smarter Software. **Smaller** Size. **Superior** Signal Integrity

Simple Flexible Model Structure

The XR8 is offered in a single streamlined model, XR804KA, making configuration and purchasing straightforward while still providing exceptional flexibility. The platform supports warranted bandwidths up to 33 GHz, with selectable options at 8, 10, 13, 16, 20, 25, and 33 GHz, allowing customers to choose exactly the performance they need — without overbuying.

To further optimize investment, the XR8 introduces a new “2+2” bandwidth configuration. This allows the first two channels to operate at a higher bandwidth while the third and fourth channels run at a lower bandwidth. For example, 13 GHz + 25 GHz or 25 GHz + 33 GHz configurations are ideal when only a single differential pair requires the highest bandwidth. This is a smart and cost-effective choice for applications such as USB4, where two high-performance channels are critical, but full four-channel high bandwidth is unnecessary.

Every XR8 channel comes standard with 128 GSa/s sampling rate and 1 Gpt of analysis memory, ensuring deep capture and high timing resolution without optional upgrades.

The XR8 front end uses 2.92 mm connectors, fully compatible with existing 3.5 mm and SMA accessories, protecting prior investments. In addition, XR8 supports Keysight’s high-performance AutoProbe III interface, enabling seamless use of advanced probes for accurate, repeatable measurements.



Model	XR804KA	Infiniium XR8 Real-Time Oscilloscope
Bandwidth	XR804KA-084	8 GHz / 4 Ch
	XR804KA-104	10 GHz / 4 Ch
	XR804KA-134	13 GHz / 4 Ch
	XR804KA-164	16 GHz / 4 Ch
	XR804KA-204	20 GHz / 4 Ch
	XR804KA-252	13 GHz / 2 Ch 25 GHz / 2Ch
	XR804KA-254	25 GHz / 4 Ch
	XR804KA-332	25 GHz / 2 Ch 33 GHz / 2Ch
	XR804KA-334	33 GHz / 4 Ch
Memory	Standard	1 Gpt / Ch
	XR804KA-02G	2 Gpts / Ch
	XR804KA-08G	8 Gpts / Ch

Superior Signal Fidelity. Upgrade When You're Ready

The Industry Leading Signal Integrity

- 4 channels up to warranted 33 GHz analog bandwidth
- 4 channels with independent 128 GSa/s sample rate and 1 Gpt memory
- High-definition 12-bit Analog-to-Digital Converter (ADC)
- Low-noise analog front ends for precision signal acquisition
 - 129 μV (rms) noise at 8 GHz of bandwidth with 40 mV full scale
 - 220 μV (rms) noise at 25 GHz of bandwidth with 40 mV full scale
 - 261 μV (rms) noise at 33 GHz of bandwidth with 40 mV full scale
- The industry leading ENOB for supported bandwidths (400 mV full scale)
 - 7.6 bits at 8 GHz
 - 6.7 bits at 25 GHz
 - 6.4 bits at 33 GHz
- Down to 4 mV/div vertical scaling supported in hardware
- Hardware bandwidth limit filters enable accurate scalability
- Correction filters ensure flat frequency magnitude and phase response
- 25 fs (typical) of intrinsic jitter produce excellent jitter characterizations

A Platform Designed for Continuous Innovation

Why Flexibility and Upgradability Matter

- Technology innovation cycles are accelerating from years to months
- AI and data-center demands are reshaping digital and RF design requirements
- Engineers need platforms that evolve — without replacing hardware
- Investments must stay relevant across multiple technology generations

The world's insatiable demand for higher data throughput and better performance is pushing today's digital and RF technologies to their limits. Driven by the rapid expansion of AI and data-center ecosystems, new standards and architectures are now emerging every 6 to 12 months, replacing the traditional 4–5 year innovation cycle. In this environment, engineers and scientists cannot afford to repeatedly replace critical R&D infrastructure just to keep pace with accelerating technology waves.

Keysight recognized this fundamental shift and designed the XR8 as a fully upgradable oscilloscope platform, built to protect long-term investment while enabling future growth. XR8 is offered as a single hardware platform with warranted bandwidth capability up to 33 GHz, allowing customers to start at 8, 10, 13, 16, 20, or 25 GHz and upgrade bandwidth as needs evolve — entirely through simple license keys. Even XR8's innovative 2+2 bandwidth configurations can be upgraded flexibly, ensuring maximum return on investment.

Every XR8 ships fully calibrated and includes 128 GSa/s sampling rate, a native 12-bit ADC, and 1 Gpt of acquisition memory, with seamless upgrades to 2 Gpts or 8 Gpts available via software licensing — no hardware changes required. This ensures deep visibility today and tomorrow.

The XR8 also benefits from full software support, with two releases per year, keeping the platform aligned with evolving workflows, compliance requirements, and analysis techniques. Combined with the industry's widest range of probing and connectivity options, along with compliance test and VSA (Vector Signal Analysis) support, the XR8 delivers unmatched flexibility.

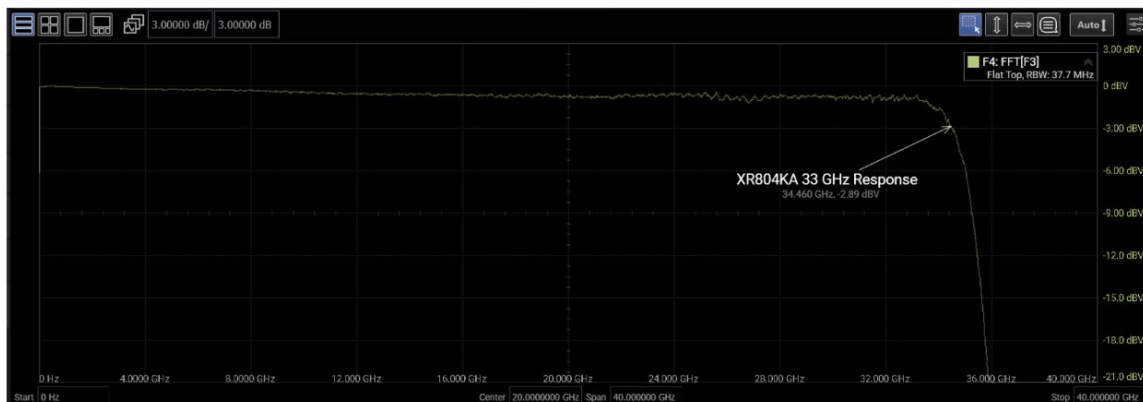
The XR8 isn't just an oscilloscope — it's a platform designed to grow with your technology roadmap.



- Bandwidth**
 - 8 → 33 GHz
 - All License Upgrades
- Memory**
 - 1 → 2 or 8 Gpts
 - All License Upgrades
- Infiniium 2026 Software**
 - 2 Release Per Year

Meet the XR8's 2.92 mm Ruggedized Input

- Threaded 2.92 mm RF connectors provide extended bandwidth capability while maintaining full compatibility with 3.5 mm and SMA connectors. Each system includes torque wrenches to ensure consistent, secure connections — maximizing signal integrity and enabling warranted bandwidth performance up to 33 GHz.
- Unrestricted 128 GSa/s per channel sample rate – with a real-time sample resolution of 7.8125 ps per sample. 1 Gpt standard, with options up to 8 Gpts per channel of deep memory.
- High-definition 12-bit Analog-to-Digital Converter (ADC) provides 4,096 quantization levels, enabling more accurate digitization of signals – 16x more vertical resolution than traditional 256 level, 8-bit systems. Industry leading ENOB and less than 10 fs (rms) of inter-channel intrinsic jitter enables precise capture of multi-channel applications and measurements.
- The XR8's 2+2 bandwidth configurations allow two channels to operate at a higher bandwidth while the remaining two run at a lower bandwidth, optimizing cost and performance. This flexible option is ideal for differential-pair applications like USB4, enabling high-bandwidth measurements without over-investing in four full-bandwidth channels.
- The standard AutoProbe III interface provides a robust, high-bandwidth probe connection and is compatible with InfiniiMax 4 probes and the new N7011A/N7012A active termination adapters. With the N2852A AutoProbe II-to-AutoProbe III interface adapter, XR8 also seamlessly supports InfiniiMax Ultra and InfiniiMax III probing systems.
- An ultra-quiet analog front-end module, powered by a highly integrated ASIC optimized for 33 GHz and below, delivers class-leading low noise and superior signal integrity, while maintaining the benefits of full-bandwidth Time-Interleaved Sampling (TIS).
- The XR8 introduces a new, compact footprint designed specifically for modern labs where space, power, and comfort matter. The platform features a lower-power architecture with improved thermal efficiency, reducing heat output and minimizing lab temperature impact. Optimized airflow and cooling design significantly lower acoustic noise, creating a quieter, distraction free environment for engineers, especially in multi-scope and shared lab deployments.



XR804KA Frequency Response

Groundbreaking Oscilloscope Technology

The Infiniium XR8 represents the eighth generation of Keysight Technologies' Infiniium portfolio of high-performance real-time oscilloscopes. It marks a major step forward in oscilloscope architecture, setting a new benchmark for high-frequency measurement performance, efficiency, and scalability.

Rather than relying on incremental enhancements, the XR8 introduces a holistic redesign that spans silicon integration, digital acquisition, and mechanical engineering. These advancements work together to deliver higher signal fidelity, improved reliability, and a more efficient measurement platform tailored for today's rapidly evolving technologies.



The architectural evolution of the XR8 is built on three foundational pillars:

- A highly integrated analog front-end ASIC
- A consolidated digital acquisition and processing system
- A redesigned mechanical and thermal platform

Together, these innovations form a streamlined and robust instrument architecture that improves measurement integrity while reducing system complexity.

Whether validating emerging high-speed interconnects, analyzing wideband RF signals, or capturing fast transient phenomena, engineers require the most accurate representation of their signals. Through sustained investment in advanced technologies, Keysight delivers the highest level of real-time oscilloscope measurement fidelity available today — ensuring confidence in both current designs and future innovations.

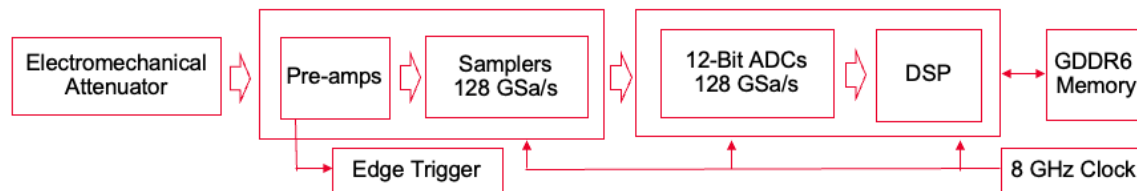
Beyond hardware innovation, the XR8 is powered by Infiniium 2026 software, a next-generation measurement environment designed to meet the demands of modern high-speed validation and debug. As signal speeds increase and design cycles compress, software usability and processing efficiency have become just as critical as raw instrument performance.

Infiniium 2026 introduces a more intuitive and responsive user interface, enabling engineers to navigate complex measurements with fewer steps and less cognitive overhead. Common workflows — such as eye analysis, jitter characterization, and protocol debugging — are optimized to deliver faster insight while maintaining measurement rigor.

Together, Infiniium 2026 and XR8 hardware form a tightly integrated platform — one that transforms advanced measurements into efficient, repeatable engineering workflows.

A Simplified, High-Integrity Signal Path

Our primary architectural objective for the XR8 was to aggressively simplify the analog signal path. In high-frequency design, every millimeter of trace and every component transition is a potential source of signal degradation. The XR8 architecture is therefore a testament to a "less is more" philosophy, achieved through unprecedented silicon integration. The system block diagram serves as a blueprint for this modern, streamlined approach.



The primary signal path within the XR8 is a model of efficiency and directness:

- Electromechanical Attenuator: The initial signal conditioning stage
- Pre-amps and Samplers (128 GSa/s): A highly integrated block that amplifies the signal and captures it at an extremely high sample rate.
- 12-Bit ADCs (128 GSa/s): A bank of four 12-Bit ADCs, each operating at 32 GSa/s, digitizes the interleaved signal from the samplers. This process preserves the full 128 GSa/s rate of the front-end while leveraging the superior resolution of the 12-bit converters.
- DSP: The Digital Signal Processing engine that handles data processing and analysis
- GDDR6 Memory: High-speed memory for storing the acquired waveforms

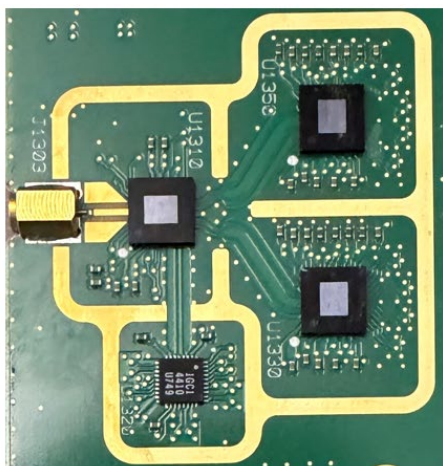
This core path is supported by two critical subsystems. The Edge Trigger taps into the preamplifier output to provide precise and stable triggering capabilities. A master 8 GHz Clk (Clock) provides the timing reference for the ADC and DSP block, ensuring coherent data acquisition and processing across the system. This block diagram illustrates a fundamentally simplified and modern architecture, evidenced by the integration of the pre-amps and samplers into one functional block and the ADCs and DSP into another.

This high-level system view sets the stage for a deeper analysis of the first key innovation: the custom-designed front-end ASIC.

Front-End Innovation: The Integrated Preamplifier and Sampler ASIC

The front-end is the most critical stage in an oscilloscope, as any signal integrity lost here cannot be recovered later in the chain. The primary architectural advancement in XR8 is the move from a complex, discrete-component front-end to a single, highly integrated ASIC. This fundamental shift minimizes the physical path length and the number of transitions the analog signal must traverse before being sampled.

The following picture provides a direct comparison between the previous UXR 3.5 mm architecture and the new XR8 design, highlighting the benefits of this integrated approach.



The UXR 3.5mm Front-End



New XR8 Integrated ASIC Front-End

The impact of this single-chip integration is profound. The XR8 front-end ASIC combines the preamplifier and the analog sampler into a single package, enabling a direct interface with a connector. This elegant design eliminates the intermediate traces and components found in older, discrete designs.

The primary benefit of this new design is a dramatic reduction in trace loss — a primary source of signal degradation in high-frequency designs — which in turn significantly improves signal integrity. By capturing a cleaner, more accurate representation of the input signal at the very first stage, the XR8 establishes a foundation of measurement fidelity that benefits the entire system. This innovation in the analog domain is complemented by an equally significant leap forward in the digital acquisition system.

Acquisition System Advancement: Miniaturization and the 12-bit ADC

Following the analog front-end, the digitizing and processing stage is essential for measurement accuracy, system throughput, and power efficiency. The XR8 revolutionizes this stage through an unprecedented level of ASIC integration, consolidating what was once a sprawling, multi-chip subsystem onto a single, powerful piece of silicon.

The previous UXR 3.5 mm acquisition board was a complex assembly, requiring twelve separate ASICs (six per channel) to manage the necessary functions. These discrete chips were responsible for the 10-bit ADC, DSP, Memory Controller, and various Buffering Functions. The large physical footprint and high component count are evident in the size of the board and its reliance on numerous large heatsinks.



**UXR 3.5 mm Acquisition
(2 Channels)**



**New XR8 Acquisition
ASIC with Memory
(2 Channels)**

In stark contrast, the new XR8 digitize engine consolidates all these functions. A newly designed, highly integrated 12-bit ADC now incorporates the DSP, memory controller, and buffering capabilities on a single chip. This consolidation represents a massive leap in semiconductor design and system-on-chip integration.

The direct consequences of this high integration and miniaturization are transformative:

- **Single Chip Integration:** Consolidating the functions of six previous ASICs into one reduces system complexity, simplifies board layout, and minimizes potential points of failure.
- **Significant Size Reduction:** The physical footprint of the acquisition system is dramatically smaller, enabling a more compact and efficient overall instrument design.
- **Significant Power Consumption Reduction:** A direct and crucial benefit of consolidating multiple ASICs into a single, more advanced chip is a major decrease in overall power draw.

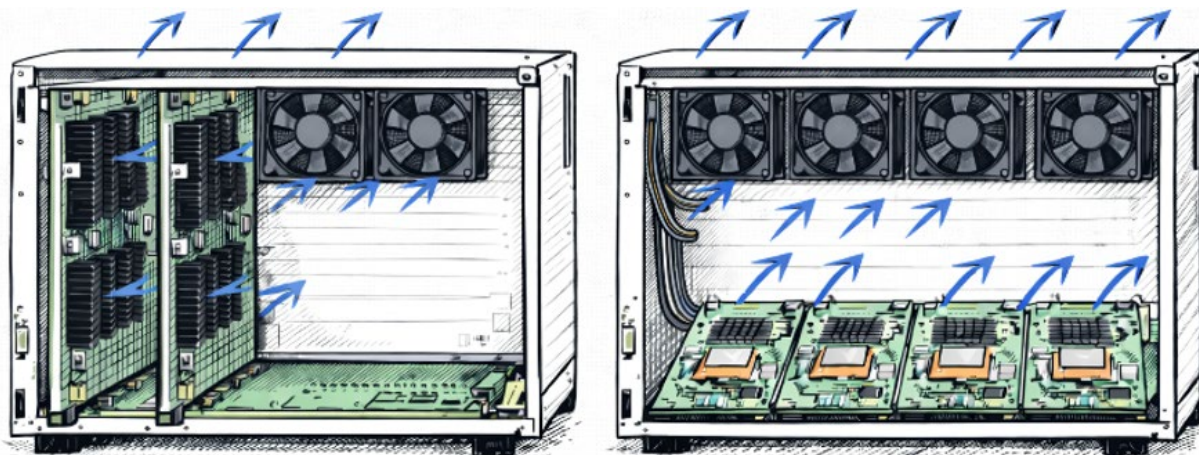
This dramatic reduction in power density and physical footprint was not merely an efficiency gain; it was the critical breakthrough that made a complete rethink of the instrument's mechanical and thermal architecture possible.

Redesigned Mechanical Platform: Enhancing Reliability and Thermal Performance

The long-term reliability and sustained performance of any precision instrument are critically dependent on its mechanical and thermal design. Heat is the enemy of electronic components, and its effective management is essential for stability and longevity.

The traditional architecture employed in instruments like the UXR 3.5 mm oscilloscopes utilized vertical acquisition cards connected to a large backplane. While standard for its era, the backplane architecture introduces a high density of mechanical interconnects — a common source of long-term reliability issues. Furthermore, the vertical card orientation creates complex and inefficient airflow paths, leading to thermal hotspots that can degrade component lifespan and measurement stability.

The XR8 introduces a completely redesigned mechanical platform that addresses these challenges head-on. It replaces the legacy card-and-backplane design with a new cable interface and a flat acquisition board layout. This modern, horizontal structure fundamentally changes the thermal dynamics of the instrument.



**Traditional Vertical Position
Acquisition Cards**

**XR8 Horizontal Position
Acquisition Cards**

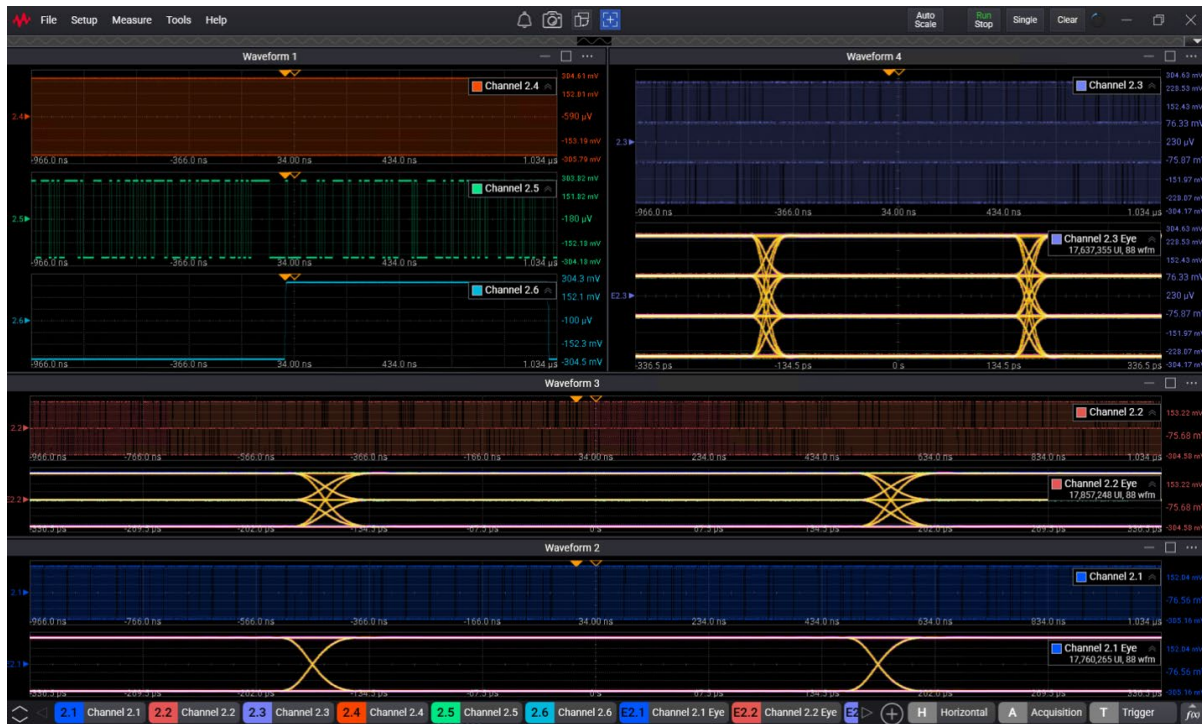
The tangible benefits of this modern structure are clear and impactful:

- **Enhanced Cooling Efficiency:** The flat, horizontal layout allows for smooth and unobstructed airflow directly across the heat-generating ASICs, leading to far more effective cooling.
- **Improved Long-Term Reliability:** By eliminating the large, multi-contact backplane, a common point of failure in complex systems, and drastically improving thermal management, the overall reliability of the instrument is enhanced.
- **Reduced Fan Noise:** More efficient cooling means the system's fans can operate at lower speeds to maintain optimal temperatures, resulting in a quieter instrument.

This intelligent mechanical design works in concert with the low-power ASICs to create a system that is not only more powerful but also more reliable and pleasant to operate.

Infiniium 2026 Software

Infiniium 2026 is the next-generation software platform for Keysight Infiniium real-time oscilloscopes, designed to maximize system performance while delivering a faster, more intuitive measurement experience. The platform leverages the instrument's internal multi-core CPU processing together with a redesigned system memory architecture that optimizes memory usage and data movement. These enhancements significantly improve processing efficiency for long records, complex measurements, and multi-channel analysis, resulting in faster responsiveness and smoother workflows.



At the software architecture level, Infiniium 2026 adopts a modernized framework aligned with the proven Keysight DCA FlexDCA baseline, ensuring a consistent user experience across sampling oscilloscopes, real-time oscilloscopes, and the Infiniium 2026 Offline application. This shared foundation enables optimized measurement engines, improved data handling, and a more intuitive, task-oriented user interface that shortens learning curves while increasing productivity.

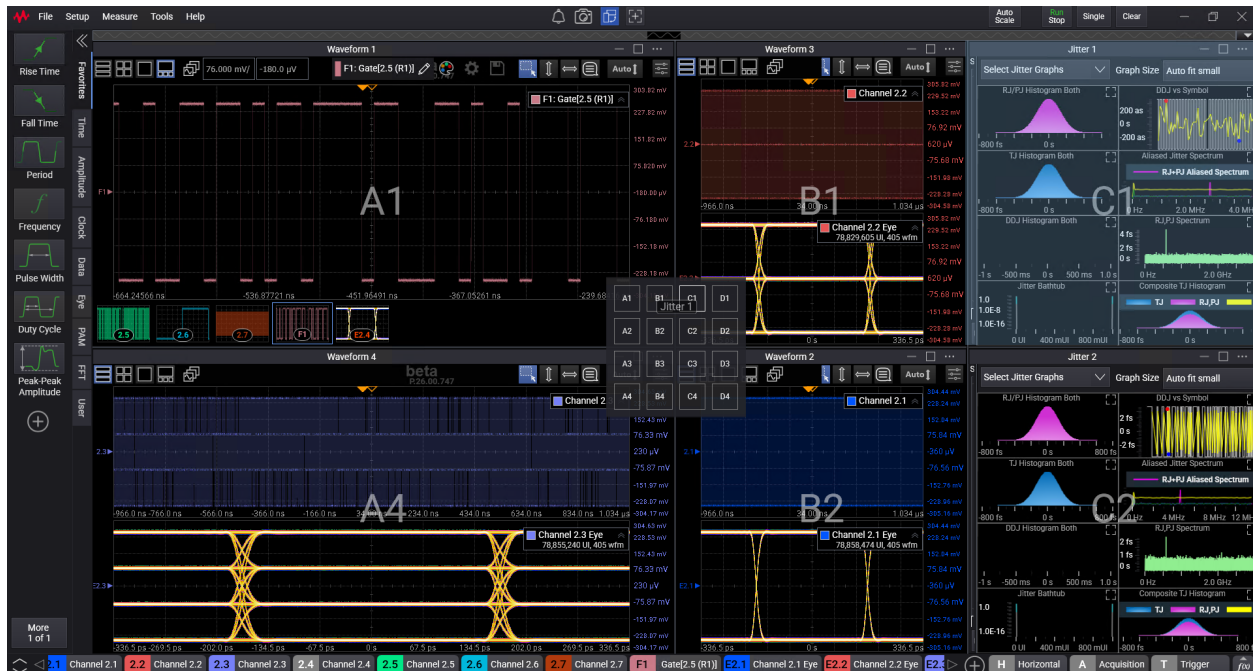
Infiniium 2026 is not just an interface update — it is a fully optimized, future-ready measurement software platform designed for the most demanding high-speed applications.

Enhanced Window and Waveform Management

Infiniium 2026 introduces a highly flexible and intuitive window and waveform management system designed to improve visual clarity and analysis efficiency for complex measurement scenarios. The display architecture allows multiple waveform windows and panels to be arranged dynamically, enabling users to correlate raw acquisitions, processed waveforms, and analysis results within a single, coherent view.

Within each waveform window, Infiniium 2026 supports multiple display modes to accommodate different analysis needs. Stacked Mode vertically stacks waveform grids for clear comparison of amplitude and timing relationships. Tiled Mode arranges waveform grids side by side, making efficient use of screen space when viewing multiple signals simultaneously. Overlapped Mode overlays multiple waveforms within a single grid, enabling direct visual comparison of signal behavior. Tab Tile Mode displays one waveform at a time while providing quick access to others through selectable tiles at the bottom of the window.

Display modes can be switched interactively using controls in the upper-left corner of each waveform window, allowing layouts to be adjusted on the fly without interrupting acquisition. Infiniium 2026 also provides a Custom Layout capability that enables users to drag and assign waveforms into one of four primary waveform windows. Across the full display, up to 16 panels can be configured and customized, offering exceptional flexibility for organizing time-domain, frequency-domain, math, and analysis views.



Together, these capabilities provide a scalable and efficient visualization environment that adapts to both simple debug tasks and advanced, multi-channel analysis workflows.

Standard Zone Qualification Trigger

At the core of Infiniium 2026 is an advanced software trigger qualification system that operates in conjunction with high-speed hardware digital edge triggering. Hardware triggers are used to efficiently capture candidate events, while software-based qualified triggers — such as measurement-qualified and zone-qualified triggers — apply additional conditions to determine whether a waveform is displayed or discarded.

Zone qualification allows users to trigger on virtually anything visible on the screen, providing a highly intuitive and visual approach to event detection. Instead of defining trigger conditions solely through numeric parameters, users can draw rectangular zones directly on the waveform display to qualify signal behavior in real time.

Infiniium 2026 supports up to eight independent zones, with each zone assigned to a specific analog channel. Each zone can be configured with a “must intersect” or “must not intersect” condition, defining whether waveform activity is required to pass through or avoid the zone. User-definable Boolean logic (AND / OR) can then be applied across multiple zones, enabling precise control over complex trigger conditions.

This flexible logic model allows users to trigger on specific bit patterns, waveform shapes, timing relationships, or signal anomalies that are difficult or impossible to describe using traditional hardware trigger settings. Zone qualification is especially effective for debugging complex digital interfaces, memory buses, and multi-signal interactions where visual correlation is critical.

By combining visual definition with logical qualification, zone qualification triggers in Infiniium 2026 provide unmatched flexibility for capturing rare, complex and intermittent signal behaviors.



Measurement-Driven Trigger Qualification

Measurement qualified triggers enable waveform capture based on measured parameters rather than signal shape alone. By evaluating measurement results against user-defined limits, these triggers allow conditions that cannot be implemented using hardware triggering. For example, a measurement qualified trigger can be configured to capture events where duty cycle is less than 30% or greater than 70%.

In this trigger mode, the oscilloscope's hardware trigger first initiates a waveform acquisition. Infiniium 2026 then performs the specified measurement across the acquired waveform and evaluates the results against the defined criteria. If any measured value satisfies the trigger condition—falling inside or outside the specified limits — the trigger event is declared valid and the waveform is displayed. If no measured values meet the criteria, the acquisition is discarded.

Only waveforms for which the measurement falls outside the specified limits are displayed. Measurement results and statistics are therefore calculated exclusively from these qualifying waveforms. The accompanying measurement histogram provides visual confirmation that only out-of-range measurement values are included in the results and statistical analysis, ensuring clarity and confidence in the measurement outcome.

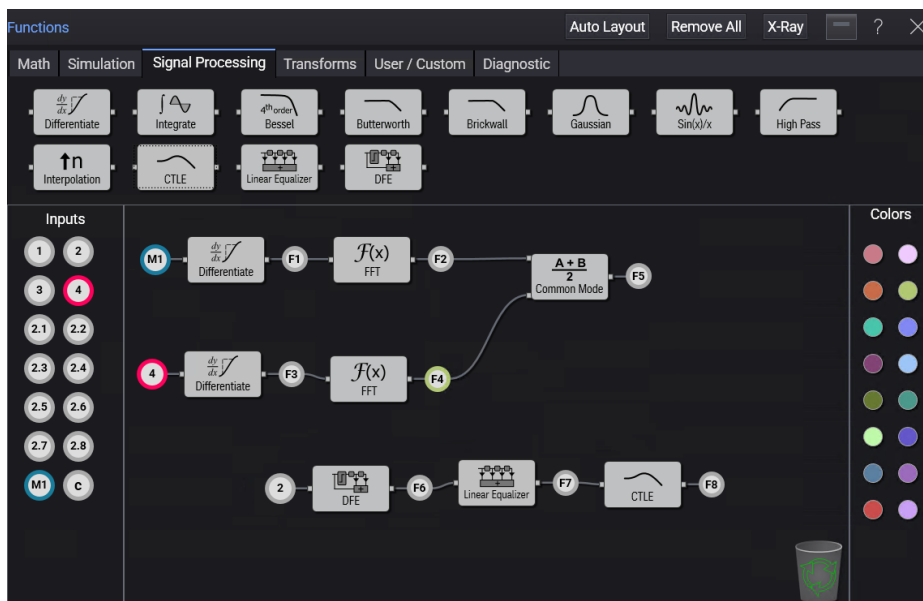


Function-Centric Analysis and Processing Model

Infiniium 2026 also introduces a streamlined functional model in which advanced analysis, signal processing, simulation, equalization, and de-embedding capabilities are implemented as operators under the Functions framework. With intuitive access through the Functions dialog, users can easily apply, chain, and configure these operators directly on measured waveforms.

Users can create up to 64 math function waveforms, each displayed and treated like any acquired waveform on the screen. Function waveforms fully support measurements, histograms, markers, and mask testing, allowing processed signals to be analyzed with the same rigor as raw acquisitions.

Functions are constructed by simply dragging operators and inputs into the operator palette, enabling rapid creation of complex processing chains without scripting. Inputs may include analog channels, differential channels, memory waveforms, existing function results, or constant values. Each operator generates an output function, which can be displayed by assigning a Function Color icon, giving users precise control over waveform visibility and layout.

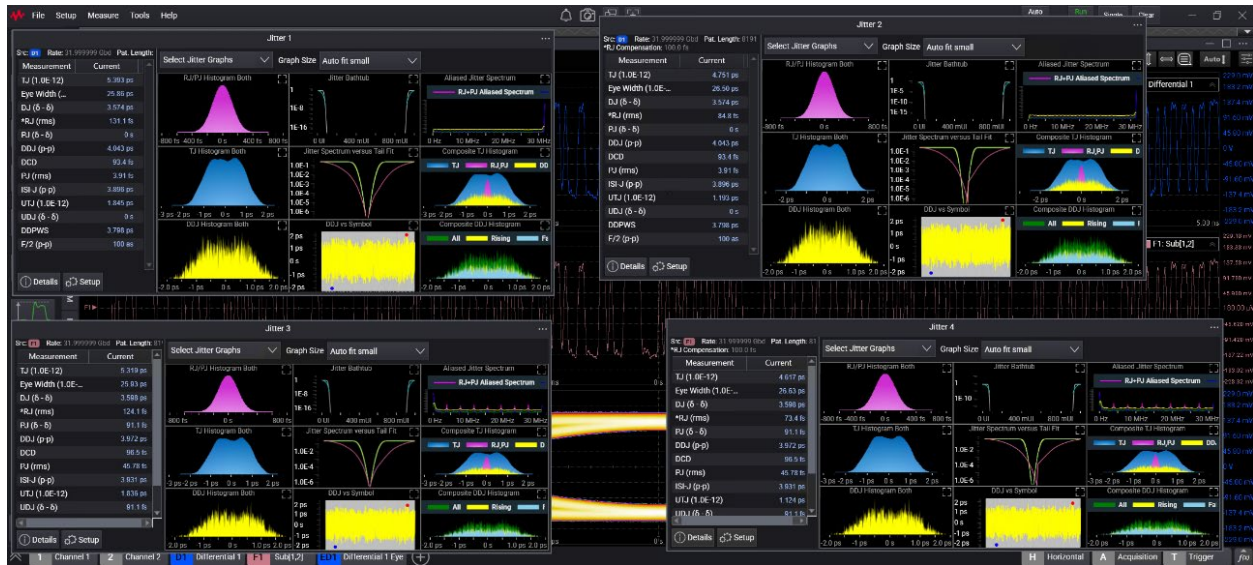


Infiniium 2026 organizes operators into five key categories: Basic Math Operators, Simulation Operators, Signal Processing Operators, Transform Operators, and User/Customer Operators. Simulation operators compensate for test-setup effects by applying or removing S-parameter-based channel characteristics, such as cable insertion loss. Signal Processing operators include standard filters (Bessel, Butterworth, Gaussian), as well as equalization functions such as CTLE, FFE, and DFE. Transform operators, including FFT, enable seamless transition between time-domain and frequency-domain analysis. (D9320ASIA is needed to enable full Signal Processing & Simulation operators including de-embedding and equalization)

This function-centric design makes advanced analysis accessible, modular, and fully integrated within the Infiniium 2026 measurement environment.

Advanced Jitter and Noise Analysis (D9320JITA)

Infiniium 2026 delivers a comprehensive and highly configurable jitter and noise analysis framework designed for detailed characterization of high-speed digital signals. The Jitter Measurement Setup supports simultaneous analysis of up to four waveforms, with independent configuration for each source, enabling efficient multi-lane and correlation studies. Jitter and noise analysis are organized into dedicated Jitter, Noise, and Advanced setup tabs, providing fine-grained control over measurement methodology and statistical modeling.



Jitter analysis supports TIE (phase), Period, and N-Unit Interval (N-UI) measurement modes, with optional DDR-specific handling when explicit clock recovery is used. Advanced clock recovery alignment and clock delay controls allow precise selection of the eye location used for jitter evaluation, ensuring consistent alignment between eye diagrams, TIE data, and jitter results. Measurements can be performed on rising edges, falling edges, or both, supporting single-edge clocks as well as double data rate signaling.

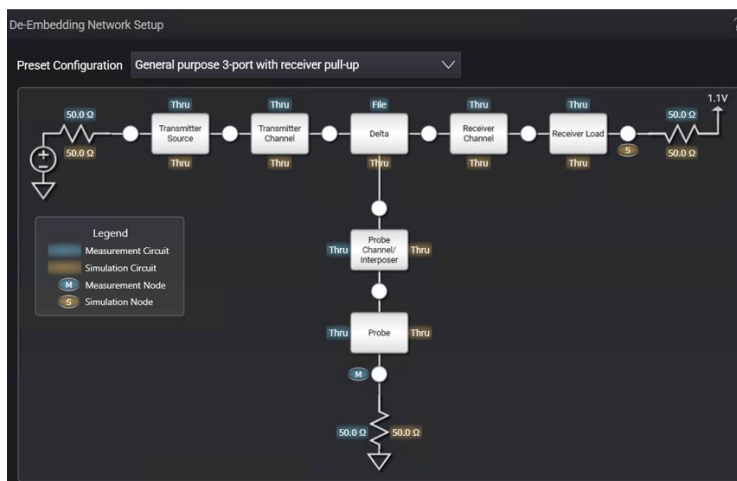
Infiniium 2026 applies spectral decomposition techniques to separate Random Jitter (RJ) from Periodic Jitter (PJ), with user-selectable RJ bandwidth models to accommodate both flat and non-flat noise spectra. A similar approach is used for noise analysis, separating Random Noise (RN) from Periodic Interference (PI) and allowing measurement at user-defined locations within the unit interval. To improve accuracy when known contributors exist, Infiniium 2026 provides RJ/RN compensation controls. Users can remove calibrated oscilloscope noise or subtract custom, user-defined jitter and noise values from the results. When compensation is applied, the amount of correction is clearly indicated in the results, ensuring transparency and confidence in the reported measurements.

Simulation Operators for Channel Modeling and De-Embedding (D9320ASIA)

Infiniium 2026 extends its Function framework with powerful simulation operators that allow users to accurately render waveforms at virtually any point within a digital serial link. These operators provide a flexible and efficient way to model real-world measurement setups, remove unwanted channel effects, and evaluate system behavior without physically modifying the test configuration. By operating directly on measured waveforms, simulation operators transform data to reflect conditions that are otherwise difficult or impractical to access.

Simulation operators are commonly used for de-embedding, where the effects of lossy cables, probes, fixtures, or interconnects are removed from the measurement. Conversely, they can also be used to insert channel models, enabling users to simulate how a waveform would appear after passing through a specific cable or interconnect. This capability allows engineers to view waveforms in physically unreachable or hypothetical locations, compensate for probe loading, or replace one channel element with another.

Infiniium 2026 supports high-precision 2-port and 4-port de-embedding operators, enabling accurate modeling of complex systems involving transmitters, receivers, and multi-port channels. Each simulation setup defines two circuits: a measurement circuit, representing the actual physical test setup, and a simulation circuit, representing the desired or idealized configuration. By relating the transfer functions of these two circuits, the software computes an overall transfer function that maps the measured waveform to the simulated environment.

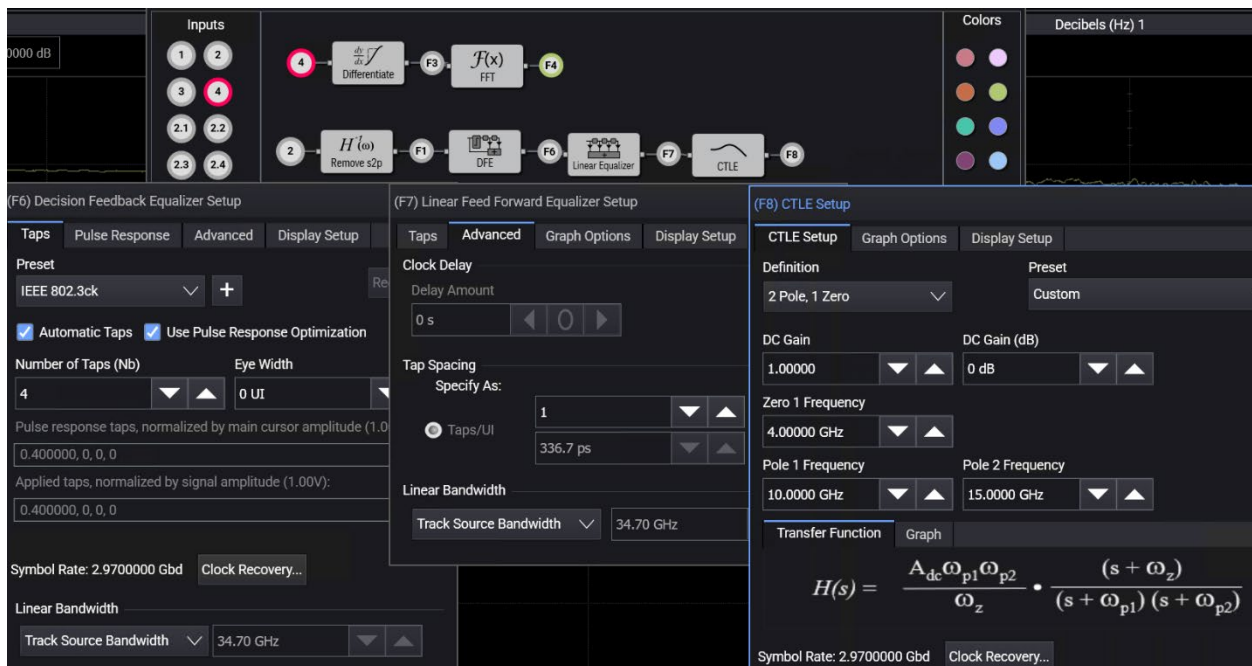


This operator-based approach makes advanced channel modeling fast, transparent, and fully integrated within the real-time oscilloscope workflow.

Serial Data Equalization (D9320ASIA)

As data rates continue to increase and channel lengths grow, equalization has become essential for maintaining signal integrity in high-speed digital systems. Lossy backplanes, connectors, and interconnects introduce frequency-dependent attenuation that reduces eye opening at the receiver, making reliable data recovery increasingly difficult. Infiniium 2026 addresses these challenges through a powerful Serial Data Equalization (SDE) capability that is tightly integrated into the platform's Function and operator framework.

Leveraging the Infiniium XR8's inherently low noise floor and robust clock-recovery algorithms, the SDE software provides accurate emulation of Continuous-Time Linear Equalization (CTLE), Linear Feed-Forward Equalization (FFE), and Decision Feedback Equalization (DFE) directly on measured waveforms. These equalization functions are implemented as operators, allowing users to easily insert, configure, and chain them as part of a complete signal-processing flow. Engineers can model receiver behavior, study equalization tradeoffs, and evaluate system margin without relying on external simulation tools.

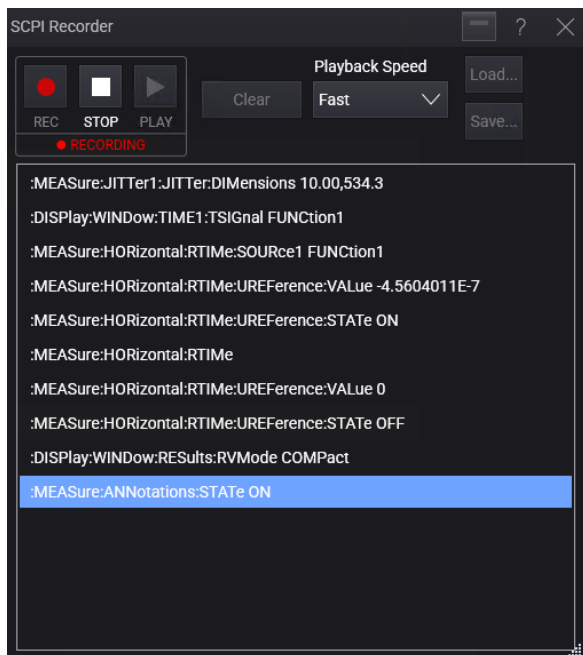


The flexible operator-based architecture allows equalization to be combined with de-embedding and channel modeling, enabling waveforms to be rendered at virtually any point in the serial link. Users can remove unwanted channel elements, compensate for probe loading, insert channel models, or examine signals at locations that are otherwise inaccessible. With support for cascading up to 64 equalization operators, Infiniium 2026 can represent even highly complex receiver architectures, including adaptive DFE with user-configurable tap values. This capability makes Infiniium 2026 a powerful and practical platform for serial link design, debug, and validation.

Integrated SCPI Recorder for Rapid Automation

Infiniium 2026 includes an integrated SCPI Recorder that significantly simplifies automation and ensures consistent, repeatable test execution. The SCPI Recorder allows users to quickly discover, record, and learn the SCPI commands required to perform nearly any oscilloscope operation, bridging the gap between interactive use and automated control.

By clicking REC, the SCPI Recorder captures most instrument setting changes made through the user interface, including acquisition configuration, measurement setup, and even waveform window layout and sizing adjustments. Each action is automatically translated into the corresponding SCPI remote-programming command and recorded sequentially in the recorder window. The recorded command set can be played back immediately, saved as a reusable macro, or exported for use in external automation scripts, enabling fast and repeatable test setup.



This capability is especially valuable for daily or repetitive test workflows, where the same measurement setup must be applied consistently across multiple sessions or instruments. Recorded scripts can be replayed after retuning an instrument, restoring a known-good configuration, or applying identical settings to a second device, reducing setup time and minimizing human error. For enhanced usability, recorded SCPI scripts can also be assigned to the oscilloscope's front-panel Multi-Purpose button, enabling one-touch execution of complex test sequences.

By enabling rapid script creation, repeatable configuration, and seamless transition from manual operation to automation, the SCPI Recorder in Infiniium 2026 helps users improve test efficiency, consistency, and confidence in measurement results.

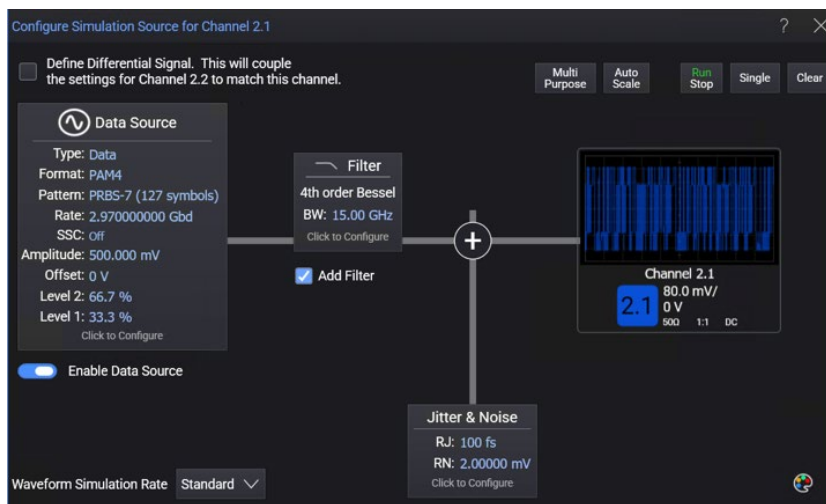
Built-In Waveform Simulation

Infiniium 2026 includes a powerful waveform simulation capability that allows users to generate realistic, fully configurable signals without requiring physical hardware. Simulated instruments support a wide range of waveform types, including data, clock, function, DC, and waveforms loaded from file, enabling flexible use across debug, development, and validation workflows. Users can configure key parameters such as symbol rate, amplitude, offset, and waveform format, and can even load previously saved HDF5 (.h5) waveform files to replay or analyze signals captured on the same or a different instrument.

For data waveforms, Infiniium 2026 supports common serial formats including NRZ, PAM3, PAM4, and PAM6, with selectable patterns such as PRBS sequences. Built-in filtering allows users to realistically model source bandwidth limitations using standard filter responses, including Bessel, Butterworth, Gaussian, $\sin(x)/x$, and high-pass filters, with user-defined cutoff frequencies.

Waveform realism is further enhanced through configurable jitter and noise injection, including random jitter, random noise, and F/2 periodic jitter. Bandwidth-limited jitter modeling ensures accurate jitter levels while maintaining spectral fidelity. For differential signals, resultant differential jitter and noise values are automatically calculated and displayed.

Waveform simulation in Infiniium 2026 is widely used for education and training, developing and testing automation scripts, comparing design targets to measured performance, and replaying previously captured waveforms. By integrating simulation directly into the measurement environment, Infiniium 2026 enables efficient analysis even when hardware is unavailable.



Precision and Efficiency: The Infiniium 2026 SCPI Advantage

The transition to Infiniium 2026 introduces a modernized SCPI command architecture designed to deliver higher precision, improved efficiency, and a more natural fit for today's automation workflows. At the core of this evolution is a fine-grained command mapping model that closely mirrors user interaction with the instrument. Instead of using broad SCPI commands that modify multiple settings at once, Infiniium 2026 maps individual Graphical User Interface (GUI) actions directly to dedicated SCPI commands. This one-to-one relationship removes ambiguity and ensures that remote scripts reproduce manual operation with exceptional fidelity.

This granular command structure directly enables the powerful SCPI Recorder built into Infiniium 2026. Users can simply configure the oscilloscope through the GUI while the recorder captures the exact SCPI commands required, including automatically inserted synchronization queries such as `*OPC?`. Recorded sequences can be replayed, saved as macros, or exported into automation scripts, dramatically reducing development time and eliminating guesswork when creating complex test setups.

Infiniium 2026 also improves automation efficiency through enhanced waveform data handling. Standardized support for 32-bit floating-point waveform transfers provides ample precision for advanced signal analysis while significantly reducing data size compared to double-precision formats. This optimization accelerates data movement from deep memory acquisitions to external analysis environments such as MATLAB or Python-based tools.

Debugging and script robustness are further enhanced with improved system error reporting. The updated `:SYSTem:ERRor?` query supports a diagnostic mode that identifies exactly which command caused a fault. This capability reduces the need for excessive error polling, enabling faster and more efficient test execution.



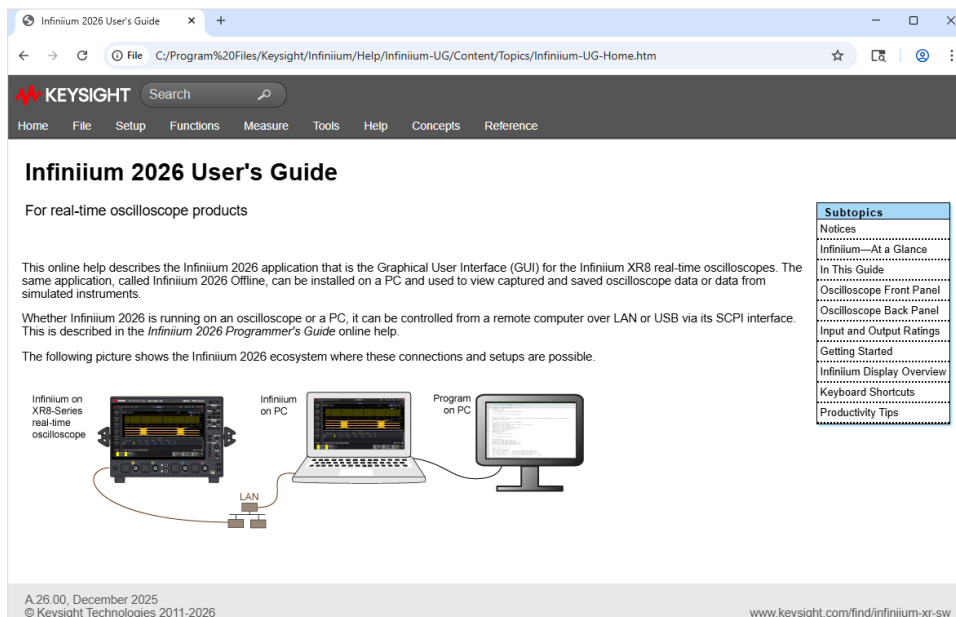
Together, these SCPI enhancements make Infiniium 2026 a strong foundation for scalable, reliable, and high-performance automated measurement systems.

Modernized User Guide, Programming Guide, and SCPI Migration Resources

Infiniium 2026 introduces a significantly enhanced documentation experience designed to support faster learning, easier navigation, and more efficient development. The User Guide, Programming Guide, and SCPI Command Migration Guide are all delivered as web-based resources, allowing users to access them directly through any standard browser without installing additional software. This approach ensures that documentation is always available, easy to update, and aligned with the latest software capabilities.

The web-based User Guide is organized to closely reflect the Infiniium 2026 graphical user interface and workflow. Topics are structured around practical tasks and features — such as acquisition setup, Functions, qualified triggers, jitter and noise analysis, waveform simulation, and automation — making it easier for users to find relevant information without navigating large static manuals. Integrated cross-links allow readers to quickly move between related concepts, UI descriptions, and measurement theory.

The Programming Guide provides clear, example-driven guidance for SCPI-based automation, including command syntax, usage patterns, and common programming scenarios. Searchable content and code examples accelerate script development and reduce time spent locating specific commands or parameters. For users transitioning from earlier Infiniium software versions, the SCPI Command Migration Guide plays a critical role. It highlights command changes, replacements, and recommended best practices, helping developers update existing automation scripts with confidence and minimal disruption.



Together, these web-based guides create a cohesive, accessible documentation ecosystem that supports both interactive users and automation engineers. By making information easier to search, read, and apply, Infiniium 2026 reduces ramp-up time and improves productivity across the entire measurement workflow.

Industry's Most Advanced and Flexible Probing System

To fully leverage the performance of a high-bandwidth oscilloscope such as Infiniium XR8, the front-end measurement chain — probing and termination — must be designed to preserve signal integrity while enabling fast, repeatable test workflows. Keysight's InfiniiMax probing solutions and active termination adapters are purpose-built to complement XR8's ultra-low noise, low intrinsic jitter, and high-speed processing architecture.

Together, they form a complete measurement ecosystem that minimizes loading, reduces uncertainty, and significantly improves test efficiency for modern high-speed serial interfaces.

InfiniiMax Ultra RC: Ultra-Low Loading for High-Speed Nodes

InfiniiMax Ultra RC probes deliver up to 25 GHz bandwidth using an RC input impedance profile, providing extremely low mid-band loading — critical for today's low-swing, high-speed transmitter and interconnect measurements. By reducing resistive loading in the frequency range that most impacts eye height and jitter, Ultra RC probes allow XR8 to capture a more faithful representation of the DUT signal.



Key capabilities include:

- RC input impedance for minimal DUT impact and improved eye margin
- Support for InfiniiMode operation and user-defined AC calibration
- Enhanced accuracy through S-parameter-based probe characterization
- Micro and socketed probe heads for high-density ICs and fine-pitch layouts

With three attenuation ranges (1:1, 4:1, and 8:1), InfiniiMax Ultra RC probes automatically optimize dynamic range — supporting 600 mVpp, 2.5 Vpp, and 5 Vpp inputs while maintaining excellent noise performance and maximum usable bandwidth. This flexibility reduces re-measurement and speeds up debug and compliance validation.

InfiniiMax 4 RCRC: Ultra-High Bandwidth with Exceptionally Accuracy

The InfiniiMax 4 series probing system represents a major advancement in high-bandwidth probing, delivering unparalleled signal fidelity and accuracy with bandwidths up to 52 GHz, while maintaining exceptionally accuracy on the device under test. Built on Keysight-proprietary Indium Phosphide (InP) IC process technology and advanced mechanical design, InfiniiMax 4 is meticulously engineered to meet the demands of next-generation high-speed digital systems.

When paired with Infiniium XR8, InfiniiMax 4 RCRC probes provide a powerful combination of extreme bandwidth, and fast measurement throughput, accelerating debug, improving test efficiency, and increasing confidence in system-level performance.



Active Termination Adapters: Simplifying Setup and Improving Repeatability

For transmitter testing and compliance workflows that require precise termination and bias control, N7010A, N7011A, and N7012A active termination adapters complete the XR8 front-end measurement chain. These adapters provide 50 Ω active termination with user-defined DC bias (VTERM) directly at the oscilloscope input, eliminating the need for external bias tees, cables, and adapters.

Key advantages include:

- Cleaner signal paths with fewer interconnects and reduced loss
- Faster setup and configuration, improving overall test efficiency
- More repeatable jitter and noise measurements across test runs
- Greater flexibility for transmitter validation under real operating conditions

By integrating termination and biasing at the instrument input, active termination adapters help XR8 achieve faster, more consistent results — particularly in compliance and production-oriented environments.



Compliance Applications

D9350USBC USB4v2 Transmitter Compliance Test

The Keysight Technologies, Inc. USB4® Version 2.0 Transmitter Test Software, when paired with the Infiniium XR8 oscilloscope platform, delivers a faster and more efficient path to USB 80 Gbps compliance, debug, and characterization.

Built on the USB4 Version 2.0 Compliance Test Specification (CTS) and SigTest defined by USB-IF, the D9350USBC application leverages XR8's ultra-low noise front end, high-performance 12-bit digitizer, and accelerated processing architecture to significantly reduce test time while improving measurement confidence. The result is quicker bring-up, faster compliance decisions, and higher overall lab productivity.

Key benefits with XR8

- Improved test efficiency with faster acquisitions, reduced re-runs, and streamlined setup using XR8's integrated hardware-software architecture
- Up to multi-times faster test execution compared to previous platforms, accelerating compliance validation and debug cycles
- Optimized for 25.6 GBaud PAM-3 signaling with superior signal integrity margin enabled by XR8's low intrinsic jitter and noise
- Guided setup wizard for rapid configuration and test selection, minimizing operator error
- Fully automated test execution for repeatable, hands-free measurements
- Comprehensive compliance reporting, including multi-trial statistics and worst-case results for every measurement

Together, XR8 and D9350USBC transform USB4 v2.0 testing from a time-consuming requirement into a fast, repeatable, and high-confidence workflow—helping teams move from validation to production sooner.



USB4 and USB 3.2 Transmitter Compliance

The Keysight XR8 Series oscilloscope supports comprehensive USB4 and USB 3.2 transmitter testing through dedicated software applications aligned with the Compliance Test Specifications defined by the USB-IF. These solutions provide automated, standards-based validation to ensure accurate and repeatable compliance results.

The applications execute required CTS measurements with integrated SigTest-based analysis and generate detailed reports that include margin analysis, enabling engineers to assess both pass/fail status and available design headroom. A guided setup wizard simplifies hardware configuration and test selection, reducing setup time and minimizing user error.

Beyond compliance, the built-in Characterization Mode extends capability for advanced debug and performance optimization. Engineers can embed custom loss channels, apply user-defined equalization, and explore performance limits beyond standard requirements. A flexible configuration menu also allows adjustment of LFPS levels and jitter conditions to match specific validation scenarios.

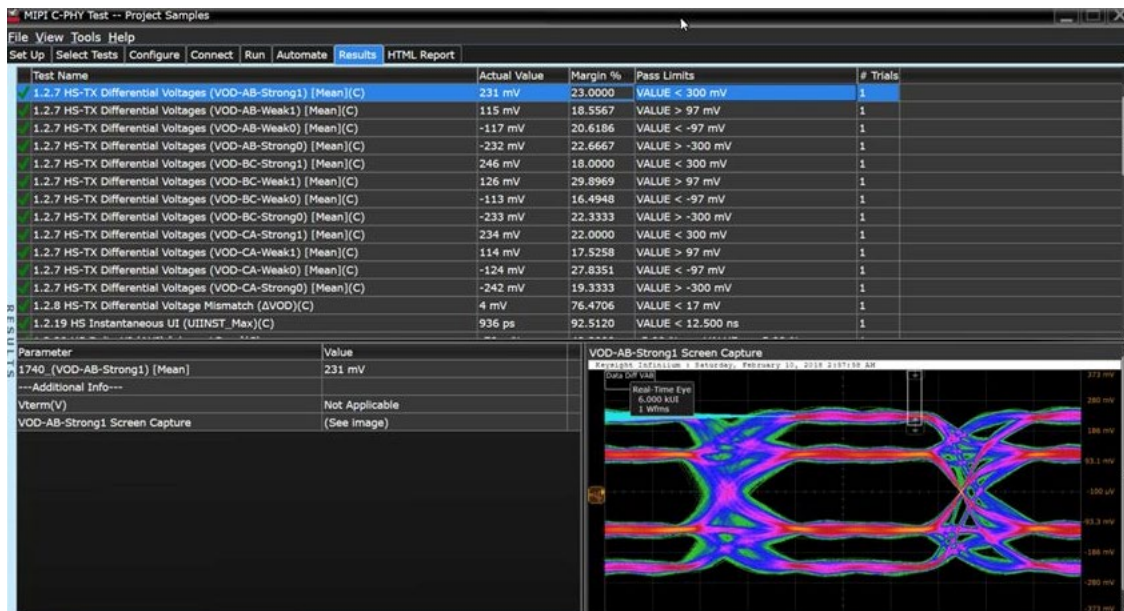
When combined with XR8's ultra-low intrinsic jitter, low noise floor, and high-resolution 12-bit acquisition architecture, these USB test applications deliver improved test efficiency and faster execution, helping accelerate bring-up, validation, and time to production for next-generation USB designs.

Model	
D9350USBC	USB 3.2 5 Gbps and 10 Gbps TX compliance test software
D9340USBC	USB 4 TX test software
D9320USBC	USB 4v2 80 Gbps TX test software
SW30USBH	USB High Speed Validation Subscription Suite (USB3.2/USB4.0/USB4.2)

MIPI C-PHY Compliance Solution

The Keysight MIPI C-PHY Compliance Test Solution for XR8 oscilloscopes provides a fast, automated, and standards-aligned validation workflow for verifying transmitter electrical performance against the latest MIPI C-PHY specifications. Built on the next-generation Infiniium 2026 software platform, the solution leverages XR8's enhanced signal integrity architecture and accelerated processing engine to deliver accurate, repeatable compliance measurements with significantly reduced test time.

Designed for engineers developing high-speed camera, display, and mobile interface chipsets and systems, the solution simplifies complex tri-level signaling analysis with guided automation and flexible debug visibility—enabling faster validation from early bring-up through final compliance submission.



- Automated compliance workflow
- Superior signal integrity measurement confidence
- Accelerated validation throughput
- Integrated debug insight beyond compliance

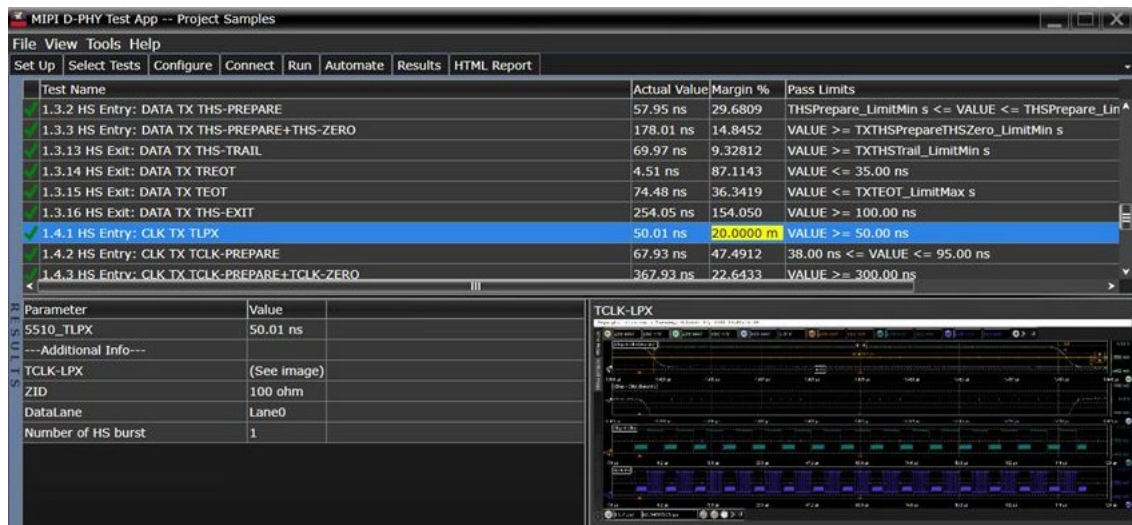
Together, XR8 hardware performance and automated compliance software enable engineers to validate C-PHY transmitters faster, with higher confidence, and reduced workflow complexity across mobile and embedded interface designs.

MIPI D-PHY Compliance Solution

The Keysight MIPI D-PHY Compliance Test Solution for XR8 oscilloscopes delivers a complete automated validation environment for transmitter electrical compliance across high-speed and low-power signaling modes defined in the latest MIPI D-PHY specifications. Running on the advanced Infiniium 2026 software platform, the solution combines XR8's improved acquisition fidelity and accelerated analysis performance to streamline compliance verification from early characterization through certification readiness.

Engineers working on mobile processors, sensors, displays, and embedded platforms benefit from a guided measurement workflow that simplifies setup complexity while ensuring consistent and standards-aligned test coverage.

- Comprehensive automated compliance coverage: Supports both HS and LP transmitter testing with standards-aligned execution, automatic pass/fail evaluation, and report generation for faster certification readiness.
- Higher measurement confidence with XR8 signal integrity: Ultra-low noise acquisition and high-resolution architecture improve eye accuracy, timing precision, and reliable amplitude and transition characterization.
- Accelerated compliance test throughput: Parallel analysis engines and the optimized Infiniium 2026 software platform significantly reduce validation time across multiple test cases.
- Efficient debug-to-compliance workflow integration: Integrated eye visualization and transition timing analysis enable quick margin insight and flexible waveform exploration for rapid root-cause identification.



With XR8's next-generation architecture and automated compliance software integration, engineers can confidently validate MIPI D-PHY transmitter performance faster and more efficiently, accelerating product readiness for mobile and high-speed embedded applications.

Comprehensive High-Speed Compliance Validation with XR8 Oscilloscopes

The Keysight XR8 real-time oscilloscope compliance application portfolio provides a scalable and automated transmitter validation solution across today's most critical high-speed digital interface standards, including DDR5, LPDDR5, LPDDR6, USB 3.2, USB4, USB4v2, DisplayPort UHBR, and MIPI C-PHY / D-PHY technologies. Built on the next-generation Infiniium 2026 software platform, XR8 combines advanced signal integrity performance with automated compliance workflows to simplify validation from early silicon bring-up through final certification readiness.

As next-generation interfaces continue pushing higher data rates and tighter timing margins, accurate transmitter characterization becomes increasingly challenging. XR8 addresses these challenges with ultra-low noise acquisition, high-resolution architecture, and accelerated multi-engine analysis that improves measurement confidence while significantly reducing validation time. Engineers can execute standards-aligned compliance measurements with guided workflows, automatic pass/fail evaluation, and report generation — enabling faster iteration cycles across memory, mobile, display, and high-speed serial interface designs.

For advanced memory technologies such as DDR5 and LPDDR6, XR8 supports automated transmitter validation workflows designed for tight-margin timing environments and trained link behavior. For next-generation display systems, the DisplayPort UHBR compliance solution enables accurate validation at UHBR10, UHBR13.5, and UHBR20 data rates with flexible lane-level automation and integrated debug visibility. Together with USB and MIPI interface compliance coverage, XR8 serves as a unified platform supporting validation across multiple subsystems within modern high-performance designs.

Additional compliance applications and expanded standards coverage will be introduced in future software releases. Please contact your local Keysight representative for the latest roadmap updates and availability details.

Model	
D9350USBC	USB 3.2 5 Gbps and 10 Gbps TX compliance test software
D9340USBC	USB 4 TX test software
D9320USBC	USB 4v2 80 Gbps TX test software
D9350DDRC	DDR5 TX compliance test software
D9350LDDC	LPDDR5 TX compliance test software
D9360LDDC	LPDDR6 TX compliance test software
D9330DPHC	DisplayPort UHBR TX test software (25 GHz +)
D9310CPHC	MIPI C-PHY TX compliance test software
D9330DPHC	MIPI D-PHY TX compliance test software
SW30USBH	USB High Speed Validation Subscription Suite (USB3.2/USB4.0/USB4.2)
SW30DDRV	DDR Validation Suite
SW30LDDR	LPDDR Validation Suite (LPDDR5/LPDDR6)
SW30DSPP	DisplayPort Validation Suite

XR8 Oscilloscope Platform — Next-Generation Architecture for High-Speed Signal Validation

The Keysight XR8 real-time oscilloscope platform represents the next generation of high-performance signal integrity measurement, designed to address the increasing complexity of today's digital application, next-generation memory, and advanced mobile and display interfaces. Built on a brand-new architecture combining Keysight's latest custom front-end ASIC technology and a redesigned high-resolution digital processing engine, XR8 delivers improved measurement fidelity, faster analysis performance, and a streamlined workflow optimized for modern compliance and debug environments.

At the hardware level, XR8 introduces enhanced low-noise acquisition performance and optimized signal path design that preserves waveform integrity from probe tip to display. This architecture enables more accurate eye measurements, improved timing precision, and higher confidence characterization of small-signal effects that directly impact transmitter validation and receiver margin analysis. Compact system integration and improved thermal and power efficiency further support scalable deployment across lab and validation environments.

On the software side, XR8 runs on the next-generation Infiniium 2026 platform, providing a faster and more responsive user experience with accelerated compliance execution and improved workflow automation. Multi-engine parallel processing significantly reduces validation time across complex measurement suites such as DDR5/LPDDR6, USB4 v2, DisplayPort UHBR, and MIPI interfaces. Integrated visualization tools support seamless transitions between debug and compliance workflows, enabling engineers to quickly identify root-cause issues and validate performance margins.



Together, XR8's new hardware architecture and software baseline create a unified measurement platform that improves signal integrity confidence, accelerates validation cycles, and prepares engineering teams for emerging high-speed interface challenges.

More Information

Keysight Infiniium XR8 oscilloscopes establish a new class of real-time oscilloscopes, combining high signal integrity with a compact, efficient platform. With bandwidth options spanning multiple performance tiers, the XR8 platform is designed to deliver accurate, low-noise measurements for today's high-speed applications while providing a scalable path for future technology needs.

Built on Keysight's proprietary front-end ASIC technology and a next-generation 12-bit ADC plus DSP digital engine, the Infiniium XR8 delivers exceptional measurement fidelity, low noise performance, and precise waveform representation. Advanced software capabilities, flexible analysis features, and modern architecture allow engineers to confidently characterize high-speed digital, power, and mixed-signal designs.

Invest with confidence today, knowing the XR8 platform is engineered for long-term value, performance scalability, and evolving measurement requirements. For more information on the Infiniium XR8 oscilloscopes, please refer to the following resources:

- [XR8 Datasheet](#)
- [XR8 Configuration Guide](#)

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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