DATA SHEET

Infiniium EXR-Series

Powerful. Easy to Own. Intuitive to Use.

KEYSIGHT TECHNOLOGIES

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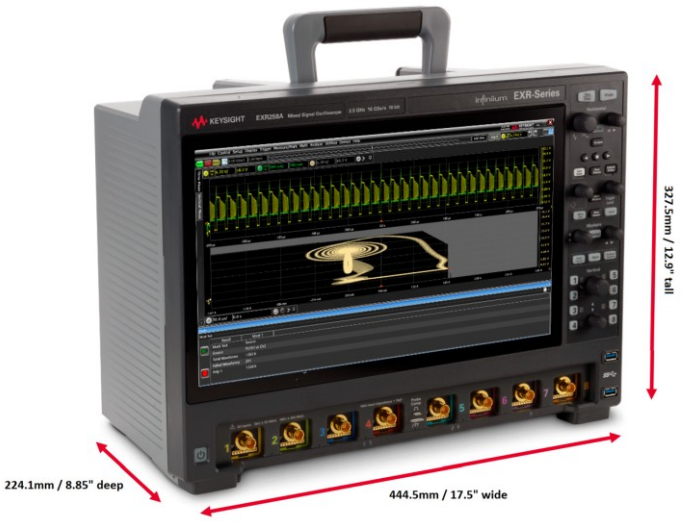
Meet the Infiniium EXR-Series

Welcome to your all-new Infiniium EXR-Series. With eight models ranging in performance from 500 MHz to 2.5 GHz, 4 or 8 analog channels, and dozens of hardware and software options, your Infiniium EXR-Series is powerful, easy to own, and intuitive to use.

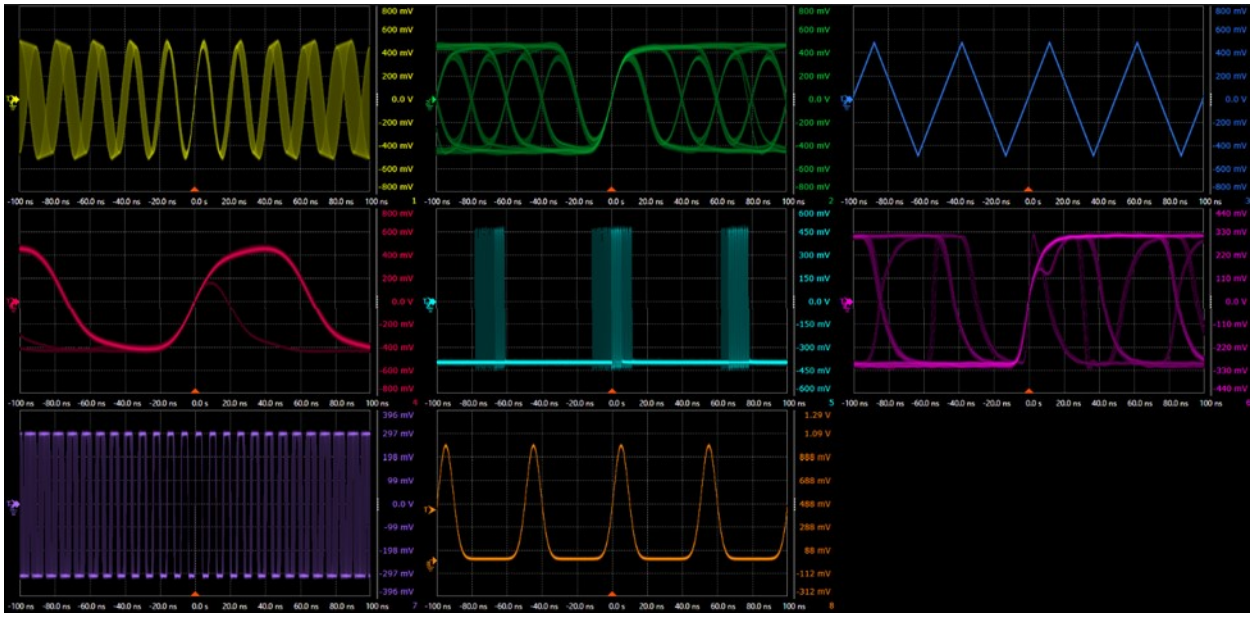


Infiniium MXR-Series Specifications	
Analog channels	4 or 8, *upgradeable*
Bandwidth	500 MHz to 2.5 GHz, *upgradeable*
Sample rate	16 GSa/s on every channel
Memory	100 Mpts, upgradeable to 400 Mpts or new 1.6 Gpts flexible memory [1]
Resolution	10 bits, up to 16 with high resolution
Digital logic channels	16, dedicated input, *upgradeable*
Update rate	> 200,000 wfm/s
Screen display	15.6” touch, full HD, dual screen support

1. See data sheet spec tables to learn more about the all-new 1.6 Gpts combined flexible memory option.

Model numbers	4 Channels	8 Channels
500 MHz	EXR054A	EXR058A
1 GHz	EXR104A	EXR108A
2 GHz	EXR204A	EXR208A
2.5 GHz	EXR254A	EXR258A

Integrated Tools	Option
16 digital channels	EXR2MSO
50 MHz waveform generator	EXR2WAV
4-digit DVM, 10-digit counters	Standard
Protocol analysis	Various
Bode plotter	Included with D9010PWRA or EXR2WAV



See More in the Time Domain with Eight Analog Channels

The Infiniium EXR-Series offers up to 2.5 GHz bandwidth and 16 GSa/s sample rate on every single one of its four or eight channels. Combined with 100 Mpts of standard memory per channel, flexible three-stage triggering, over 50 standard measurements, a massive library of application specific packages, and ASIC-accelerated testing, the Infiniium EXR-Series lets you see more of your signal than ever before.

See More with World-Class Signal Integrity

Each model incorporates a 10-bit ADC with a sample rate of 16 GSa/s available on all channels simultaneously. A high-resolution ADC's usefulness is dependent on the low-noise front end that supports the additional quantization levels. Our low noise front end includes custom ICs, like the 130 nm BiCMOS IC that incorporates user-selectable analog filters and bandwidth upgrades via a software license. This gives you:

- Four times more vertical resolution than 8-bit oscilloscopes
- Up to 16 bits with high-res mode
- As low as 43 µV of noise, 9.0 bits system ENOB with hardware filtering

See More Information with History Mode and Segmented Memory

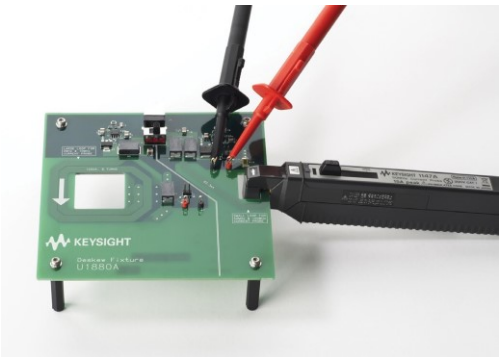
Your Infiniium EXR-Series comes standard with two useful tools that allow you to look forward and backward in time. With history mode, simply stop the oscilloscope at any time to review up to 1,024 previous trigger events. With segmented memory, you can capture >100,000 events post-trigger for analysis, with no limit between events. If your design has an elusive event that only seems to happen when you're not around, these tools can help you arm the oscilloscope to look for it, then let you review what gets captured at your leisure. And with a full HD screen of 1920x1080 pixels, and support for a second, independent external monitor, that data can be organized and displayed however is best for you.

Powerful Measurement Capabilities

Switch Mode Supplies – D9010PWRA

The Power Measurements Software Package enables a broad range of automated power supply characterization measurements on your EXR-Series oscilloscopes including unique frequency response analysis for performing control loop response and power supply rejection ratio (PSRR) measurements.

While designed to measure the rigorous operating parameters of switched mode power supplies, the measurements can also be used as a toolkit of measurements for any power converter and/or inverter. These measurements provide an ideal method to document the performance parameter of your power system. Each measurement has a Setup Wizard that makes setup of connections and analysis as simple as possible. Check the D9010PWRA data sheet for descriptions of each of the measurements outlined in the table below.

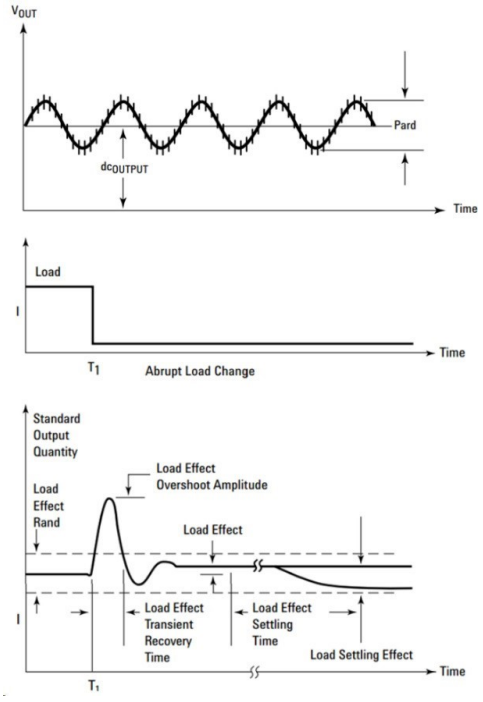


The Keysight U1880A allows you to quickly deskew your voltage and current probes, enabling accurate and precise power measurements.

Input Analysis	Switching Device Analysis	Output Analysis	Frequency Response Analysis
Real Power	Switching Loss	Output Ripple	PSRR
Apparent Power	RDS(ON)	Turn On/Off Time	Control Loop Response
Reactive Power	VCE(SAT)	Efficiency	Bode Plots
Power Factor	Slew Rate	Transient Response	
Crest Factor	Modulation Analysis		
Phase Angle	Safe Operating Area		
Current Harmonics			
Inrush Current			

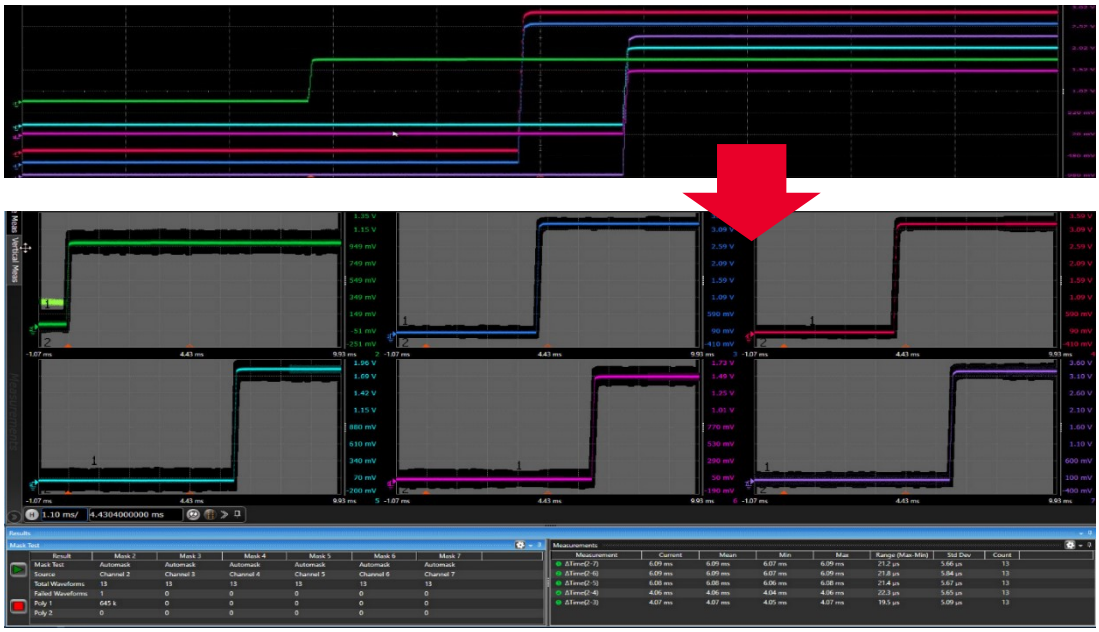
Power Rail and PMIC Integrity – D9010POWA

The increased functionality, higher density, and higher frequency operation of many modern electronic products has driven the need for lower supply voltages. It is common in many designs today to have 3.3, 1.8, 1.5, and even 1.1 V DC supplies—each of them having tighter tolerances than in previous product generations.



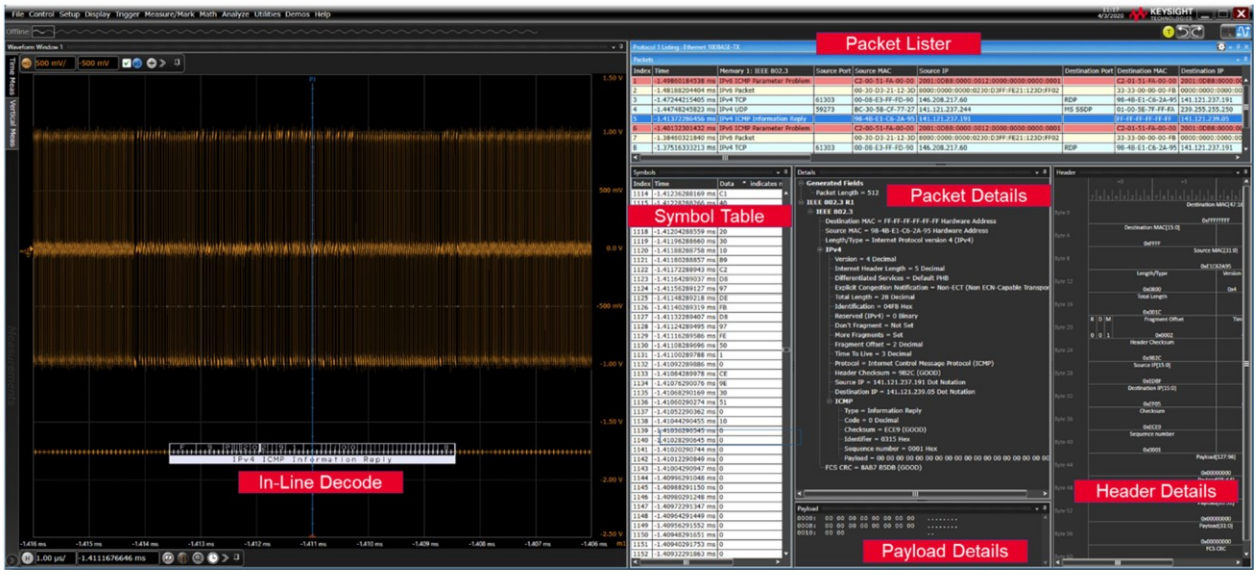
Power supply induced jitter (PSIJ) can be one of the largest sources of clock and data jitter in digital systems. Similarly, noise on DC supplies is often caused by switching currents from the transitions of clock and data in these systems. Wouldn't you like a relatively easy method of determining how much of your systems' data jitter is PSIJ and/or how much of the noise on the DC supplies is coming from specific clocks, data lines or other toggling sources? You have the tools for that in the Infiniium EXR-Series.

D9010POWA is a tool for analyzing power supply induced jitter or switching current loads on a DC supply and can analyze adverse interactions and their effects without the need for simulation or complex modeling. Together with the N7020A or N7024A Power Rail Probe, you have an even more powerful means of measuring and analyzing power integrity. And with standard mask testing on every channel, automatic delta time measurements, and a flexible user interface, PMIC analysis is simpler than ever.



With waveforms separated into grids and independent mask tests possible on every channel, you can continuously test these six power rails over thousands of startup cycles. Notice how there are mask test and measurement results on screen for a single screen shot test report.

Protocol Layer Testing

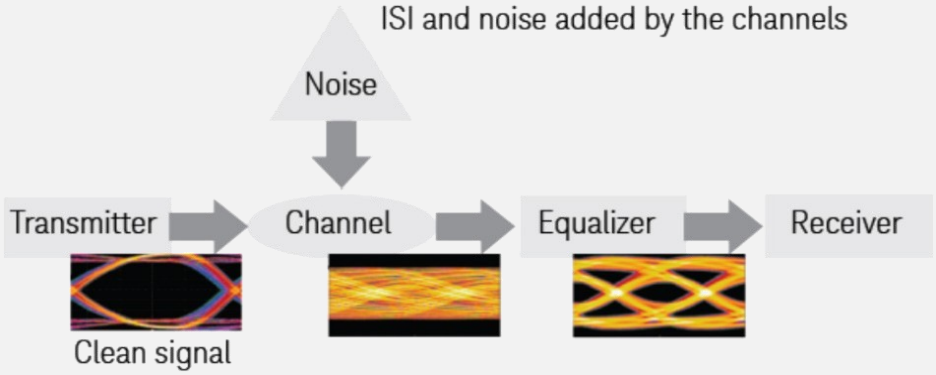


Protocol trigger and decode packages make it easy to debug and test digital designs. Get access to a rich set of integrated protocol level triggers specific to each serial bus. When serial triggering is selected, the application enables special real-time triggering hardware inside the scope. Hardware-based triggering ensures that the scope never misses a trigger event when armed. This hardware takes signals acquired using either scope or digital channels and reconstructs protocol frames. It then inspects these protocol frames against specified protocol-level trigger conditions and triggers when the condition is met. Find the web pages and data sheets for the packages to learn more – available triggers and decodes are in the configuration guide section of this document. You may want to consider D9011BDLP, which enables dozens of protocol triggers and decodes into one affordable and easy to order bundle!

Physical Layer Testing

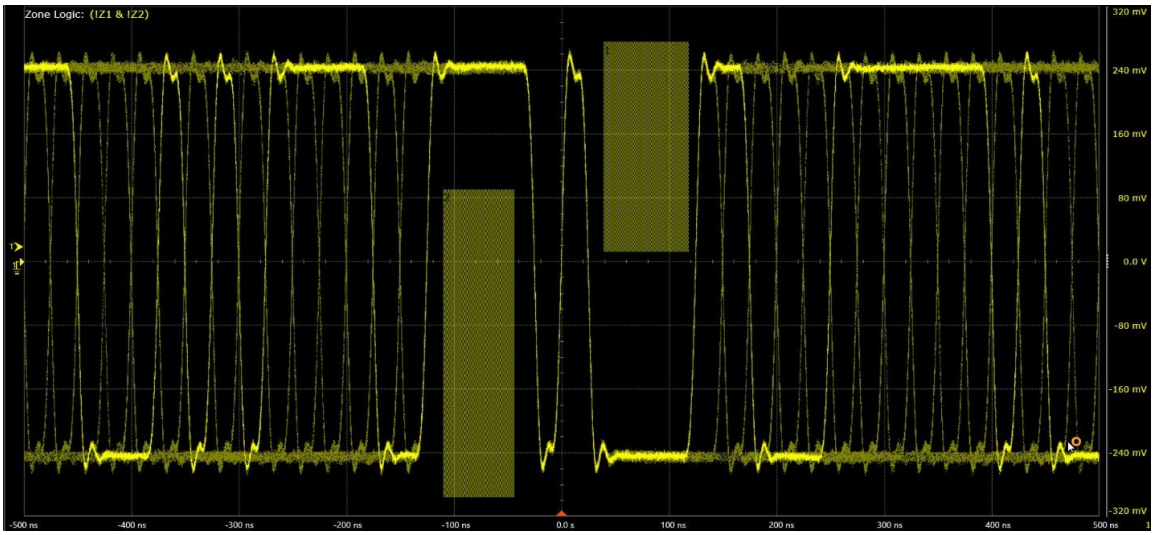
As data rates go up, the signal deteriorates from the transmitter to the receiver due to ISI, noise, and other factors. A high data rate coupled with a lossy channel will cause an open eye at a transmitter to be closed at the receiver. As eyes get more and more closed, it ultimately leads to significant data corruption and errors. Being able to analyze and find the root cause of these problems can help you develop a more robust design, leading to shorter time to market and lower failure rates in the field. Your Infiniium EXR-Series offers applications of various levels of depth to help you get the answers you need to improve your design.

The simplest of physical layer tests is a standard feature called “Fault Hunter”. Read about that feature of your EXR-Series oscilloscope later in this data sheet.



InfiniiScan Advanced and Zone Triggering – D9010SCNA

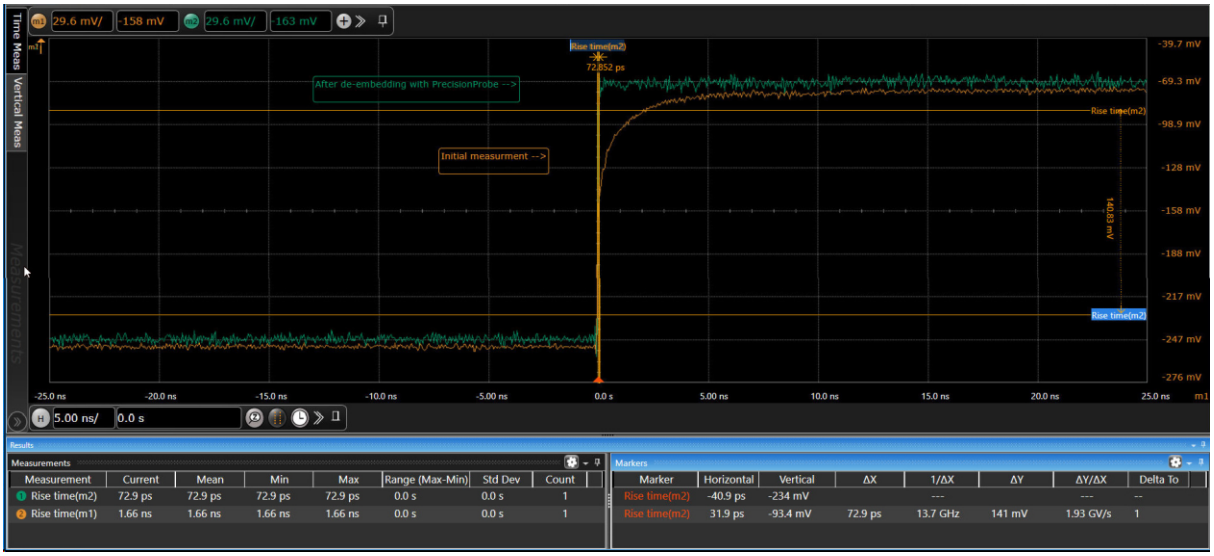
This package allows you to create a three-stage trigger to identify signal integrity issues that hardware triggering is unable to find in your electronic designs. This innovative software scans through thousands of acquired waveforms per second to help you isolate signal anomalies, saving you precious troubleshooting time. Trigger by drawing on-screen regions for a signal to hit or miss, based on measured parameters.



Vertical, Timing, and Phase Noise Analysis – D9010JITA

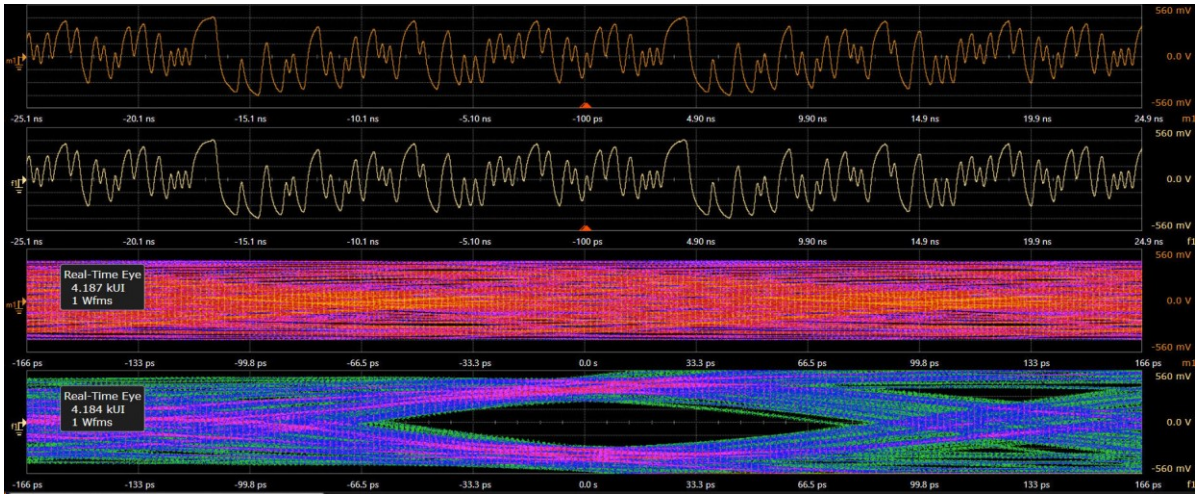
This package offers advanced statistical analysis of high-speed digital interfaces in the vertical (voltage) and horizontal (time) domains, as well as phase noise analysis. The result: the industry's most complete jitter and noise analysis software for real-time oscilloscopes.

De-embedding – D9010DMBA



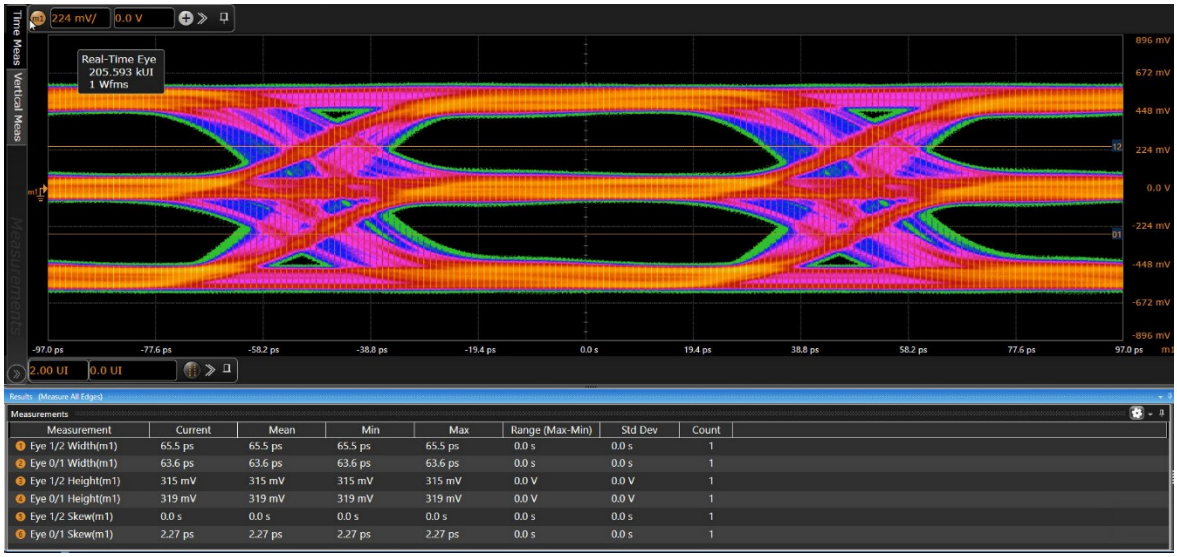
This package includes PrecisionProbe and InfiniiSim Basic, two tools designed to de-embed the effect of cables and fixtures from measurements. PrecisionProbe allows you to characterize the response of a probe, cable, or fixture; InfiniiSim lets you model them out of a measurement.

Equalization and Crosstalk – D9020ASIA



This package is intended for anyone working in high speed digital applications where eyes are closed. Equalization, InfiniiSim, and Crosstalk/Power Integrity packages enable deep analysis as to why an eye is closed, what it will take to open it, and simulating the results.

PAM-3 and PAM-4 Analysis – D9010PAMA



This package quickly sets up clock recovery and measurements for a PAM encoded signal. The software is also able to accurately set the individual threshold levels of your PAM signal and render each individual eye. It also includes BER/SER measurements and statistics. Note that PAM-3 or PAM-4 can be used for encoding signals in applications other than ethernet and the highest bandwidth frequency of the EXR-Series is 2.5 GHz.

Ease of Ownership

Save Budget and Bench Space with Instrument Integration

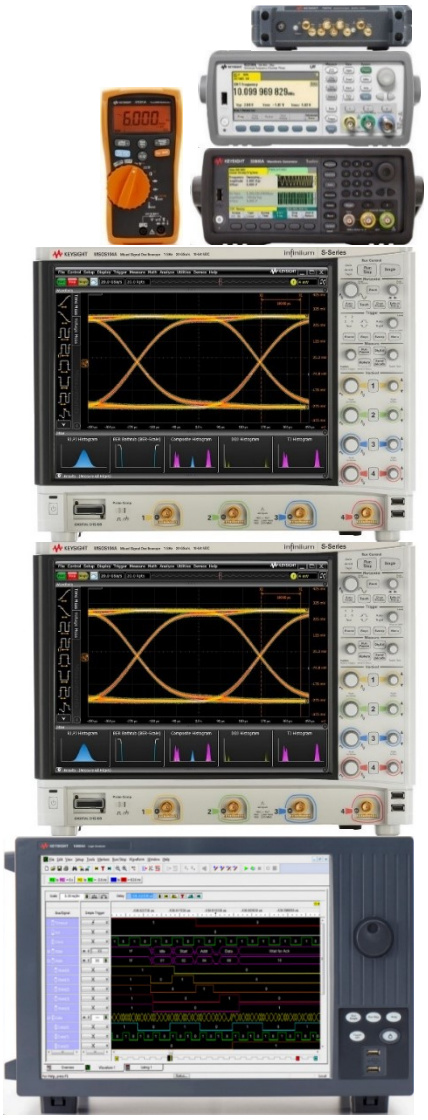
Your Infiniium EXR-Series is more than just an oscilloscope - it's 7 instruments in 1. Keysight pioneered multiple-instrument integration with the release of the mixed signal oscilloscope (MSO) in 1996. The InfiniiVision 2000/3000/4000 X-Series took the concept to the next level by integrating five instruments in one in 2011. The Infiniium EXR-Series integrates seven instruments in one. They are pictured on the right of this page, to scale, next to an EXR258A.

- 8 high-speed analog oscilloscope channels
- 16 digital channels (logic analyzer)
- 50 MHz arbitrary waveform generator
- 50 MHz frequency response analyzer
- 10-digit counter
- 4-digit voltmeter
- Protocol analyzer

Having all these tools integrated into your oscilloscope has many benefits aside from the obvious space and budget simplifications. One user interface means a lower learning curve when you need to use one of the integrated tools. It also means fewer pieces of instrumentation to store, calibrate, and keep updated on firmware.

The counter and DVM are standard features, and special because they use a separate signal path, different than the captured waveform, to make their measurements. This makes them much more accurate, flexible, and user friendly than standard on-screen measurements. Simply connect a probe or cable to an unused channel – no need to scale, trigger, or otherwise set the signal up on screen to make basic frequency and voltage measurements!

The logic analysis, AWG, and FRA can be purchased at any time for permanent installation to your EXR-Series. The variety of protocol analysis capabilities can be purchased for different lengths of time, to best fit your budget and project needs at the moment, or permanently.



Product sizes to scale!

Completely Upgradeable

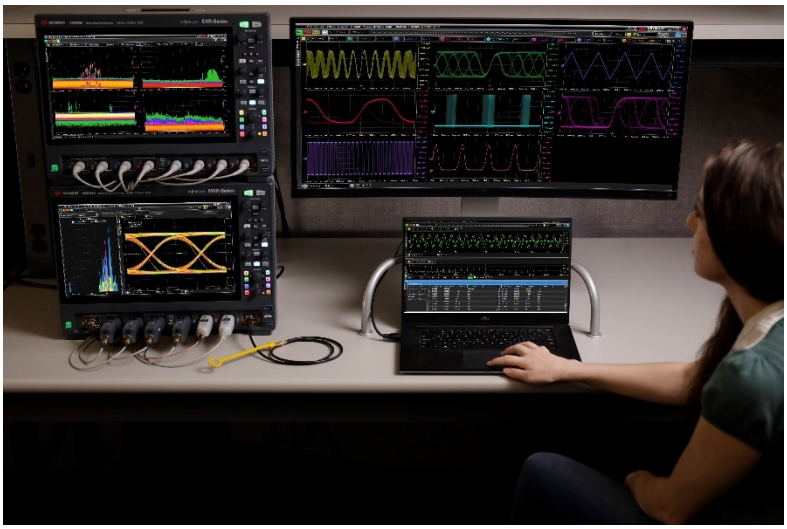
Assume that today's project requires 4 channels of 1 GHz analysis bandwidth. What if your next project needs 8 channels and 2 GHz of analysis bandwidth? And a waveform generator? This is no problem with the Infiniium EXR-Series, which is fully upgradeable – no exceptions. The Infiniium EXR gives you the flexibility to use capital or operating expense budgets more intelligently when making your purchase now and in the future.

Keysight is the world's only oscilloscope manufacturer to offer an upgrade from 4 to 8 analog channels, and it is always more affordable than purchasing a new 8 channel oscilloscope. Along with this, you can upgrade bandwidth, memory, integrated equipment, applications and more after purchase, with just a license key. No matter how your needs change, the Infiniium EXR-Series protects your investment by growing with your lab's needs of tomorrow.

Post-Purchase Upgrades	Model
Add analog bandwidth, up to 2.5 GHz	EXR2BW
Add analog channels, 4 to 8	EXR28CH
Add memory, 400 Mpts/ch or 1.6 Gpts/ch flexible memory	EXR2MEM
Add waveform generator, 50 MHz	EXR2WAV
Add MSO, 16 channels	EXR2MSO

Combine Two Oscilloscopes For 16 Channel Test With Multiscope

With software 11.10 or greater, you can combine two EXR-Series oscilloscopes together using a cabling system to perform 16 channel tests. This gives you the ability to have individual 4 or 8 channel oscilloscopes when needed and combine oscilloscopes on the fly when higher channel density measurements are required. All channels from each oscilloscope can be viewed and analyzed on a designated “leader” oscilloscope or managed from your PC using Infiniium Offline.



Multiscope is a standard feature of the EXR-Series oscilloscope and of Infiniium Offline – the only requirement to combine two oscilloscopes is the cabling kit. Specifications for frame-to-frame jitter, setup instructions, and ordering information can be found in the Multiscope Brochure and User’s Guide. Simply search for “Multiscope” on our website or look in the technical documentation on your oscilloscope model’s product page.

Maximize Test Flexibility with Infiniium Offline

You depend on your oscilloscope to capture an accurate picture of what’s happening in your design. But in today’s environment, you may find yourself in a variety of situations where access to an oscilloscope is limited. you may be sharing the instrument with others in the lab, have limited site access, or are trying to collaborate with a colleague remotely. Infiniium Offline can solve all of these problems, and more.

Infiniium Offline is a copy of the same powerful software provided on your Infiniium EXR- Series oscilloscope, just without the oscilloscope hardware. If you wish to control an oscilloscope remotely from the comfort of your desk or home office, the hosted mode can connect and control a single EXR-Series, or many EXR-Series with the MultiScope application outlined above. When access to the oscilloscope is limited, you can capture waveforms on your scope, save to a file, and recall the waveforms into Infiniium Offline from any PC. In addition, the application supports a variety of popular waveform formats from multiple oscilloscope vendors. Now you can view, analyze, share, and document scope measurements anywhere your PC goes. Find model numbers in the configuration guide at the end of this document.

Intuitive to Use

Visualize Rare Phenomena Automatically with Exclusive ASIC Technology

Many oscilloscopes claim impressive specifications, but behind the scenes, require special setups from the user. Or, they rely on special modes that compromise the performance of the oscilloscope in ways you may not be aware of. For example, some oscilloscopes claim fast triggering when in a special mode that may severely restrict memory and/or sample rate, or only when using segmented memory. With the EXR-Series, we made maximizing performance automatic, always-on, and with no guesswork from you.

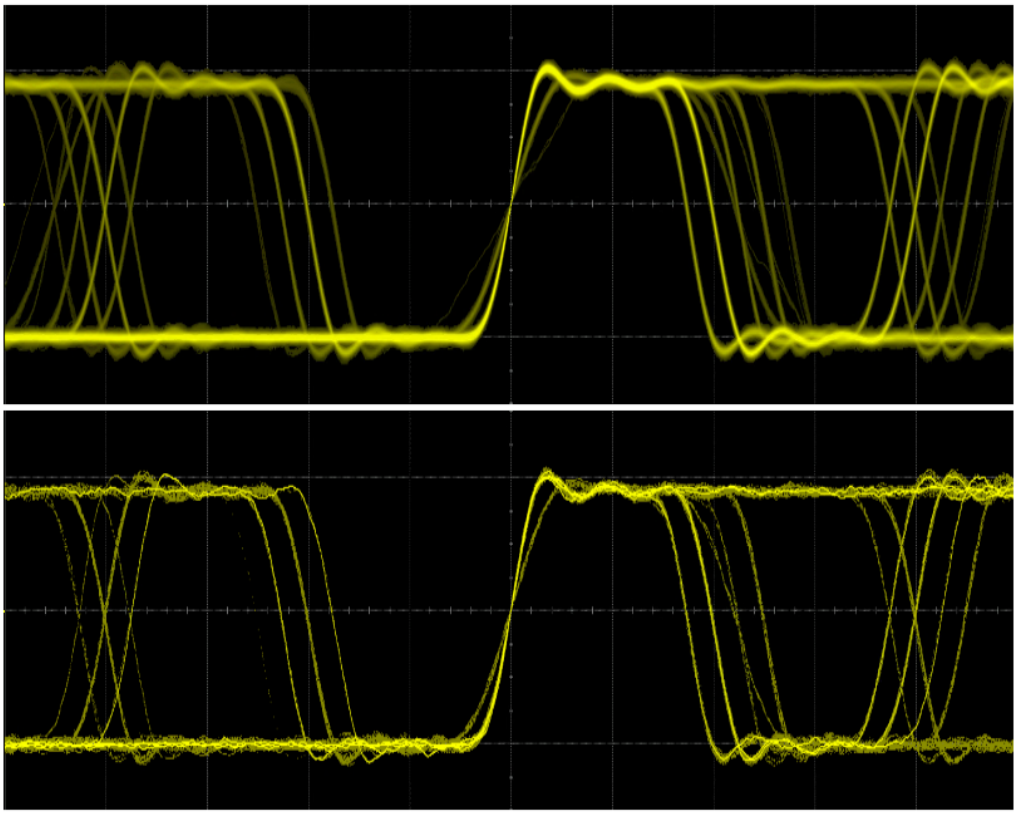
And since memory depth, sample rate, bits of resolution, and update rate are automatically optimized based on your measurement setup, there is no extra work required. Just press Auto Scale and go!

The Infiniium EXR-Series leverages a 100M+ gate CMOS ASIC from our UXR-Series oscilloscope, which acts as an “oscilloscope on a chip”. With many core oscilloscope features done in hardware, performance of some features improved by 100x or more over previous generations, including:

Metric	Why You Care	Infiniium EXR-Series	Comparable Scopes
Update rate (wfm/s)	See more of your signal	> 200,000 **(> 200x faster)**	< 1,000
Averaging (wfm/s)	Noise reduction on repetitive signals	> 12,000 **(> 100x faster)**	< 100
Measurements (meas/s)	Reach 6σ quicker	> 300,000 **(20% faster)**	< 250,000
Eye plotting (UI/s)	Identify transients and jitter	> 750,000 **(> 50x faster)**	< 15,000

wfm/s = waveforms per second.
meas/s = measurements per second.
UI/s = Unit Intervals per second.

Below is a comparison of the EXR-Series (top) vs. another oscilloscope, each viewing the same signal, and identical settings. The lower photo is an oscilloscope triggering under 1,000 wfm/s, with one second of persistence enabled. How many signal details would you have missed if you were using the oscilloscope on the bottom instead of the EXR-Series?



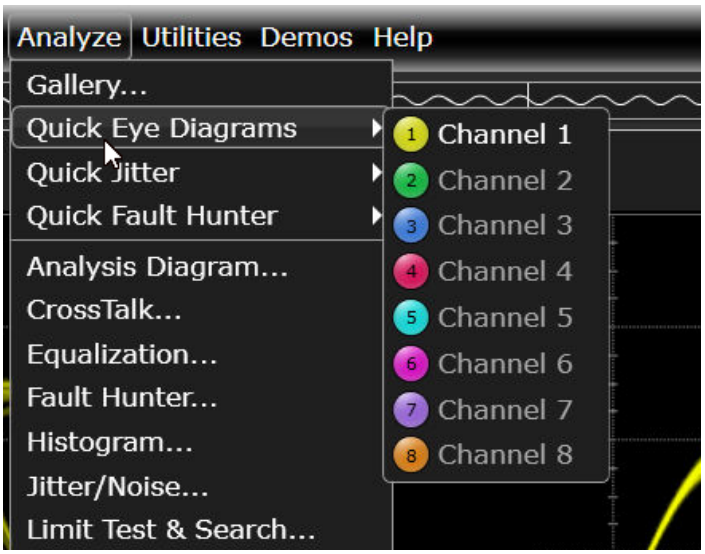
Identify Errors in One Click using Fault Hunter

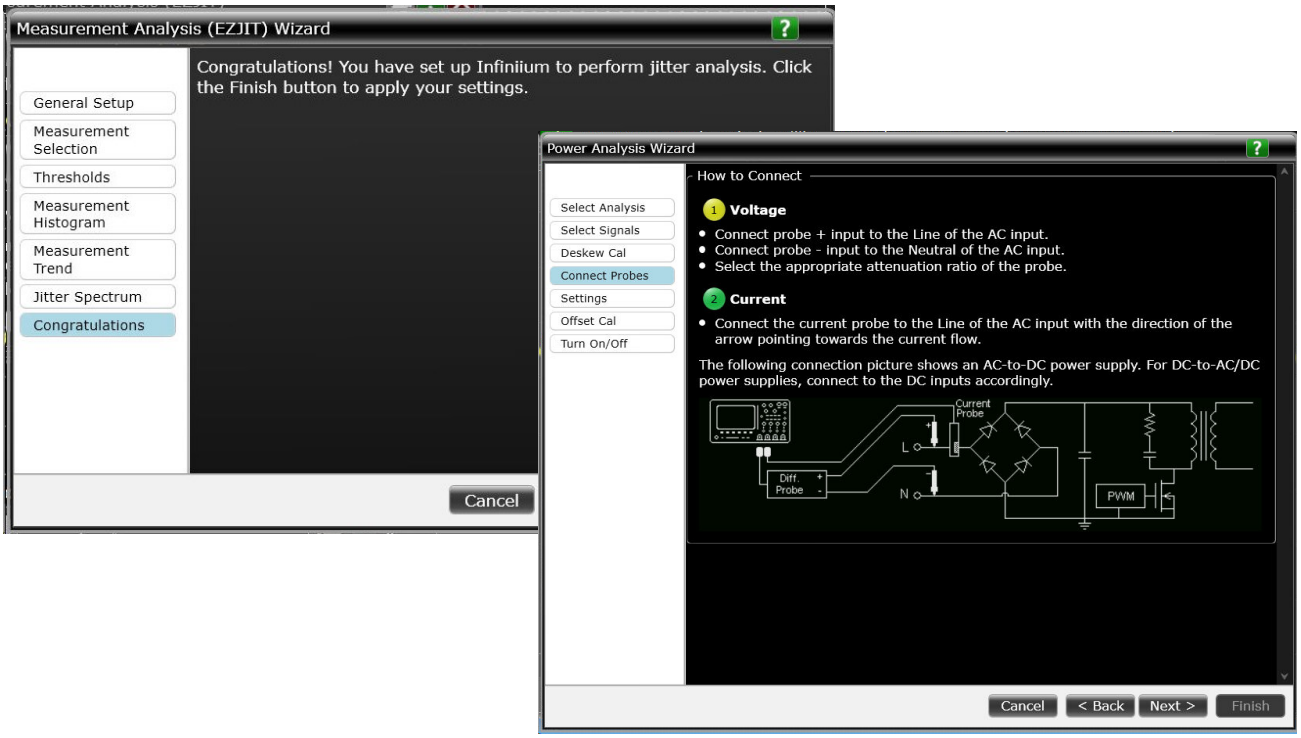
Fault Hunter is a new and innovative expert system for inspecting digital systems and can be ran with a single button press on the front panel of your EXR-Series oscilloscope. It automatically evaluates your signal's characteristics against user-definable criteria, quickly finding and saving errors for your review. It's flexible; you can define the test duration from 60 seconds up to 48 hours. Set up your device under test on a Friday afternoon, and return Monday morning with a full test report to review, with billions of tests complete thanks to our always-on fast triggering speeds of > 200,000 wfm/s.

Configure Complex Measurements Simply with Setup Wizards

Today's oscilloscopes, especially in this class, are complex tools with hundreds of functions and features available. Keysight has gone to great lengths to ensure these tools are accessible to you simply and repeatably, in easy to find locations, without limiting the power or scope of the analysis.

Quick Setups are available to enable common measurements, trigger/decodes for serial buses, eye diagrams, jitter decomposition, and fault hunter. With one click, the scope will do most or all of the work for you.





For more complex tests, there are Setup Wizards. These step driven dialog boxes walk you through fine tuning your analysis even further, explaining different features and settings in more detail. These are available for power analysis, power integrity, Real Time Eye diagrams, jitter decomposition, measurement analysis (trends, histograms, etc), crosstalk, and more.

Finally, you might notice a green question mark at the top right of any dialog box. This will act as a shortcut to the built-in help system for that feature, explaining in even further detail what you can adjust in that dialog box.

Complete Control of Your User Interface

When you connect an external monitor to most oscilloscopes, it simply duplicates the built-in screen. This can be helpful for when the built-in monitor is small or in an inconvenient place, but not so helpful when you wish to use that extra screen space to visualize waveforms or analysis. With the Infiniium EXR-Series, a second monitor can be used to effectively extend the amount of space you can use to view data thanks to the flexibility of the Infiniium user interface. You can organize your waveforms and traces into tabs, separate windows, separate grids, overlay waveforms on top of each other, move data onto separate monitors and more all with a few swipes and taps of your mouse or fingertip.

You can also remotely control your EXR-Series remotely from another Windows 10 PC, with the proper network setup, using the standard Windows 10 feature Remote Desktop Connection. Simply enter the oscilloscope's IP address, default username and password (see the user's guide) and go! You can also use most available VNC software without issue. This gives you complete control of the interface, as if you were sitting in front of the oscilloscope itself.

Explore the Keysight Real-Time Oscilloscope Portfolio

Keysight engineers have been creating reliable, insightful products for more than 80 years. We are continually looking for new ways to help you shape the future with innovative products and test solutions. From high performance to extreme value, and bandwidths ranging from 50 MHz to more than 110 GHz, we have the oscilloscope solutions to meet your evolving needs. Below is a small sample of our portfolio; check our website for the latest information.

Product Series	1000 X-Series	3000T X-Series	EXR-Series	S-Series	V-Series	Z-Series	UXR-Series
Analog channels	2 or 4	2 or 4	4 or 8, *upgradeable*	4	4	4	1, 2 or 4, *upgradeable*
Bandwidth, all channels	200 MHz	1 GHz	2.5 GHz	4 GHz	16 GHz	33 GHz	110 GHz
Sample rate, all channels	1 GSa/s	2.5 GSa/s	16 GSa/s	10 GSa/s	40 GSa/s	80 GSa/s	256 GSa/s
Max memory, all channels	1 Mpts	2 Mpts	400 Mpts	400 Mpts	2 Gpts	2 Gpts	2 Gpts
Resolution	8 bits	8 bits	10 bits	10 bits	8 bits	8 bits	10 bits
Timebase accuracy	50 ppm	1.6 ppm	8 ppb	12 ppb	100 ppb	100 ppb	25 ppb
Intrinsic Jitter	–	–	118 fs	100 fs	100 fs	50 fs	25 fs
Lowest noise (1 mV/div)	–	113 µV	43 µV	74 µV	210 µV	210 µV	150 µV
Max ENOB	–	–	9.0	8.1	6.6	6.6	6.8
Logic analysis	–	16 ch.	16 ch.	16 ch.	16 ch.	16 ch.	–
Hardware plotting	Yes	Yes	Yes	No	No	–	Yes
Screen display	7” WVGA	8.5” WVGA	15.6” Full HD	15.6” XGA	12.1” XGA	12.1” XGA	15.4” XGA

Performance Characteristics

Analog channel specifications					
		EXR05xA	EXR10xA	EXR20xA	EXR25xA
Bandwidth (-3 db)	50 Ω [1]	500 MHz	1 GHz	2 GHz	2.5 GHz
	1 MΩ	500 MHz	500 MHz	500 MHz	500 MHz
Typical rise/fall time [4]	10/90%	860 ps	430 ps	215 ps	172 ps
	20/80%	620 ps	310 ps	155 ps	124 ps
Input channels		4 or 8 channels analog, 16 channels digital (optional)			
Sample rate, real-time		16 GSa/s, all analog channels [1]			
Sample resolution		62.5 ps (divide by interpolation factor, if enabled)			
Vertical resolution [3]		10 bits, up to 16 bits with high-resolution mode			
Real-time update rate		> 200,000 waveforms/sec			
Memory depth [1]	Standard	100 Mpts/channel, all channels			
	Optional	400 Mpts/channel, all channels (400 Mpts/ch option) 1.6 Gpts shared between channels 1-4, 5-8 (1.6 Gpts Combined Flexible Memory option) [6]			
Input impedance	50 Ω [1]	± 3.5% (typically ± 1% at 25 °C)			
	1 MΩ	± 1% (14 pF typical)			
Input sensitivity [3]	50 Ω [1]	1 mV/div to 1 V/div			
	1 MΩ	1 mV/div to 5 V/div			
Input coupling	50 Ω [1]	DC			
	1 MΩ	DC, AC (> 11 Hz)			
Bandwidth limit filters	Analog	20 MHz, 200 MHz			
	Digital [5]	14.7 MHz up to scope bandwidth, increments of one decimal point. Filter options: Brick Wall, 4th Order Bessel, or Bandpass			
Max input voltage	50 Ω	± 5 V_{MAX} [1]			
	1 MΩ	30 V_{RMS} or ± 40 V_{MAX} (DC + V_{PEAK})			
	Notes	Probing technology allows for testing of higher voltages; the included N2873A 10:1 probe supports 300 V_{RMS} or ± 400 V_{MAX} (DC + V_{PEAK}). No transient overvoltage allowed in either the 50 Ω or 1 MΩ path, with or without probes.			
Offset range	50 Ω [1]	≤ 55 mV/div: ± 0.8 V ≤ 120 mV/div: ± 1.6 V ≤ 260 mV/div: ± 3.2 V > 260 mV/div: ± 4 V			
	1 MΩ	< 10 mV/div: ± 5 V ≤ 200 mV/div: ± 20 V > 200 mV/div: ± 40 V			
Offset accuracy [1, 3]		< 2 V: ±0.1 div ± 2 mV ± 1%; > 2 V: ± 0.1 div ± 2 mV ± 1.5%			
Dynamic range		± 4 divisions from center screen			
DC gain accuracy [1, 2, 3]		± 2% full scale (± 1% typical)			
DC voltage measurement accuracy [2]		Dual cursor: ± [(DC gain accuracy) + (resolution)] Single cursor: ± [(DC gain accuracy) + (offset accuracy) + (resolution/2)]			
Channel-channel isolation		Adjacent Channels: ≤ -60 dB (DC to 2 GHz), ≤ -50 dB (over 2 GHz) Non-Adjacent Channels: ≤ -85 dB (DC to 2 GHz), ≤ -65 dB (over 2 GHz)			

1. Denotes warranted specifications, all others are typical. Specifications are valid after a 30-minute warm-up period and ± 5 °C from firmware calibration temperature. Input impedance is valid when V/div scaling is adjusted to show all waveform vertical values within the oscilloscope display.
2. Full scale is defined as 8 vertical divisions. Magnification is used below 2 mV/div, full-scale is defined as 16 mV. Testing is at maximum sample rate.
3. 50 Ω input: The major scale settings are 5 mV, 10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, and 1 V per division. 1 MΩ input: The major scale settings are 5 mV, 10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2 V, and 5 V per division. For a 10:1 probe, vertical scaling is multiplied by 10.
4. 10/90 calculation based on Tr = 0.43/BW. 20/80 calculation based on Tr = 0.31/BW.
5. You may adjust bandwidth limits up to the bandwidth of the scope when using Brick Wall filter. When using 4th Order Bessel, maximum bandwidth limit is roughly 2/3 the bandwidth of oscilloscope. Bandpass is designed for use in our Phase Noise Analysis application and not designed for general purpose use. Contact Keysight if more information is needed.
6. Combined flexible memory shares 1.6 Gpts of memory between channels 1 through 4. This means you can have 1 channel with 1.6 Gpts, two channels with 800 Mpts, or three channels with 533 Mpts memory (on top of 400 Mpts on all channels). Double those channel counts for 8 channel models, as the same logic applies to channels 5-8.

High-resolution mode (standard)		
Bits of resolution	**Sample rate**	**Bandwidth [1]**
10	Up to 16 GSa/s	2.5 GHz
11	6.4 GSa/s	2.4 GHz
12	3.2 GSa/s	1.2 GHz
13	1.6 GSa/s	600 MHz
14	800 MSa/s	300 MHz
15	400 MSa/s	165 MHz
16	200 MSa/s	82.5 MHz
16	100 MSa/s	41.3 MHz
16	50 MSa/s	20.6 MHz

1. Up to bandwidth specified or oscilloscope model bandwidth, whichever is lower.

RMS noise floor ($V_{RMS\ AC}$) on 50 Ω inputs						
Vertical setting	**20 MHz [1]**	**200 MHz [1]**	**500 MHz [1]**	**1 GHz [1]**	**2 GHz [1]**	**2.5 GHz**
1, 2 mV/div	43 µV	59 µV	63 µV	73 µV	91 µV	100 µV
5 mV/div	40 µV	61 µV	70 µV	81 µV	102 µV	112 µV
10 mV/div	46 µV	69 µV	81 µV	99 µV	131 µV	144 µV
20 mV/div	59 µV	99 µV	122 µV	156 µV	209 µV	233 µV
50 mV/div	210 µV	278 µV	328 µV	401 µV	520 µV	569 µV
100 mV/div	452 µV	582 µV	681 µV	821 µV	1.06 mV	1.17 mV
1 V/div	2.95 mV	4.10 mV	5.07 mV	6.33 mV	8.4 mV	9.31 mV

1. High-resolution is used for bandwidths 2 GHz and below. Keysight recommends this to maximize signal to noise ratio and still meet the system bandwidth requirements you need for your measurement.

ENOB on 50 Ω inputs, 50 mV/div							
20 MHz	**200 MHz**	**250 MHz**	**350 MHz**	**500 MHz**	**1 GHz**	**2 GHz**	**2.5 GHz**
9.0	8.5	8.4	8.3	8.2	8.0	7.6	7.5

High resolution on the Infiniium EXR-Series works like no other oscilloscope before it. Instead of setting high-resolution bits automatically with no user control, you select ADC bits or a system bandwidth, and let the scope optimize around that. This means the resolution of your data isn't changing without your explicit request. ADC resolution and bandwidth limit filters work in tandem to produce the best measurement results possible.

All Infiniium EXR-Series scopes come from the factory calibrated to 2.5 GHz, and leverage brickwall filters to achieve each model bandwidth. Thus, the noise and ENOB data above is applicable from 20 MHz up to the bandwidth of your oscilloscope model when using the built-in global bandwidth limit feature.

Analog channel specifications (horizontal)			
Acquisition modes	Sample Mode	Sequential sampling with up to 32-point sin(x)/x interpolation	
	Averaging	2 to 1,048,575 averages, up to 12,000 avg/sec (HW accelerated)	
	Peak detect	Oversamples at 16 GSa/s, saving min and max voltages, to detect glitches or aliasing	
	Segmented	Up to 78,953 future acquisitions	
	History mode	Up to 1,024 previous acquisitions	
	Roll mode	Scrolls waveform across the display, right to left	
Timebase range	Roll mode	50 ms/div to 1000 s /div	
	Other modes	5 ps/div to 200 s/div	
	Zoom window	1 ps/div to current main time scale setting	
Horizontal position range		0 s to ± 200 s, Continuously adjustable	
Horizontal position resolution	Main window	40 fs (granularity of horizontal position of waveform on screen)	
	Zoom window	8 fs	
De-skew range		± 1 ms, in steps of 100 fs	
Time scale accuracy [1, 7]		± (8 ppb initial + 75 ppb/year aging)	
Intra-channel intrinsic jitter[3, 5]		4 channel models	8 channel models
	100 ns/div	118 fs_{RMS}	150 fs_{RMS}
	1 µs/div	130 fs_{RMS} [9]	156 fs_{RMS}
	10 µs/div	140 fs_{RMS} [9]	172 fs_{RMS} [10]
	100 µs/div	145 fs_{RMS} [9]	175 fs_{RMS} [10]
	1 ms/div	155 fs_{RMS} [9]	181 fs_{RMS} [10]
Inter-channel intrinsic jitter [3]		100 fs_{RMS}	
Inter-channel skew drift [3, 6]		< 500 fs_{MAX}	
Intra-channel jitter measurement floor [2, 3]	Time interval error	$\sqrt{\left(\frac{\text{noise floor}}{\text{slew rate}}\right)^2 + (\text{intrinsic jitter})^2}$	
	Periodic	$\sqrt{2} \times \sqrt{\left(\frac{\text{noise floor}}{\text{slew rate}}\right)^2 + (\text{intrinsic jitter})^2}$	
	Cycle-cycle / N-cycle	$\sqrt{3} \times \sqrt{\left(\frac{\text{noise floor}}{\text{slew rate}}\right)^2 + (\text{intrinsic jitter})^2}$	
Inter-channel jitter measurement floor [2, 3, 4]		$\sqrt{\left(\frac{\text{Time interval}}{\text{error (edge 1)}}\right)^2 + \left(\frac{\text{Time interval}}{\text{error (edge 2)}}\right)^2 + \left(\frac{\text{inter}-\text{channel}}{\text{intrinsic jitter}}\right)^2}$	
Delta time measurement accuracy [2, 3, 4, 8]	Intra-channel	$\pm\left[\frac{5}{n} \times \sqrt{\left[\frac{\text{Time interval}}{\text{error (edge 1)}}\right]^2 + \left[\frac{\text{Time interval}}{\text{error (edge 2)}}\right]^2} + \left(\left(\frac{\text{Time scale}}{\text{accuracy}}\right) \times \left(\frac{\text{Delta}}{\text{time}}\right)\right)\right]$	
	Inter-channel	$\pm\left[\frac{5}{n} \times \sqrt{\left[\frac{\text{Time interval}}{\text{error (edge 1)}}\right]^2 + \left[\frac{\text{Time interval}}{\text{error (edge 2)}}\right]^2 + \left[\frac{\text{Interchannel}}{\text{intrinsic jitter}}\right]^2} + \left(\left(\frac{\text{Time scale}}{\text{accuracy}}\right) \times \left(\frac{\text{Delta}}{\text{time}}\right)\right) + \left(\frac{\text{Intechannel}}{\text{skew drift}}\right)\right]$	

1. Denotes warranted specifications, all others are typical. Specifications are valid after a 30-minute warm-up period and ± 5 °C from firmware calibration temperature.
2. Sample rate at maximum. Noise floor and slew rate determined at fixed-voltage measurement threshold, near middle of signal. Displayed signal not vertically clipped. Slew rate of sine wave = (peak signal amplitude) x 2πf; slew rate of fast edge = 0.8 * amplitude / (risetime 10-90%).
3. Intra-channel = both edges on the same channel, Inter-channel = two edges on different channels.
4. Scope channels and signal interconnect de-skewed prior to measurement.
5. External timebase reference values measured using a Wenzel 501-04608A 10 MHz reference. Intrinsic jitter value depends on acquisition time range for Time Interval Error formula and depends on delta-time between edges for all two-edge formulas.
6. Skew between channels caused by ± 5 degrees C temperature change.
7. Initial = immediately after factory or user calibration.
8. Reading is the displayed Delta Time Measurement Accuracy measurement value. Do not double the listed Time Scale Accuracy value in Delta Time Measurement Accuracy formula.'n' represents the square root of the number of averages taken; e.g. n=1 is no averaging, n=16 is 256 averages. Averaging allows for more accurate delta time measurement accuracy.
9. 120 fs_{RMS} possible with external reference.
10. 161 fs_{RMS} possible with external reference.

Analog channel triggering	
Trigger sources	Edge Trigger on all analog channels, aux-in, power supply line
	Other Trigger operations as outlined below
Max edge trigger frequency (50 Ω)	2.5 GHz
Trigger level range	± 4 divisions from center screen (auxiliary: ± 5 V, max input 5 V_{PP})
Trigger sensitivity	Analog channels: see next table
	Aux trigger input: 200 mV_{PP}, DC to 2.5 GHz
Trigger hold off range	25 ns to 10 s, fixed or random
Trigger coupling	DC, AC, LF reject (50 kHz HPF), HF reject (50 kHz LPF)
Sweep modes	Auto, triggered, single
Trigger jitter	4 channel models: 523 fs_{RMS}
	8 channel models: 531 fs_{RMS}
Minimum trigger re-arm time	< 5 µs

Trigger edge sensitivity, analog channels					
Bandwidth (HW or SW limit)		20 MHz	200 MHz	1 GHz	2.5 GHz
1 MΩ path	< 5 mV/div	< 0.7 div	< 1.0 div	< 1.4 div to BW limit (500 MHz)	
	≥ 5 mV/div	< 0.3 div	< 0.5 div	< 0.8 div to BW limit (500 MHz)	
50 Ω path	< 5 mV/div	< 0.15 div	< 0.2 div	< 0.3 div	< 0.45 div
	≥ 5 mV/div	0 div	< 0.1 div	< 0.1 div	< 0.1 div

Digital channel specifications (optional)	
Analog bandwidth	300 MHz
Maximum sample rate	8 GSa/s, all channels
Maximum memory depth	At 8 GSa/s: 250 Mpts/ch
	Under 8 GSa/s: 125 Mpts/ch
Minimum detectable glitch	2 ns
Max input voltage	± 40 V_{PEAK}
Input dynamic range	±10 V about threshold
Minimum input voltage swing	500 mV_{PP}
Input impedance	100 kΩ ± 2% (~8 pF) at probe tip
Resolution	1 bit
Channel to channel skew	200 ps (typical)
Threshold selections	TTL, CMOS (5.0 V, 3.3 V, 2.5 V), ECL, PECL, User-defined (± 8 V in 10 mV increments)
Threshold accuracy	± (100 mV + 3% of threshold setting)

Available triggers (standard, unless otherwise noted)		
Trigger type	**Channels available on**	**Description**
Edge	Channels 1-8, digital, line, aux	Triggers on a specified slope (rising, falling or alternating between rising and falling) and voltage level on any channel or auxiliary trigger.
Edge transition	Channels 1-4	Triggers on rising or falling edges that cross two voltage levels in > or < the amount of time specified. Edge transition setting from 75 ps to 10 s.
Edge then edge (time)	Channels 1-4, digital	The trigger is qualified by an edge. After a specified time-delay between 1.5 ns to 20 s, a rising or falling edge on any one selected input will generate the trigger.
Edge then edge (event)	Channels 1-4, digital	The trigger is qualified by an edge. After a specified delay between 1 to 65,000,000,000 rising or falling edges, another rising or falling edge on any one selected input will generate the trigger.
Pulse width	Channels 1-4, digital	Triggers on a pulse that is wider or narrower than the other pulses in your waveform by specifying a pulse width and a polarity. Pulse width range settings 75 ps to 20 s. Trigger point can be configured for “end of pulse” or “time out”.
Glitch	Channels 1-8, digital	Triggers on glitches narrower than the other pulses in your waveform by specifying a width less than your narrowest pulse and a polarity. Glitch range settings: < 75 ps to < 10 s.
Runt	Channels 1-4	Triggers on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again. Can be time qualified with a range of 75 ps to 10 s.
Timeout	Channels 1-4, digital	Triggers the oscilloscope when the waveform has been at a higher voltage than the voltage specified by the Level control for too long (High Too Long), when the waveform has been at a lower voltage than the Level voltage for too long (Low Too Long), or when the waveform has taken too long to pass through the Level voltage (Unchanged Too Long). Timeout settings from 75 ps to 20 s.
Pattern/State	Channels 1-4, digital	Identifies a trigger condition by looking for a specified pattern or a pattern and an edge (state) across the input channels.
Setup / hold	Channels 1-4	Triggers on violations of setup time, hold time, or both setup and hold time. Setup times from 75 ps to 20 s and hold times from 75 ps to 100 ns.
Window	Channels 1-4	Specifies a voltage range and then trigger when the waveform either exits this range, enters this range, stays outside the range for too long or too short, or stays inside the range for too long or too short. Range setting from 75 ps to 20 s.
Protocol	Bus dependent	Trigger on certain packets or patterns in protocol-based data. *Requires a protocol trigger/decode option, for example D9010LSSP*
Generic Protocol	Channels 1-8	Software triggers on NRZ or 8 b/10 b-encoded data up to 6 Gbps, up to 80-bit pattern. Support multiple clock data recovery methods including constant frequency, 1st-order PLL, 2nd-order PLL, explicit clock, explicit 1st-order PLL, explicit 2nd-order PLL, Fibre Channel, FlexRay receiver, FlexRay transmitter.
Burst	Channels 1-4	Triggers on the Nth edge of a burst that occurs after an idle time from 1.5 ns to 20 s.
Nth Edge	Channels 1-8	Triggers on the Nth edge
OR’d Edges	Channels 1-4	Identifies a trigger condition by looking for selected edges on up to four channels
InfiniiScan Zone	Channels 1-8	Qualified trigger across up to 8 user-drawn zones. For each zone, user specifies “must intersect” or “must not intersect.” Zones can be drawn on analog channels and combined using Boolean logic. *Requires option D9010SCNA*
Measurement limit	Channels 1-8, digital, line, aux	Software triggers on the results of the measurement values. For example, when the “time interval error (TIE)” is measured, InfiniiScan can trigger on a specific TIE value. *Requires option D9010SCNA*
Non-monotonic edge	Channels 1-8	Software triggers on the non-monotonic edge. The non-monotonic edge is specified by setting a hysteresis value. *Requires option D9010SCNA*

Serial Data Analysis (standard)	
Real-Time Eye displays	>750,000 Unit Intervals per second Unfolding of eye diagram BER eye contours (contact Keysight) Recovered clock display
Clock recovery methods	1st or 2nd order PLL, explicit clock, Golden PLL (for PCI Express)
Automation	One-click quick setup Complete setup wizard Custom mask templates, mask editor

Fault Hunter (standard)	
Auto Setup	30 second statistical measurement analysis of incoming signal
Result information	Test failure automatically saved in memory. Fault condition can be copied to trigger for further testing
Test results	Automatic identification of common digital signal errors: Positive glitch, negative glitch, slow rising edge, slow falling edge, positive runt, negative runt

Measurements (standard, unless otherwise noted)	
Maximum at once	20 in either main, zoom, or gated region (up to 16 gates)
Maximum rate	> 300,000 measurements/second (any number of measurements on, “measure all edges” enabled)
Voltage (analog)	Amplitude, average, base, crossing point, maximum, minimum, overshoot and preshoot (as a percentage or voltage), V_{PP} contrast, peak to peak, pulse (amplitude, base, top), RMS, top, thresholds (lower, middle, upper), voltage @ time
Time (analog)	Rise time, fall time, period, frequency, pulse width (+/-), duty cycle, T_{MIN}, T_{MAX}, crossing point time, delta time, pulse count, bursts (width, period, interval), s/h time
Time (digital)	Period, frequency, pulse width (+/-), duty cycle, delta time
Mixed (analog)	Area, slew rate, charge. *Requires N282xA probe*
Frequency domain	FFT frequency and magnitude, channel power, power spectral density, occupied bandwidth
Level qualification	Make timing measurements only when other input signal level conditions are true. Any channels not involved in a measurement can be used to qualify all timing measurements. *Requires D9010SCNA*
Eye diagrams	Eye height, eye width, eye jitter, crossing percentage, Q factor, duty-cycle distortion > 750,000 UI/second (for eye diagrams, with hardware acceleration enabled)
Statistic modes	Mean, standard deviation, minimum, maximum, count

Math (standard, unless otherwise noted)		
Sources		Any analog or digital channel, waveform memory, or other math functions
Maximum at once		16
Functions	Math	Add, subtract, multiply, divide, FFT (magnitude and phase), absolute value, average, common mode, delay, differentiate, integrate, invert, max, min, square, square root
	Filters	High pass filter, low pass filter, smoothing
	Visualizations	Amplitude demodulation, bus chart, envelope, gating, histogram, pattern average, measurement log, measurement trend, magnify / duplicate, XY mode (Z-Qualified)
	MATLAB	Preinstalled scripts: Butterworth, FIR, LFE, RTEye, and SqrtSumOfSquare User Defined: The input source data is passed to a MATLAB script you create. The processed data is passed back to Infiniium to be displayed as a function. *Requires a MATLAB license*
FFT	Range	DC to Nyquist frequency
	Horizontal Scale	Linear, logarithmic
	Vertical Units	dBm, dBmV, dBuV, V_{RMS}, Watts

Math (standard, unless otherwise noted)		
	Controls	Start and stop frequency, span and center frequency, resolution bandwidth
	Peak detect	Automatically find and annotate up to 25 peaks of a user-defined level
	Windows	Flattop, rectangular, Hanning, Blackman Harris, Hamming
Histograms	Sources	Any waveform or measurement below
	Orientation	Horizontal (timing and jitter) or vertical (noise and amplitude)
	Measurements	Peak-to-peak, min, max, mean, median, mode, standard deviation, mean ±1σ/2σ/3σ, total hits, peak (area of most hits), bin width, FWHM (histogram width at half maximum)

Digital Voltmeter (standard, specifications are typical)	
Functions	AC_{RMS}, DC, DC_{RMS}
Resolution	4 digits
Measuring rate	100/sec
Auto Range	Automatic adjustment of vertical amplification to maximize the dynamic range of measurements
Range Meter	Graphical display of most recent measurement, plus extrema over the previous 3 seconds

Counter / Totalizer (standard, specifications are typical)	
Available counters	Counter A and B: General purpose (Channels 1-4)
	Counter C: Trigger qualified (trigger channel)
Measurements	Frequency, period, totalize, ratio (ratio of A/B, mathematical)
Resolution	General purpose: 5 to 10-digits
	Trigger qualified: 5 to 8 digits
Accuracy	± (8 ppb initial ± 75 ppb/year aging)
Uncertainty	± 0.1 digits
Minimum pulse width	75 ps [1]
Maximum frequency	General purpose: 2.5 GHz
	Trigger qualified: 1/(trigger hold off time)
Totalizer	Counter size: 64 bits
	Edge: Rise or fall

Waveform Generator (optional, specifications are typical)		
Output	Connector	BNC, rear panel
	Voltage range, 50 Ω	1 mV_{PP} [1] to 5 V_{PP} [2]
	Voltage range, 1 MΩ	2 mV_{PP} [1] to 10 V_{PP} [2]
	Presets	TTL, CMOS (5 V), CMOS (3.3 V), CMOS (2.5 V), ECL
	Vertical resolution	100 µV
	Vertical accuracy	2% (< 1 kHz)
	Frequency resolution [3]	12.5 mHz
	Frequency accuracy [4]	Square/pulse: 1 ppm (f ≥ 8 kHz), [f/25000] ppm (f < 8 kHz)
		Other waveforms: 1 ppm (f ≥ 5 kHz), 3 ppm (f < 5 kHz)
	Modes	Normal, single shot (all but square, pulse, noise, DC)
	Waveforms	DC, sine, square, pulse, triangle/ramp, noise, sinc, exponential rise/fall, cardiac, Gaussian pulse, PRBS, arbitrary
	Protection	Overload automatically disables output
	Isolation	Not available, main output BNC is grounded
DC offset	Range	± (8 V_{DC} – Peak AC) into 1 MΩ
		± (4 V_{DC} – Peak AC) into 50 Ω
	Resolution	100 µV or 3 digits, whichever is higher
	Accuracy	Waveform modes: ± 1.5% of offset setting ± 1% of amplitude ± 1 mV
		DC mode: ± 1.5% of offset setting ± 3 mV
Sine	Frequency range	12.5 mHz to 50 MHz
	Amplitude flatness	± 0.5 dB (≤ 20 MHz), ± 1 dB (> 20 MHz)
	Harmonic distortion	Harmonic distortion: -40 dBc [5]
	SFDR	Spurious (non-harmonic): -40 dBc [6]
	THD	1% [7]
	SNR	40 dB [8]
Square / pulse	Frequency range	Frequency range: 0.0125 Hz to 20 MHz
	Duty cycle	Duty cycle: 20 to 80%, resolution of 1% or 1 ns [9], whichever is larger
	Pulse width	Pulse width: 10 ns minimum, 1 ns resolution [9]
	Rise/fall time	Rise/fall time: 9 ns (10 to 90%)
	Overshoot	Overshoot: < 10%
	Asymmetry (at 50% DC)	± 1% ± 5 ns
	Jitter (TIE RMS)	100 ps [10, 6]
Triangle (ramp)	Frequency range	12.5 mHz to 200 kHz
	Linearity	1%
	Symmetry	0 to 100%, 1% resolution
Noise	Bandwidth	40 MHz
Sine Cardinal (Sinc)	Frequency range	12.5 mHz to 1.0 MHz
Exponential Rise/Fall	Frequency range	12.5 mHz to 10.0 MHz
Cardiac	Frequency range	12.5 mHz to 200.0 kHz

Waveform Generator (optional, specifications are typical)			
Gaussian Pulse	Frequency range	12.5 mHz to 5.0 MHz	
PRBS	Pattern length	2^7, 2^15, 2^23, 2^31	
	Bit rate	100 bps to 40 Mbps (speeds of 200 MHz divided by an integer value)	
	Encoding	NRZ	
Arbitrary	Waveform Length	1 to 122,070 points	
	Repetition Rate	12.5 mHz to 12 MHz	
	Sample Rate	200 MSa/s	
	Filter Bandwidth	40 MHz	
	Editor	On-screen editor; import/export of data to and from channels/memories, import/export data to and from a file (.csv)	
Modulation	Types	AM, FM, FSK	
	Carriers	Sine, ramp, sine cardinal, exponential rise, exponential fall, and cardiac	
	Source	Internal (no external modulation capability)	
	AM	Profile	Sine, square, ramp
		Frequency	1 Hz to 20 kHz
		Depth	0% to 100%
	FM	Profile	Sine, square, ramp
		Frequency	1 Hz to 20 kHz
		Minimum carrier	10 Hz
		Deviation	1 Hz to carrier frequency or (2e12 / carrier frequency), whichever is smaller
	FSK	Modulation	50% duty cycle square wave
		FSK rate	1 Hz to 20 kHz
		Hop frequency	2 x FSK rate to 10 MHz

1. 10 mV_{PP} (1 MΩ) / 5 mV_{PP} (50 Ω) minimum if | DC + Peak AC | ≥ 400 mV
2. 8 V_{PP} (1 MΩ) / 4 V_{PP} (50 Ω) maximum for Gaussian waveshape
3. Resolution is Freq/25000 Hz for square and pulse waveforms < 8 kHz
4. Include (add) external reference clock frequency error, if applicable
5. For amplitude ≤ 1 V_{PP} at 50 MHz, ≤2 V_{PP} at 40 MHz, ≤ 5 V_{PP} at ≤ 30 MHz, into 50 Ω load
6. For amplitude ≥ 5 mV_{PP} into 50 Ω load
7. For amplitude ≤ 1 V_{PP} at 50 MHz, ≤ 2 V_{PP} at 40 MHz, ≤ 5 V_{PP} at ≤ 30 MHz, into 50 Ω load
8. ≥ 35 mV_{PP}, 0 V offset, into 50 Ω
9. 5 nS if frequency is < 8 kHz
10. Amplitude ≥ 20 mV_{PP} into 50 Ω load

Display	
Size	15.6” capacitive multi-touch
Resolution	Full HD (1920 x 1080)
Annotations	Up to 100, floating or anchored
Grids and Windows	Up to 16 grids on up to 8 waveform windows
Waveform modes	Connected samples (sin(x)/x interpolated or lines), dots only
Persistence modes	Infinite, variable, color graded

Computer system	
Operating system	Windows 10
CPU	Intel Core i5-6500, 3.2 GHz
System memory	8 GB
Hard drives	500 GB removeable SSD, upgradeable to 1 TB SSD, additional of either are available
Peripherals	Optical USB mouse and full-siz e keyboard provided
LXI compliance	Class C

I/O	
LAN	RJ-45 connector, supports 10/100/1000Base-T. Enables Web-enabled remote control, email on trigger, data/file transfers and network printing (supports up to 80 MB/s data offloading)
USB	6x USB 3.0 host ports (2x front panel, 4x side panel), 1x USB 3.0 device port (side panel, supports up to 200 MB/s data offloading)
Audio	Microphone, line in, line out
Display out	DisplayPort and VGA (supports up to two simultaneous displays)
Trigger out	TTL levels, high impedance load
Auxiliary out	Configurable: DC level, probe compensation, trigger out, or a demo signal
Timebase reference output	Amplitude into 50 Ω: 1.65 ± 0.05 V_{pp} (8.3 ± 0.3 dBm) sine wave (internal or external timebase reference selected)
	Frequency: 10 MHz ± (8 ppb initial + 75 ppb/year aging) when internal timebase reference is selected; external reference frequency when external timebase reference is selected
Timebase reference input	Amplitude into 50 Ω: 356 mV_{PP} (-5 dBm) to 5 V_{PP} (+18 dBm) sine, 285 mV_{PP} to 4 V_{PP} square
	Frequency: 10 MHz ± 5 ppm

Supported file types		
Infiniium setup files	.set	Infiniium settings only
	.osc	settings and waveform data
Waveform files, compressed	wfm	binary, Infiniium format
	.bin	binary, approx. 5x smaller than larger XY format
	.h5	open source, Infiniium or InfiniiVision format
	.mat	MATLAB
Waveform files, raw data	.csv	XY values, comma-separated
	.tsv	XY values, tab-separated
	.txt	Y values
Image files	png	24-bit color
	.jpg	24-bit color
	.bmp	24-bit color
	.gif	8-bit color
	.tif	8-bit color
	All images may be saved or printed with waveforms only, inverted backgrounds, with setup info, and/or in a compressed format.	

Environmental, safety and dimensions		
Temperature	Operating	+5 to +40 °C
	Non-operating	-40 to +70 °C
Humidity	Operating	≤ 80% relative humidity (non-condensing) at +40 °C
	Non-operating	≤ 90% relative humidity (non-condensing) up to +70 °C
Altitude	Operating	Up to 3,000 m (9,842 ft)
	Non-operating	Up to 15,300 m (50,196 ft)
Power	100 to 120 V @ 50/60/400 Hz	
	100 to 240 V @ 50/60 Hz	
	Max power dissipated	4 channel models: 450 Watts
		8 channel models: 650 Watts
Acoustic Noise	Operator position (standing, 0.5 m height at 0.25 m away)	4 channel models: 45.5 dB
		8 channel models: 49.9 dB
	Bystander position (1 m height at 1 m away)	4 channel models: 39.4 dB
		8 channel models: 42.9 dB
Weight	Frame	4 channel models: 13.75 kg (30.3 lbs.)
		8 channel models: 14.50 kg (32.0 lbs.)
	Shipping	4 channel models: 20.95 kg (46.2 lbs.)
		8 channel models: 21.90 kg (48.3 lbs.)
		Package: 7.2 kg (15.9 lbs.)
Dimensions	Height	327 mm (12.9 in) with feet retracted
	Width	443 mm (17.5 in)
	Depth	223 mm (8.8 in) including knobs and rear feet
Safety	IEC 61010-1:2017	
	IEC 61010-2-030:2017	
	UL 61010-1:2012 (3rd edition)	
	UL 61010-2-030:2018	
	CAN/CSA-22.2 No. 61010-1-12	
	CAN/CSA-22.2 No. 61010-2-030-17	
EM standards	CISPR 11/EN 55011	
	IEC 61000-4-2/EN 61000-4-2	
	IEC 61000-4-3/EN 61000-4-3	
	IEC 61000-4-4/EN 61000-4-4	
	IEC61326-1:2012/EN61326-1:2013	

Ordering Guide and Upgrade Information

Ordering your EXR-Series oscilloscope couldn't be easier. Contact your Keysight representative or authorized partner for more information, or to place an order: www.keysight.com/find/contactus

Standard accessories

Description	Part	Quantity
Passive Probe, 10:1, 500 MHz	N2873A	4 or 8
50 Ω Calibration Cable, 1 meter	54609-61609	1
Accessory Pouch	54925-62301	1
Protective Front Cover	54925-44101	1
Local Power Cord	Varies	1
Full-Size Keyboard	0960-3245	1
Optical Scroll Wheel Mouse	0960-3246	1
1 Year Factory Calibration Certificate	–	1
Safety Leaflets, if Applicable	–	1
Probe Selection Guide	–	1

Main model configuration

This page is intended for configuring a new unit. For post-purchase upgrades, see the last page.

Channel bandwidth	4 channels	8 channels
500 MHz	EXR054A	EXR058A
1 GHz	EXR104A	EXR108A
2 GHz	EXR204A	EXR208A
2.5 GHz	EXR254A	EXR258A

Integrated instruments	Model
4-digit digital voltmeter, 10-digit counters	Standard
Arbitrary Waveform Generator, 50 MHz	EXR2WAV
Logic Analysis, 16 Channels (includes N2756A probe)	EXR2MSO
Frequency Response Analyzer, 50 MHz (Bode plotter)	Part of D9010PWRA Or included in EXR2WAV
Phase Noise Analyzer	Part of D9010JITA
Protocol Analyzer	Various, see next pages

Performance upgrades	Model
Memory Upgrade, 200 Mpts/ch	EXR2MEM-001
Memory Upgrade, 400 Mpts/ch	EXR2MEM-002
Memory Upgrade, 1.6 Gpts Combined Flexible Memory	EXR2MEM-004
Upgrade to 1 TB Removable SSD	EXR2SSD-01T
ISO 17025 Calibration (Not Accredited)	EXR000-1A7
ISO 17025 Calibration (Accredited)	EXR000-AMG

Additional equipment	Model
Rackmount Kit, 8U	EXR2RACK
Additional Removable SSDs, 500 GB or 1 TB	EXR2SSD
Hard Shell Transit Case, Sold by CaseCruzer	3F2002-1910C 1
BNC(m) to SMA(f) Adapters, DC-10 GHz	54855-67604
GPIB Adapter, Sold by ICS Electronics	4865B 1

1. Parts available from third party vendors listed in description, not sold by Keysight.

Probes and Accessories

The Infiniium EXR-Series oscilloscopes include both 1 MΩ and 50 Ω paths. This expands their flexibility by making them compatible with a wider range of probes than high-performance oscilloscopes that only support a 50 Ω path. All models ship standard with an N2873A 500 MHz passive probe per channel and support a wide range of about 100 compatible current and voltage probes.

Additionally, legacy probes from Tektronix may be used on the EXR-Series with the proper adapter, listed below. See the data sheet for a list of compatible probes.

The table below highlights probes commonly used with the Infiniium EXR- Series. Read *The Infiniium Oscilloscope Probes and Accessories Guide* for additional information, or visit the Probe Resource Center at prc.keysight.com.

Category	Models	Description
Passive	N2870A-76A	2.5 mm probe tip diameter for fine pitch component probing, easily replaceable spring-loaded or solid probe tip, 10-25 pF input C (high-Z, 10:1) covers wide range of scope input, 7 probes and 4 accessory kits available, N2873A shipped with Infiniium EXR series
Hi-Z+ Passive *All New!*	PP0001A-03A	Three passive probes that, with the help of an adapter, can achieve best-in-class bandwidth, voltage, and loading specifications, up to 1 GHz or 1.2 kV.
Digital	N2756A	Ships with EXR2MSO option. 16 flying leads with grabbers, ground leads, and other accessories.
Single-ended Active	N2795A-97A	Up to 2 GHz, low cost, high impedance input (1 MΩ at DC), wide dynamic/offset range, headlight, -40 to +85 C of extreme temp range for chamber testing (N2797A)
Differential low voltage	N2750A-52A	Up to 6 GHz, 200 kΩ input, InfiniiMode for Diff, SE, CM probing, built-in multifunction scope control, headlight
Differential high voltage	DP0001A	400 MHz, 2 kV input, high CMRR >80 dB at DC, UL safety certified
Current	N7026A	150 MHz, 30 ARMS, 1 mV/div sensitivity clamp-on, AutoProbe interface
High sensitivity current	N2820A/21A	3 MHz, measurable down to 100 µA AC/DC, provides wide dynamic range, ideal for capturing low level current flow
Power rail	N7020A	2 GHz, low noise for power rail noise measurement, high offset voltage, 50 kΩ loading at DC
Adapter	N2744A	Adapter for using legacy Tektronix TekProbe oscilloscopes. See data sheet for compatible models.

Analysis software packages

Software	Description	Data sheet
Signal integrity		
InfiniiScan Zone Trigger	InfiniiScan visual and measurement-based triggering	D9010SCNA
EZJit Complete	Timing jitter, vertical noise, and phase noise analysis	D9010JITA
De-Embedding	Modeling and simulating out cables, probes and fixtures	D9010DMBA
Advanced Signal Integrity	Opening closed eye diagrams	D9020ASIA
Power		
Power Integrity, Rails, PMICs	Power Integrity Analysis (PSIJ, SSN, victim/aggressor, etc.)	D9010POWA
Switch Mode Supplies	Power Supply Analysis (Input, Switching, Output, PSRR)	D9010PWRA
Additional packages		
PAM	PAM-4 measurements	D9010PAMA
User Defined Application	Remote measurement automation and test reports	D9010UDAA

Protocol decode and trigger software packages

Package	Description	Data sheet
Low Speed Serial	I^2C, SPI, Quad SPI, eSPI, RS232, UART, JTAG, I^2S, SVID, Manchester, MDIO	D9010LSSP
Embedded	USB 2.0, 10/100 Mb/s Ethernet, USB-PD, eUSB2, DisplayPort AUX	D9010EMBP
Low Speed Automotive	CAN, CAN-FD, LIN, SENT, FlexRay	D9010AUTP
MIPI Low Speed	RFFE, I^3C, SPMI	D9010MPLP
Military	ARINC 429, MIL-STD 1553, SpaceWire	D9010MILP
High Speed Automotive	100BASE-T1 Automotive Ethernet	D9020AUTP
Basic Protocol Bundle	Contains all packages above, except D9020AUTP	D9011BDLP

Offline testing

View and analyze test results at your desk! Save an oscilloscope file, then view and analyze on your PC using the full Infiniium user interface without needing additional access to your scope. Infiniium Offline uses the exact same code as your Infiniium EXR-Series.

Use waveform math, filtering, FFT, protocol decoding, jitter analysis, eye diagrams and more to get more insight. Infiniium offline is a truly powerful software tool to help you get your job done faster while freeing up precious hardware resources. See the Infiniium Offline data sheet to learn more.

Description	Details	Option
Infiniium Offline	Required as baseline software. Prerequisite to all other options.	D9010BSEO
EZJit Complete	Timing jitter, vertical noise, and phase noise analysis.	D9010JITO
Advanced Signal Integrity	Equalization, InfiniiSim, PAM-N analysis, and crosstalk	D9010ASIO
Low Speed Protocol Package	I^2C, SPI, SR232/UART, JTAG, CAN, CAN-FD, LIN, FlexRay, SVID, USB 2.0, USB-PD, MIPI RFFE, eSPI, I^2S, Ethernet 10/100BaseT, SpaceWire, SPMI, 100BASE-T1, Manchester, ARINC429, MIL-STD1553)	D9010LSPO
High Speed Protocol Package	DDR2/3/4, LPDDR2/3/4, Ethernet 10GBASE-KR 64/66, Ethernet 100Base KR/CR, MIPI [CSI-3, DigRF v4, D-PHY, LLI, RFFE, UniPro], PCIe Gen 1/2/3, SATA/SAS, UFS, USB 2.0, USB 3.0, USB 3.0 SSIC, USB 3.1, C-PHY	D9010HSPO

Post-purchase upgrades

Hardware options	Model
Add logic analysis, 16 channels (includes N2756A probe)	EXR2MSO
Add arbitrary waveform generator, 50 MHz	EXR2WAV
Rackmount Kit, 8U	EXR2RACK
Additional Removable SSD, 500 GB	EXR2SSD-500
Additional Removable SSD, 1 TB	EXR2SSD-01T

Memory upgrades			
	…to 200 Mpts/ch	…to 400 Mpts/ch	…to 1.6 Gpts/ Combined Flexible Memory
From 100 Mpts/ch…	EXR2MEM-001	EXR2MEM-002	EXR2MEM-004
From 200 Mpts/ch…	-	EXR2MEM-003	EXR2MEM-005
From 400 Mpts/ch….	-	-	EXR2MEM-006

Bandwidth upgrades		4 channels	8 channels
From 500 MHz…	…to 1 GHz	EXR2BW-001	EXR2BW-007
	…to 2 GHz	EXR2BW-002	EXR2BW-008
	…to 2.5 GHz	EXR2BW-003	EXR2BW-009
From 1 GHz…	…to 2 GHz	EXR2BW-004	EXR2BW-010
	…to 2.5 GHz	EXR2BW-005	EXR2BW-011
From 2 GHz…	…to 2.5 GHz	EXR2BW-006	EXR2BW-012

1. Every model is calibrated to 2.5 GHz from the factory, so bandwidth upgrades require no further calibration outside of the standard recommended interval.

Analog channel upgrades	Model
Channel upgrade from 4 to 8 channels, 500 MHz	EXR28CH-001
Channel upgrade from 4 to 8 channels, 1 GHz	EXR28CH-002
Channel upgrade from 4 to 8 channels, 2 GHz	EXR28CH-003
Channel upgrade from 4 to 8 channels, 2.5 GHz	EXR28CH-004

1. Requires return to Keysight service center. Model and serial number are kept. Cost of upgrade does not include shipping.

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications, or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

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