

# Keysight Infiniium EXR-Series Oscilloscopes

## The best of Keysight in one platform...

- ✓ ASICs from our Infiniium UXR-Series
  - HW accelerated eyes and triggering
  - Fantastic ENOB and low noise
- ✓ 7-in-1 integration from our InfiniiVision X-Series

## With a Number of Industry Firsts!

- ✓ Over 2 GHz on ALL 8 channels
- ✓ 4 to 8 channel upgrades
- ✓ Hardware accelerated eyes *with 10 bits resolution*

## Exciting new customer delighters:

- ✓ 1920x1080 wide **HD display**
- ✓ Auto **Fault Hunter** application
- ✓ 50 MHz FG with **demo signals**
- ✓ Dual **10 digit counters**
- ✓ **4 digit DVM**
- ✓ Faster **hardware averaging**
- ✓ 4 to 8 **channel upgrade**
- ✓ **HW protocol** trigger
- ✓ History mode
- ✓ **8 channel mask** testing
- ✓ **100 Mpts/ch standard** memory

## The benefits of the Infiniium EXR-Series over the Infiniium S-Series

### See More.

- ✓ **ENOB equal or higher** at every frequency
- ✓ Up to **25% lower noise** (63  $\mu$ V at 1 GHz)

### Do More.

- ✓ **8 analog channels**
- ✓ Fully **upgradeable**
- ✓ **New Fault Hunter** application
- ✓ **7-in-1** instrumentation

### Save Time.

- ✓ Trigger rate **>200x faster**
- ✓ Build eye-diagrams **>50x faster**
- ✓ Waveform averaging **>120x faster**

## First in class with...



... >2 GHz on 8 channels



... full upgradeability, no exceptions!



...Fault Hunter for fast and efficient debug!

## For More Info...

Resources Available: [CSG Resource Center](#)

[Mike Hoffman](#) – Product Manager

[David Liu](#) – Business Development

## Infiniium EXR-Series Specifications

Analog channels	4 or 8, upgradeable
Bandwidth	500 MHz to 6 GHz
Sample rate	16 GSa/s
Memory	100 Mpts/ch → 400 Mpts/ch
Resolution	10 bits, up to 16 with high-res
Digital channels	16 (dedicated logic probe)
Noise floor	As low as 43 $\mu$ V
ENOB	Up to 9.0
Integrated tools	Scope, Logic, Protocol, DVM, Counter, WaveGen, Bode Plots



# Key Features and Competition

## Where the Infiniium EXR-Series Wins

	KEYS	Tek		Rohde		LeCroy	
	EXR-Series	5 Series	6 Series	RTO2000	RTP	WavePro HD	8000HD
>2 GHz bandwidth, 8 channels	✓	✗	✗	✗	✗	✗	✗
16 GSa/s sample rate, 8 channels	✓	✗	✗	✗	✗	✗	✗
Upgradeable channels	✓	✗	✗	✗	✗	✗	✗
Timebase accuracy <10 ppb	✓	✗	✗	✗	✗	✗	✗
<b>Dual</b> 10 digit counters	✓	✗	✗	✗	✗	✗	✗
>750,000 UI/s eye diagrams	✓	✗	✗	✗	✗	✗	✗
100 Mpts/ch STANDARD memory	✓	✗	✗	✗	✗	✗	✗
Time-based software licenses	✓	✗	✗	✗	✗	✗	✗
Upgradeable bandwidth (license)	✓	✗	✓	✗	✗	✗	✗
50 MHz function generator	✓	✓	✓	✗	✗	✗	✗
4 digit DVM	✓	✓	✓	✗	✗	✗	✗
≥10 bit ADC	✓	✓	✓	✗	✗	✓	✓
>200,000 wfm/s update rate	✓	✓	✓	✓	✓	✗	✗

**Have you thought of more? Let us know!**

## Industries and Applications



### Power Integrity

- ✓ Dedicated Power Integrity application
- ✓ 2 or 6 GHz Power Rail Probes
- ✓ 8 channels for PMIC / power sequencing
- ✓ Mask testing on every channel
- ✓ Automatic delta time measurements



### High Speed Digital

- ✓ High ENOB, low noise, and fast plotting
- ✓ Complete jitter and noise decomposition
- ✓ De-embed the effects of probes/fixtures
- ✓ Remove effects of channel noise and ISI
- ✓ Hundreds of probes and accessories



### Automotive

- ✓ CAN/CAN-FD/CAN-dbc, LIN, SENT decode and trigger
- ✓ Auto. Ethernet decode, trigger, compliance
- ✓ Suite of single-ended, differential probes
- ✓ Mixed signal operation to test inputs and outputs of sensors



### Aero / Defense

- ✓ ARINC 429, MIL-STD-1553, SpaceWire decode and trigger
- ✓ Removable SSD for easy movement in secure environments
- ✓ Full remote programming for test systems
- ✓ Low noise and high sensitivity for small signals

## What Competitors Might Say, and Why the Infiniium EXR-Series Wins

Competitor	Challenges // Responses	Where Infiniium EXR-Series Wins
5 Series	<ul style="list-style-type: none"> <li>• FastAcq mode (fast update rate) // <b>FastAcq is a special mode with limited 1k memory</b></li> <li>• Linux OS option, “sleeker” UI // <b>purely customer preference, our menu and mouse driven interface is intuitive</b></li> <li>• 12 bit ADC // <b>Noise levels are so high that their ADC resolution is rendered useless</b></li> <li>• 6 channel model available // <b>this was only to accommodate 4 analog + 16 digital since they use FlexChannel</b></li> </ul>	Better signal integrity; lower noise at almost every setting; more bandwidth, higher sample rate and memory; channel upgrades; faster update rate and measurements; no FlexChannel compromise
6 Series	<ul style="list-style-type: none"> <li>• FastAcq mode (fast update rate), Linux OS option, “sleeker” UI, 12 bit ADC // <b>see above</b></li> <li>• Higher BW / sample rate // <b>sell S-Series for customers who need 8 GHz, but know they offer 4x 8 GHz ch.</b></li> <li>• Higher ENOB // <b>We have lower noise at many settings, and a more accurate timebase. But their ENOB is good</b></li> </ul>	8 channel model; more memory; faster update rate; faster measurements; no FlexChannel compromise; lower noise on higher BW/sensitivities
RTO2000	<ul style="list-style-type: none"> <li>• Faster update rate // <b>they sacrificed screen resolution, ADC bits, noise, and ENOB in the process</b></li> <li>• RF superiority for cleaner front end // <b>they offer worse noise and lower ENOB</b></li> </ul>	8 channel model; 10 bit ADC; 7-in-1 instruments; lower noise and better ENOB
WavePro HD	<ul style="list-style-type: none"> <li>• 5 Gpts memory // <b>only available for single shots. Analysis memory limited to 500 Mpts</b></li> <li>• 12 bits ADC // <b>their timebase is 20x less accurate and have higher noise at sensitive scales</b></li> <li>• Higher ENOB // <b>given above data, we have to question their ENOB calculation method. They don't share it</b></li> <li>• Higher BW / sample rate // <b>sell S-Series for customers who need 8 GHz, they offer 2x 8 GHz ch. like S-Series</b></li> </ul>	8 channel model; faster update rate; faster measurements
8000HD	<ul style="list-style-type: none"> <li>• 5 Gpts memory // <b>see above</b></li> <li>• 12 bits ADC // <b>their timebase is 200x less accurate and have higher noise at sensitive scales</b></li> <li>• Higher ENOB // <b>given above data, we have to question their ENOB calculation method. They don't share it</b></li> </ul>	More bandwidth; more sample rate; more memory depth; available channel upgrades; faster update rate; integrated instruments; lower noise on higher sensitivities

## The Keysight Infiniium EXR-Series Oscilloscope

While the Infiniium S-Series is an outstanding general-purpose oscilloscope, the new Infiniium EXR-Series combines the best signal integrity and capabilities of our industry-first technology in our advanced high-performance UXR-Series scope with the instrument integration and speed of our InfiniiVision scopes. This makes the Infiniium EXR-Series the best scope from 500 MHz to 2.5 GHz in the industry.



## The Benefits of the Keysight EXR-Series over the Keysight S-Series Oscilloscope

### The EXR-Series is Faster

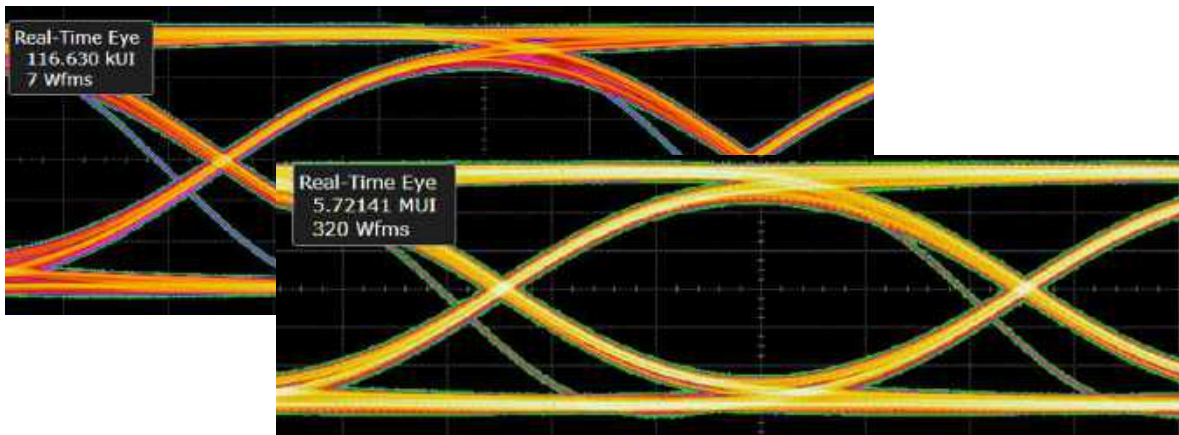
- ✓ Waveform update rate >200x faster
- ✓ Build eye-diagrams >50x faster
- ✓ On screen measurements >20% faster
- ✓ Waveform averaging >120x faster

### The EXR-Series is More Accurate

- ✓ ENOB is equal or higher at every frequency, period!
- ✓ Up to 25% lower noise (as low as 63  $\mu$ V at 1 GHz)

### The EXR-Series has Much More Test Capability

- ✓ 8 analog channels
- ✓ New Fault Hunter
- ✓ 7 instruments in 1
  - ✓ Digital oscilloscope
  - ✓ Logic Analyzer
  - ✓ Protocol Analyzer
  - ✓ New Digital Voltmeter
  - ✓ New 10-digit counter
  - ✓ New Arbitrary Waveform Generator
  - ✓ New Frequency Response Analyzer



The Infiniium EXR-Series builds eye diagrams 50 time faster than the S-Series. In the same amount of time, the EXR-Series captures 5.7 million UI while the S-Series captures only 0.12 million UI

Spec/Criteria	InfiniiVision 6000 X-Series	Infiniium S-Series	Infiniium EXR-Series
Channel Count, Analog	✗ 2 or 4	✗ 4	✓ 4 or 8
Channel Upgrades	✗ No	✗ No	✓ Yes
Bandwidths available	✗ 1, 2.5, 4, 6 GHz	✓ 500 MHz, 1, 2, 2.5, 4, 6, 8 GHz	✗ 500 MHz, 1, 2, 6 GHz
Max Bandwidth (2 channel)	✗ 6 GHz	✓ 8 GHz	✗ 6 GHz
Max Bandwidth (4 channels)	✗ 4 GHz	✗ 4 GHz	✓ 6 GHz
Max Bandwidth (8 channels)	✗ -	✗ -	✓ 6 GHz
Max Sampling Rate (all channels)	✗ 10 GSa/s	✗ 10 GSa/s	✓ 16 GSa/s
Total Scope Sample Rate	✗ 40 GSa/s	✗ 40 GSa/s	✓ 128 GSa/s
Vertical Resolution (ADC bits)	✗ 8	✓ 10	✓ 10
Standard Memory (all channels)	✗ 2 Mpts	✓ 100 Mpts	✓ 100 Mpts
Maximum Memory (all channels)	✗ 2 Mpts	✓ 400 Mpts	✓ 400 Mpts
Arbitrary Waveform Generator	✗ Yes (20 MHz)	✗ No	✓ Yes (50 MHz)
Counter	✗ Yes, one (10 digits)	✗ No	✓ Yes, three (10 digits)
Digital Voltmeter	✓ Yes (4 digits)	✗ No	✓ Yes (4 digits)
Fault Hunter	✗ No	✗ No	✓ Yes
Fast Capture History Mode	✗ No	✗ No	✓ Yes
Waveform Update Rate	✓ > 200,000 wfm/s	✗ < 1,000 wfm/s	✓ > 200,000 wfm/s
Eye Diagram Plotting Speed	✗ >15,000 UI/s	✗ >15,000 UI/s	✓ >750,000 UI/s
Noise Floor (100 mV/div, 1 GHz)	✗ 3,150 µV	✗ 960 µV	✓ 821 µV
ENOB (50mV/div)	✗ <7.0	✗ 7.8 (1 GHz), 7.4 (2.5 GHz)	✓ 8.0 (1 GHz), 7.5 (2.5 GHz)
Timebase Accuracy	✗ ±1,600 ppb	✗ ±12 ppb	✓ ±8 ppb
Intrinsic Jitter (w/ ext. ref)	✗ 600 fs rms	✗ 145 fs rms	✓ 120 fs rms
Waveform Averaging Speed	✗ >100 wfm/s	✗ >100 wfm/s	✓ >12,000 wfm/s
Screen Size/Resolution	✗ 12.1" / 800 x 600	✗ 15" / 1024 x 768 XGA	✓ 15.6" / 1920 x 1080 (Full HD)
Standard Storage (removable)	✗ None	✗ 256 GB SSD	✓ 500 GB SSD (1 TB SSD optional)
Power	200 W	380 W	4ch: 450 W; 8ch: 650 W
Weight	15 lbs. (6.8 kg)	26.4 lbs. (12 kg)	4ch: 30 lbs. (13.7 kg); 8ch: 32 lbs. (14.5 kg)
Dimensions	H 29cm x W 43cm x D 15cm	H 33cm x W 43cm x D 23cm	H 33cm x W 44cm x D 23cm

### Future Proof Your EXR-Series - Upgrade

- ✓ From 4-channels to 8-channels
- ✓ Bandwidth from 500 MHz to 6 GHz (license key upgrade)
- ✓ Add capture and analysis memory
- ✓ Extensive protocol decodes and compliance applications
- ✓ Full compliment of probes

### EXR-Series Industry Firsts

- ✓ First and only scope to support >2 GHz on 8 channels
- ✓ Upgrade from 4 to 8-channels
- ✓ Always on update rate > 200,000 wfm/s
- ✓ On-Screen Waveform Editor for AWG
- ✓ Keysight Fault Hunter analysis application
- ✓ Fully Upgradeable, no exceptions

# Keysight Infiniium EXR-Series vs. Tektronix 5 Series MSO

## The Infiniium EXR-Series is...

### Powerful.

- ✓ Keysight offers higher effective bits and lower noise at every bandwidth, less trigger jitter, and a more accurate timebase – all while providing triple the available bandwidth and 150% more sample rate.
- ✗ Tektronix reports a timebase accuracy (100x) and trigger jitter (up to 80x) worse than Keysight.
- ✓ Keysight offers more than 25 protocol trigger/decode options to meet your project's needs.
- ✗ Tektronix only supports about half that, without key technologies like USB-PD or JTAG.
- ✓ Keysight offers a Power Integrity testing application, as well as standard mask testing on every channel, to help facilitate PMIC sequencing as well as measuring Power Supply Induced Jitter (PSIJ).
- ✗ Tektronix has no dedicated power integrity applications, nor offers standard mask test across all channels.

### Easy to Own.

- ✓ Keysight offers 100 Mpts/ch memory standard, with 400 Mpts/ch optional.
- ✗ Tektronix offers 38% less standard memory (62.5 Mpts) and 60% less sample rate (6.25 GSa/s).
- ✓ Keysight offers analog channel upgrades, and bandwidth upgrades that don't require a trip to a service center. Each analog channel is upgradeable to 6 GHz without leaving your bench.
- ✗ Tektronix does not have channel upgrades. Bandwidth is capped at 2 GHz, and upgrading to 2 GHz requires return to Tektronix for service.
- ✓ Keysight's traditional MSO setup has 4 or 8 analog and 16 digital channels, all independent.
- ✗ Tektronix only offers eight total inputs, which can either be 1 analog or 8 digital channels. This creates compromise for analyzing mixed signal designs, and redundancy when purchasing probes.

### Intuitive to Use.

- ✓ Keysight offers always-on triggering up to 200,000 waveforms per second, showing >60,000% more data on screen without special modes. Eye diagrams are plotted at >750,000 UI/s, getting you results faster.
- ✗ Tektronix does offer FastAcq mode, but only with limited memory, reducing sample rates (and bandwidth) drastically at most timebase settings. Eyes are plotted >98% slower.
- ✓ Keysight offers Fault Hunter and setup wizards for analysis, reducing setup and increasing repeatability.
- ✗ Tektronix doesn't offer explicit setup wizards for setup of tests like eye diagrams or jitter analysis.



### Infiniium EXR-Series Specifications

Bandwidth	500 MHz to 6 GHz
Analog Channels	4 or 8, upgradeable
Digital Channels	16 (dedicated logic probe)
Resolution	Up to 16 with intelligent high-resolution mode
Plotting Speeds	Eye Diagrams: >750,000 UI/s Triggering: >200,000 wfms/s
Memory	100 Mpts/channel standard 400 Mpts/channel optional
Sample Rate	16 GSa/s
ENOB	As high as 9.0
Noise	As low as 43 $\mu$ V

		Infiniium EXR-Series	Tektronix 5 Series	
Powerful	Analog channels	✓ 4 or 8	✓ 4, 6, or 8	
	Analog channels w/ 16 ch digital	✓ 4 or 8	✗ Up to 6	
	Channel Bandwidths	✓ 500 MHz, 1 GHz, 2 GHz, 6 GHz	✗ 350 MHz, 500 MHz, 1 GHz, 2 GHz	
	Analog sample rate	✓ 16 GSa/s	✗ 6.25 GSa/s	
	Sample Memory	✓ 100 Mpts/ch standard, 400 Mpts/ch optional	✗ 62.5 Mpts/ch standard, 500 Mpts/ch optional	
	Effective Number of Bits (ENOB)	✓ 2 GHz: 7.6 bits, 1 GHz: 8.0 bits, 500 MHz: 8.2 bits	✗ 2 GHz: not given, 1 GHz: 7.6 bits, 500 MHz: 7.9 bits	
	Noise as a percentage of full scale (Tektronix provides no 2 GHz data)	1 mV/div	✓ 1 GHz: 0.91%,	✗ 1 GHz: 2.54% (179% worse)
			✓ 500 MHz: 0.79%,	✗ 500 MHz: 1.98% (150% worse)
			✓ 20 MHz: 0.54%	✗ 20 MHz: 0.70% (29% worse)
		10 mV/div	✓ 1 GHz: 0.12%	✗ 1 GHz: 0.28% (133% worse)
			✓ 500 MHz: 0.10%	✗ 500 MHz: 0.22% (120% worse)
			✓ 20 MHz: 0.58%	✗ 20 MHz: 0.80% (38% worse)
	100 mV/div	✓ 1 GHz: 0.10%	✗ 1 GHz: 0.16% (60% worse)	
		✓ 500 MHz: 0.09%	✗ 500 MHz: 0.12% (50% worse)	
		✗ 20 MHz: 0.57%	✓ 20 MHz: 0.46% (19% better)	
	Timebase accuracy	✓ 8 ppb	✗ 500 ppb	
	Trigger jitter	✓ <531 fs <sub>RMS</sub>	✗ Edge: <5,000 fs <sub>RMS</sub> , other: <40,000 fs <sub>RMS</sub>	
Easy to Own	Arbitrary Waveform Generator	✓ Yes, 50 MHz	✓ Yes, 50 MHz	
	DVM	✓ 4 digit standard	✓ 4 digit, registration required	
	Counter	✓ Three available; 2x 10 digit general, 1x 8 digit trigger; standard	✗ 8 digit, triggered signals only, registration required	
	Mask testing	✓ 8 channels, standard	✗ 8 channels, optional, more limited functionality	
	Analog Channel Upgrades	✓ Yes	✗ No	
	Bandwidth Upgrades	✓ Yes, always field upgradeable	✗ Yes, may require return to service center	
	External monitor	✓ Interface can be extended to second display	✗ Interface can only be duplicated	
	Onboard storage	✓ 500 GB SSD standard, 1 TB SSD optional (both removable)	✗ 80 GB m.2 standard, 480 GB SSD optional (both removable)	
	Operating system	✓ Windows 10, no extra cost	✗ Embedded standard, Windows 10 at extra cost	
	Shareable licenses	✓ USB portable, server based (Keysight's or your own)	✓ Server based (Tektronix's)	
	Flexible, time-based licenses	✓ Yes: 6, 12, 24, or 36 month terms	✗ No	
	Intuitive to Use	One-Click "Quick" Analysis	✓ Eye Diagrams, Jitter Analysis, Fault Hunter	✗ No
		Fault Hunter	✓ Yes, Standard	✗ No
Setup Wizards		✓ Yes, provided for all analysis capabilities		
Trigger rate, normal mode[1]		✓ >200,000 waveforms/sec	✗ <300 waveforms/sec	
Trigger rate, special mode		✓ >200,000 waveforms/sec, no special mode required	✓ >500,000 waveforms/sec using FastAcq (see other side for more)	
Eye diagram plotting rate		✓ >750,000 UI/sec	✗ >13,000 UI/sec[2]	

1. 5 Series trigger rate is not specified without FastAcq, and was measured by Keysight using 10 MHz sine wave, optimizing the scope's timebase, and taking the mean of 1,000 frequency measurements of the trigger out signal.

2. Eye plotting speeds is not specified by Tektronix, and was measured by Keysight using a 25 MHz data signal, optimizing the scope's timebase and memory depth, and measuring UIs captured in a 30 second time window.

# Keysight Infiniium EXR-Series vs. Teledyne LeCroy WavePro HD

## The Infiniium EXR-Series is...

### Powerful.

- ✓ Keysight offers 16 GSa/s and 6 GHz on every channel, with a timebase accuracy of 8 parts per billion.
- ✗ Teledyne LeCroy's 4 ch. sample rate is 60% lower, with 12x worse timebase accuracy.
- ✓ Keysight offers more than 25 protocol trigger/decode options to meet your project's needs.
- ✗ Teledyne LeCroy only supports about half that, with many of those being decode only. This forces you to trigger on generic edges and search for packets of interest.

### Easy to Own.

- ✓ Keysight offers a built-in AWG, DVM, counter, Bode plotter, and spectrum analyzer, in addition to the usual logic analysis (MSO) and protocol analysis integrated in the unit.
- ✗ Teledyne LeCroy only offers the usual logic analysis and protocol analysis.
- ✓ Keysight offers channel upgrades, and bandwidth upgrades that don't require a trip to a service center. Each analog channel is upgradeable to 6 GHz without leaving your bench.
- ✗ Teledyne LeCroy offers no channel or bandwidth upgrades.
- ✓ Keysight offers flexible, time-based licenses that let you match your budget to your project timelines. We also offer licensing to a single scope, or licenses that can be shared between scopes across the globe.
- ✗ Teledyne LeCroy only offers perpetual licenses that are assigned to a single oscilloscope.

### Intuitive to Use.

- ✓ Keysight offers always-on triggering up to 200,000 waveforms per second, meaning you see >600x more data without special modes. Eye diagrams are plotted at >750,000 UI/s, getting you results faster.
- ✗ Teledyne LeCroy's update rate in run mode is <300 wfm/s, making it prone to missing infrequent events.
- ✓ Keysight's InfiniiScan Visual Trigger allows you to isolate events with just your fingertip.
- ✗ Teledyne LeCroy does not offer any visual triggering system.
- ✓ Keysight offers Fault Hunter and setup wizards for analysis, reducing setup and increasing repeatability.
- ✗ Teledyne LeCroy doesn't offer explicit setup wizards for setup of tests like eye diagrams or jitter analysis.



### Infiniium EXR-Series Specifications

Bandwidth	500 MHz to 6 GHz
Analog Channels	4 or 8, upgradeable
Digital Channels	16 (dedicated logic probe)
Resolution	Up to 16 with intelligent high-resolution mode
Plotting Speeds	Eye Diagrams: >750,000 UI/s Triggering: >200,000 wfm/s
Memory	100 Mpts/channel standard 400 Mpts/channel optional
Sample Rate	16 GSa/s
ENOB	As high as 9.0
Noise	As low as 43 $\mu$ V

	Infiniium EXR-Series	LeCroy WavePro HD	
Powerful	Analog channels	✓ 4 or 8	✗ 4 only
	Analog channels w/ 16 ch MSO	✓ 4 or 8	✗ 4 only
	Channel bandwidth	✓ 500 MHz, 1 GHz, 2 GHz, 6 GHz	✓ 2.5 GHz, 4 GHz, 6 GHz, 8 GHz
	4 channel sample rate	✓ 16 GSa/s	✗ 10 GSa/s
	Sample memory (all channels)	✓ 100 Mpts/ch standard, 400 Mpts/ch optional	✓ 50 Mpts/ch standard, 2.5 Gpts/ch optional
	Analysis memory (all channels)	✓ 400 Mpts	✓ 500 Mpts
	Timebase accuracy	✓ 8 ppb	✗ 100 ppb
	Trigger jitter	✓ <531 f <sub>S</sub> RMS	✗ <2,500 f <sub>S</sub> RMS
	System ENOB	✓ 2.5 GHz: 7.5	✓ 2.5 GHz: 7.8 (4% better)
	Noise at 1 mV/div	✓ 2.5 GHz: 100 μV	✗ 2.5 GHz: 155 μV (55% worse)
	Noise at 10 mV/div	✓ 2.5 GHz: 144 μV	✗ 2.5 GHz: 155 μV (8% worse)
	Noise at 100 mV/div	✗ 2.5 GHz: 1.17 mV	✓ 2.5 GHz: 889 μV (24% better)
Easy to Own	Bandwidth upgrades	✓ Yes, always field upgradeable	✗ No
	Analog channel upgrades	✓ Yes	✗ No
	Shareable licenses	✓ USB portable, server based (Keysight's or your own)	✗ Locked to one oscilloscope only
	Flexible, time-based licenses	✓ Yes: 6, 12, 24, or 36 month terms	✗ No
	Arbitrary waveform generator	✓ Yes, 50 MHz	✗ No
	DVM	✓ 4 digit standard	✗ No
	Counter	✓ Three standard; 2x 10 digit general, 1x 8 digit trigger	✗ No
Intuitive to Use	Trigger rate, normal mode	✓ >200,000 waveforms/sec (hardware)	✗ <300 wfm/s
	Visual triggering	✓ Yes, InfiniiScan, 16 rectangular zones	✗ No
	Mask testing	✓ 8 channels standard	✗ 1 channel standard
	One-Click "Quick" Analysis	✓ Eye Diagrams, Jitter Analysis, Fault Hunter	✗ No
	Fault Hunter	✓ Yes, Standard	✗ No
	Setup Wizards	✓ Yes, provided for all analysis capabilities	✗ Only for jitter



# Keysight Infiniium EXR-Series vs. Tektronix 6 Series MSO

## The Infiniium EXR-Series is...

### Powerful.

- ✓ Keysight offers more than 25 protocol trigger/decode options to meet your project's needs.
- ✗ Tektronix only supports about half that, without key technologies like USB-PD or JTAG.
- ✓ Keysight offers a Power Integrity testing application, as well as standard mask testing on every channel, to help facilitate PMIC sequencing as well as measuring Power Supply Induced Jitter (PSIJ).
- ✗ Tektronix has no dedicated power integrity applications, nor offers standard mask test across all channels

### Easy to Own.

- ✓ Keysight offers analog channel upgrades, and bandwidth upgrades that don't require a trip to a service center. Each analog channel is upgradeable to 6 GHz without leaving your bench.
- ✗ Tektronix does not have channel upgrades, limited to 4 analog channels.
- ✓ Keysight's traditional MSO setup has 4 or 8 analog and 16 digital channels, all independent.
- ✗ Tektronix only offers four total inputs, which can either be 1 analog or 8 digital channels. This creates compromise for analyzing mixed signal designs, having only two analog inputs with 16 digital in use.
- ✓ Keysight offers 100 Mpts/ch memory standard, with 400 Mpts/ch optional.
- ✗ Tektronix is limited to 38% less standard memory (62.5 Mpts). This equates to 40% less time that can be acquired at full memory and sample rate (6.25 ms vs 2.5 ms) without expensive memory options.

### Intuitive to Use.

- ✓ Keysight offers always-on triggering up to 200,000 waveforms per second, meaning you can see >500% more data on screen without special modes. Eye diagrams are plotted at >750,000 UI/s, getting you results faster.
- ✗ Tektronix does offer FastAcq mode, but only with limited memory, reducing sample rates (and bandwidth) drastically at most timebase settings.
- ✓ Keysight offers Fault Hunter and setup wizards for analysis, reducing setup and increasing repeatability.
- ✗ Tektronix doesn't offer explicit setup wizards for setup of tests like eye diagrams or jitter analysis.
- ✓ Keysight offers standard mask testing on every channel, making things like turn-on test fast and easy.
- ✗ Tektronix only has mask test on a single channel.



### Infiniium EXR-Series Specifications

Bandwidth	500 MHz to 6 GHz
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Digital Channels	16 (dedicated logic probe)
Resolution	Up to 16 with intelligent high-resolution mode
Plotting Speeds	Eye Diagrams: >750,000 UI/s Triggering: >200,000 wfm/s
Memory	100 Mpts/channel standard 400 Mpts/channel optional
Sample Rate	16 GSa/s
ENOB	As high as 9.0
Noise	As low as 43 $\mu$ V

		Infiniium EXR-Series	Tektronix 6 Series
Powerful	Analog channels	✓ 4 or 8	✗ 4 only
	Analog channels w/ 16 ch MSO	✓ 4 or 8	✗ 2 only
	Analog bandwidth	✓ 500 MHz, 1 GHz, 2 GHz, 6 GHz	✓ 1 GHz, 2.5 GHz, 4 GHz, 6 GHz, 8 GHz
	Sample memory	✓ 100 Mpts/ch standard, 400 Mpts/ch optional	✗ 62.5 Mpts/ch standard, 1 Gpt/ch optional
	Timebase accuracy	✓ 8 ppb	✗ 12 ppb
	Trigger jitter	✓ <531 fs <sub>RMS</sub>	✗ Edge: <1,500 fs <sub>RMS</sub> ; other: <40,000 fs <sub>RMS</sub>
	System ENOB	✓ 1 GHz: 8.0	✓ 1 GHz: 8.2 (only 2.5% better)
		✓ 2 GHz: 7.6	✓ 2 GHz: 7.8 (only 2.6% better)
✓ 4 GHz: 7.2		✓ 4 GHz: 7.3 (only 1.3% better)	
✓ 6 GHz: 6.8		✓ 6 GHz: 6.8	
Easy to Own	Math functions available	✓ 40+	✓ 40+
	User definable functions?	✓ MATLAB integration for custom functions	✗ No
	Arbitrary waveform generator	✓ Yes, 50 MHz with on-screen editor	✗ Yes, 50 MHz, no on-screen editor
	DVM	✓ 4 digit standard	✓ 4 digit, registration required
	Counter	✓ Three available; 2x 10 digit general, 1x 8 digit trigger; standard	✗ 8 digit, triggered signals only, registration required
	Mask testing	✓ 8 channels standard	✗ 1 channel, optional
	Onboard storage	✓ 500 GB SSD standard (removable)	✗ 80 GB m.2 standard (removable)
		1 TB SSD optional (removable)	480 GB SSD optional (removable)
	Operating system	✓ Windows 10, no extra cost	✗ Embedded standard, Windows 10 at extra cost
	Shareable licenses	✓ USB portable, server based (Keysight's or your own)	✓ Server based (Tektronix's)
	Flexible, time-based licenses	✓ Yes: 6, 12, 24, or 36 month terms	✗ No
	Warranty	✓ 3 year standard, lifetime warranties available	✓ 3 year standard
Intuitive to Use	External monitor	✓ Interface can be extended to second display	✗ Interface can only be duplicated
	User interface control	✓ Conventional mouse/keyboard menu interface and touch	✗ Touch controls only
	One-Click "Quick" Analysis	✓ Eye Diagrams, Jitter Analysis, Fault Hunter	✗ No
	Fault Hunter	✓ Yes, Standard	✗ No
	Setup Wizards	✓ Yes, provided for all analysis capabilities	✗ No
	Trigger rate, normal mode[1]	✓ >200,000 waveforms/sec (hardware)	✗ >30,000 waveforms/sec

		Infiniium EXR-Series	Yokogawa DLM5000
Speed	Analog channels	✓ 4 or 8	✓ 4 or 8
	Digital channels	✗ 16	✓ Up to 32
	Bandwidths	✓ 500 MHz, 1 GHz, 2 GHz, 6 GHz	✗ 350 MHz, 500 MHz
	8 channel sample rate	✓ 16 GSa/s per channel	✗ 2.5 GSa/s per channel
	Trigger rate, normal mode	✓ >200,000 waveforms/sec (hardware)	✗ <1,000 wfm/s (estimated, not specified)
Accuracy	System ENOB	✓ 500 MHz: 8.2 bits, 1 GHz: 8.0 bits, 2 GHz: 7.6 bits	✗ Not specified
	Noise, 1 mV/div	✓ 200 MHz: 59 $\mu$ V	✗
		✓ 500 MHz: 63 $\mu$ V	✗
	Noise, 10 mV/div	✓ 200 MHz: 69 $\mu$ V	✗
		✓ 500 MHz: 81 $\mu$ V	✗
	Noise, 100 mV/div	✓ 200 MHz: 582 $\mu$ V	✗
		✓ 500 MHz: 681 $\mu$ V	✗
	Noise, 1 V/div	✓ 200 MHz: 4.1 mV	✗
		✓ 500 MHz: 5.07 mV	✗
	Timebase accuracy	✓ 5 ppb	✗ 2,500 ppb
Trigger jitter	✓ <531 fs <sub>RMS</sub>	✗ Not specified	
Capability	Sample memory (all channels)	✓ 100 Mpts/ch standard, 400 Mpts/ch optional	✗ 6.25 Mpts/ch standard, 125 Mpts/ch optional
	Math functions displayable at once	✓ 16	✗ 4
	Visual triggering	✓ Yes, InfiniiScan, 16 rectangular zones	✗ No
	Arbitrary Function Generator	✓ Yes, 50 MHz	✗ No
	DVM	✓ 4 digit standard	✗ No
	Counter	✓ 10 digit standard, any signal or channel	✗ No
	Mask testing	✓ 8 channels standard	✓ ?
Usability	Integrated Display	✓ 1920x1080, 15.6", capacitive touch	✗ 1024x768, 12.1", capacitive touch
	External monitor	✓ Interface can be extended to second display	✗ Duplicate only
	Onboard storage	✓ 480 GB SSD standard (removable), 960 GB SSD optional (removable)	✗ 1.8 GB standard, 7.2 GB optional
	Operating system	✓ Windows 10, no extra cost	✓ Embedded
	Shareable licenses	✓ USB portable, server based (Keysight's or your own)	✗ No
	Flexible, time-based licenses	✓ Yes: 6, 12, 24, or 36 month terms	✗ No
	Analog channel upgrades	✓ Yes	✗ No
	Bandwidth upgrades	✓ Yes, always field upgradeable	✗ No

# Keysight Infiniium EXR-Series vs. Teledyne LeCroy WaveRunner 8000HD

## The Infiniium EXR-Series is...

### Powerful.

- ✓ Keysight offers 16 GSa/s and 6 GHz on every channel, with a timebase accuracy of 8 parts per billion.
- ✗ Teledyne LeCroy's 8 ch. sample rate is 60% lower, with 120x worse timebase accuracy.
- ✓ Keysight offers more than 25 protocol trigger/decode options to meet your project's needs.
- ✗ Teledyne LeCroy only supports about half that, with many of those being decode only. This forces you to trigger on generic edges and search for packets of interest.

### Easy to Own.

- ✓ Keysight offers a built-in AWG, DVM, counter, Bode plotter, and spectrum analyzer, in addition to the usual logic analysis (MSO) and protocol analysis integrated in the unit.
- ✗ Teledyne LeCroy only offers the usual logic analysis and protocol analysis.
- ✓ Keysight offers channel upgrades, and bandwidth upgrades that don't require a trip to a service center. Each analog channel is upgradeable to 6 GHz without leaving your bench.
- ✗ Teledyne LeCroy offers no channel or bandwidth upgrades.
- ✓ Keysight offers flexible, time-based licenses that let you match your budget to your project timelines. We also offer licensing to a single scope, or licenses that can be shared between scopes across the globe.
- ✗ Teledyne LeCroy only offers perpetual licenses that are assigned to a single oscilloscope.

### Intuitive to Use.

- ✓ Keysight offers always-on triggering up to 200,000 waveforms per second, meaning you see >600x more data without special modes. Eye diagrams are plotted at >750,000 UI/s, getting you results faster.
- ✗ Teledyne LeCroy's update rate in run mode is <300 wfm/s, making it prone to missing infrequent events.
- ✓ Keysight's InfiniiScan Visual Trigger allows you to isolate events with just your fingertip.
- ✗ Teledyne LeCroy does not offer any visual triggering system.
- ✓ Keysight offers Fault Hunter and setup wizards for analysis, reducing setup and increasing repeatability.
- ✗ Teledyne LeCroy doesn't offer explicit setup wizards for setup of tests like eye diagrams or jitter analysis.



### Infiniium EXR-Series Specifications

Bandwidth	500 MHz to 6 GHz
Analog Channels	4 or 8, upgradeable
Digital Channels	16 (dedicated logic probe)
Resolution	Up to 16 with intelligent high-resolution mode
Plotting Speeds	Eye Diagrams: >750,000 UI/s Triggering: >200,000 wfm/s
Memory	100 Mpts/channel standard 400 Mpts/channel optional
Sample Rate	16 GSa/s
ENOB	As high as 9.0
Noise	As low as 43 $\mu$ V

		Infiniium EXR-Series	Teledyne LeCroy WaveRunner 8000HD
Powerful	Analog channels	✓ 4 or 8	✓ 8 only
	8 channel bandwidth	✓ 500 MHz, 1 GHz, 2 GHz, 6 GHz	✓ 500 MHz, 1 GHz, 2 GHz
	8 channel sample rate	✓ 16 GSa/s	✗ 5 GSa/s, 10 GSa/s with Enhanced Interpolation
	Standard memory	✓ 100 Mpts	✗ 50 Mpts
	Maximum memory (for analysis)	✓ 400 Mpts	✓ 500 Mpts
	Timebase accuracy	✓ 8 ppb	✗ 1,000 ppb
	Trigger jitter	✓ <531 fs <sub>RMS</sub>	✗ <2,500 fs <sub>RMS</sub>
	System ENOB	✓ 500 MHz: 8.2	✓ 500 MHz: 8.8 (7% better)
		✓ 1 GHz: 8.0	✓ 1 GHz: 8.6 (8% better)
		✗ 2 GHz: 7.6	✓ 6 GHz: 7.2 (11% better)
	Noise at 1 mV/div	✓ 500 MHz: 63 μV	✗ 500 MHz: 100 μV (59% worse)
		✓ 1 GHz: 73 μV	✗ 1 GHz: 130 μV (78% worse)
		✓ 2 GHz: 91 μV	✗ 2 GHz: 170 μV (87% worse)
	Noise at 10 mV/div	✓ 500 MHz: 81 μV	✗ 500 MHz: 125 μV (54% worse)
		✓ 1 GHz: 99 μV	✗ 1 GHz: 155 μV (70% worse)
		✓ 2 GHz: 131 μV	✗ 2 GHz: 200 μV (53% worse)
Noise at 100 mV/div	✗ 500 MHz: 681 μV	✓ 500 MHz: 310 μV (54% better)	
	✗ 1 GHz: 821 μV	✓ 1 GHz: 390 μV (52% better)	
	✗ 2 GHz: 1.06 mV	✓ 2 GHz: 510 μV (52% better)	
Easy to Own	Arbitrary Function Generator	✓ Yes, 50 MHz	✗ No
	DVM	✓ 4 digit standard	✗ No
	Counter	✓ Three standard; 2x 10 digit general, 1x 8 digit trigger	✗ No
	Bandwidth upgrades	✓ Yes, always field upgradeable	✗ No
	Analog channel upgrades	✓ Yes	✗ No
	Shareable licenses	✓ USB portable, server based (Keysight's or your own)	✗ Locked to one oscilloscope only
	Flexible, time-based licenses	✓ Yes: 6, 12, 24, or 36 month terms	✗ No
Intuitive to Use	Visual triggering	✓ Yes, InfiniScan, 16 rectangular zones	✗ No
	Mask testing	✓ 8 channels standard	✗ 1 channel standard
	Trigger rate, normal mode	✓ >200,000 waveforms/sec	✗ <300 wfm/s
	Eye diagram plotting rate	✓ >750,000 UI/s	✗ >80,000 UI/s
	One-Click "Quick" Analysis	✓ Eye Diagrams, Jitter Analysis, Fault Hunter	✗ No
	Fault Hunter	✓ Yes, Standard	✗ No
	Setup Wizards	✓ Yes, provided for all analysis capabilities	✗ Only for jitter