

# Keysight 4000 X-Series vs. R&S RTO Series

## InfiniiVision 4000 X-Series

### Oscilloscope Experience Redefined

- 12.1-inch capacitive touch display
- InfiniiScan Zone touch trigger
- > 1,000,000 wfm/sec uncompromised
- Standard segmented memory
- Bandwidth upgrade to 1.5 GHz
- Fully upgradable 5-instrument-in-1
  - Oscilloscope
  - Digital channels (MSO)
  - Protocol analysis
  - Dual-channel WaveGen with arbitrary waveform and modulation support
  - Digital voltmeter (DVM)
- InfiniiView oscilloscope analysis software

Imagine an oscilloscope that sees everything, triggers on anything, has the ease-of-use of a tablet device and grows with your projects. The new 4000 X-Series oscilloscopes are engineered for next-generation performance, delivering waveform update rates orders of magnitude faster than the competition to display the most signal detail on an industry-leading 12.1-inch capacitive touch screen with innovative InfiniiScan Zone touch triggering for the most intuitive and responsive oscilloscope measurements. Coupled with a fully upgradable 5-instruments-in-1, the 4000 X-Series provides maximum investment protection. It's without a doubt the very best embedded-operating system oscilloscope on the market today.



	Keysight 4000 X-Series		Rohde & Schwarz RTO
Bandwidth	200 MHz, 350 MHz, 500 MHz, 1 GHz, 1.5 GHz	<input type="checkbox"/>	600 MHz, 1 GHz, 2 GHz, 4 GHz
Upgradable bandwidth	Yes	<input type="checkbox"/>	Not available
Sampling rate	Up to 5 GSa/s	<input type="checkbox"/>	10 GSa/s up to 2 GHz (2x more) 20 GSa/s on 4 GHz (4x more)
Update rate (analog ch only)	> 1 M Wfms/sec	<input type="checkbox"/>	> 1 M Wfms/sec
Update rate (vectors on)	> 1 M Wfms/sec (1.66x faster)	<input type="checkbox"/>	> 600 K Wfms/sec
Update rate (analog + digital)	> 1 M Wfms/sec (5x faster)	<input type="checkbox"/>	> 200 K Wfms/sec
Update rate (analog + decode)	> 1 M Wfms/sec (1,428x faster)	<input type="checkbox"/>	~ 700 Wfms/sec
Std. memory depth half ch	Up to 4 M	<input type="checkbox"/>	Up to 40 M (10x more)
Display size	12.1" (>35% more viewing area)	<input type="checkbox"/>	10.4"
Touch screen	Yes – capacitive	<input type="checkbox"/>	Yes – resistive
HW-based zone trigger	Yes – InfiniiScan Zone touch trigger	<input type="checkbox"/>	Not available
Waveform generator	Yes – integrated 2-ch	<input type="checkbox"/>	Not available
Serial support	USB Low/Full/Hi, I2C, SPI, RS232, UART, CAN, LIN, I2S, ARINC, 1553, FlexRay	<input type="checkbox"/>	I2C, SPI, RS232, UART, CAN, LIN, FlexRay
Application support	Mask, FPGA, Power, Video, InfiniiView, VSA/ASV	<input type="checkbox"/>	Mask
Standard passive probe	700 MHz passive (50% more)	<input type="checkbox"/>	500 MHz passive
System BW (w/ std. probe)	700 MHz for 1 GHz and above models	<input type="checkbox"/>	Not specified (likely 500 MHz)
Knob per channel	Yes	<input type="checkbox"/>	Not available

**MegaZoom** IV custom ASIC powers the fast update rate, MSO, function generator, protocol analysis and responsive, deep memory



## Experience the Speed

With an uncompromised 1,000,000 wfm/sec update rate:



Decoding RS232 link while looking at a metastable edge on the 4000 X-Series. With just 1 s of persistence turned on you can see multiple glitches on either side of the metastable edge.

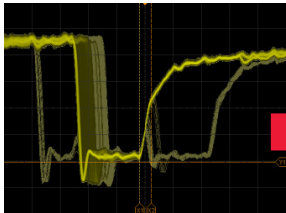


Decoding RS232 link while looking at a metastable edge on the RTO. Notice, even after 20 s of infinite persistence, the RTO is unable to capture the infrequent glitches on either side of the metastable edge.

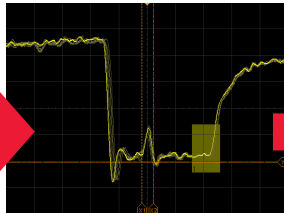
> 1,000,000 waveforms per second update rate is only good if it is uncompromised. The 4000 X-Series' update rate doesn't matter if you have serial decode turned on, MSO turned on, vectors turned on, etc. It is truly a 1,000,000 waveform per sec updated rate without compromise.

## Experience the Usability

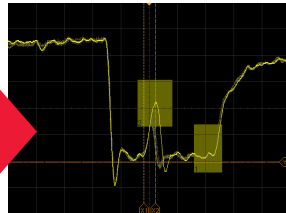
With InfiniiScan Zone touch trigger and 12.1-inch capacitive touch screen:



With the InfiniiScan Zone touch trigger, if you can see it, you can trigger on it.



It is as simple as finding the signal and drawing the zone box. The metastable signal was isolated immediately.



Added the second zone to further isolate dangerous glitches above the logical threshold.



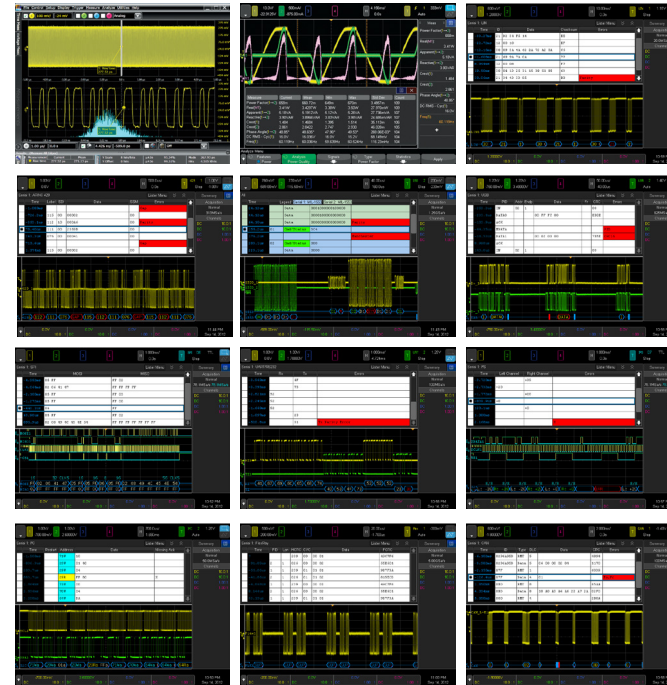
No InfiniiScan Zone available with the RTO.



Upgradable bandwidth and dual-channel WaveGen are not available with the RTO.

## Experience the Integration

More application support:



Trigger/decode for:

- USB low/full/hi
- I<sup>2</sup>C
- SPI
- RS232/UART
- CAN
- LIN
- FlexRay
- I<sup>2</sup>S
- ARINC 429
- MIL-STD 1553

Additional analysis:

- InfiniiView
- Mask
- FPGA
- Power
- Video
- Vector signal analysis
- Spectrum viewer

Class' only fully upgradable 5-instruments-in-1:

**Best-in-class oscilloscope:** Equipped standard features like InfiniiScan Zone, segmented memory, advanced math, advanced triggers, and class-leading 12.1-inch capacitive touch screen.

**Protocol analysis:** Provides hardware-based protocol-aware triggering decode, search, and navigation for serial buses.

**Logic timing analyzer (MSO):** Ideal for R&D engineers and education establishments that need more than the traditional 2 or 4 analog channels.

**Industry-exclusive 20 MHz dual-channel WaveGen:** With a modulation feature, it

is ideal for educational or design labs where bench space and budget are limited.

**Integrated Digital Voltmeter:** Provides a 3-digit DVM and 5-digit counter measurements through the same probes as the oscilloscope channels.

