Competitive Comparison

Keysight InfiniiVision 3000 X-Series versus Danaher-Tektronix MDO3000 Series Oscilloscopes

InfiniiVision 3000 X-Series

- Uncompromised fast update rate
- Uncompromised bandwidth
- Segmented smart memory
- Low cost of ownership
- Excellent signal integrity
- 5-in-1 integration
- Fully upgradable

Keysight-designed MegaZoom IV custom ASIC technology powers the uncompromised, industry-leading waveform update rate; always-on, responsive deep memory; integrated MSO; integrated WaveGen; and integrated protocol analyzer.

Keysight Techologies, Inc. 3000 X-Series oscilloscopes use breakthrough technology to deliver value, functionality and flexibility at prices that fit into existing budgets. Using an Keysight-designed MegaZoom IV custom ASIC, the 3000 X-Series provides unprecedented signal visibility with a 1,000,000 waveforms-per-second update rate. The 3000 X-Series also offers uncompromised bandwidth, and segmented smart memory allows extended time captures and complements the always-on, responsive deep memory. Its low cost of ownership is solidified with a standard 2-year calibration cycle and excellent mean-time between failure (MTBF).

	Keysight 3000 X-Series		Danaher-Tektronix MDO3000	
Bandwidth	100/200/350/500 MHz, 1 GHz	√	100/200/350/500 MHz, 1 GHz	√
Maximum actual bandwidth	1 mV/div to 1.98 mV/div: 1 GHz	√	1 mV/div to 1.98 mV/div: 150 MHz	x
	2 mV/div to 4.98 mV/div: 1 GHz	√	2 mV/div to 4.98 mV/div: 350 MHz	x
	5 mV/div to 9.98 mV/div: 1 GHz	√	5 mV/div to 9.98 mV/div: 500 MHz	x
	10 mV/div to 5 V/div: 1 GHz	√	10 mV/div to 5 V/div: 1 GHz	√
Rise time (10-90% calc)	100 MHz: ≤ 3.5 nS	√	100 MHz: ≤ 4 nS	x
	200 MHz: ≤ 1.75 nS	√	200 MHz: ≤ 2 nS	x
	350 MHz: ≤ 1 nS	√	350 MHz: ≤ 1.143 nS	x
	500 MHz: ≤ 700 pS	√	500 MHz: ≤ 800 pS	x
	1 GHz: ≤ 450 pS	x	1 GHz: ≤ 400 pS	√
Max sample rate	100/200/350/500 MHz: 4 GSa/s	√	100/200/350/500 MHz: 2.5 GSa/s	x
	1 GHz: 5 GSa/s	√	1 GHz: 5 GSa/s	√
Max memory depth	Up to 4M always-on deep memory	x	Max of 1 K with FastAcq On	x
			Up to 10 M if selected, 10 K default	√
Segmented smart memory	Yes	√	Not available	x
Update rate (normal)	> 1 M wfms/s	√	Up to 55 K wfms/s	x
Update rate (special mode)	No special mode required	√	Up to 280 K wfms/s	x
Update rate (with MSO on)	> 1 M wfms/s	√	130 wfms/s	x
Update rate (with serial decode on)	> 1 M wfms/s	√	< 45 K wfms/s	x
Update rate (with 1 M of memory)	1.6 K wfms/s	√	152 wfms/s	x
Hardware-based serial decode	Yes	√	No – software based	x
RF input up to 3 GHz	No	x	Yes	√
Channel-to-channel isolation	100:1 up to 1 GHz	√	30:1 > 100 MHz	x
RMS noise 100 mV/div, 50 Ω	2.8 mV	√	8.15 mV	x
Standard passive probe	Up to 500 MHz	x	Up to 1 GHz	√
Mask testing	Hardware based – > 240 K wfms/s	√	Software based – not specified	x
Standard calibration cycle	2 years	√	1 year	x
MTBF	> 250,000 hours	√	Not specified	x

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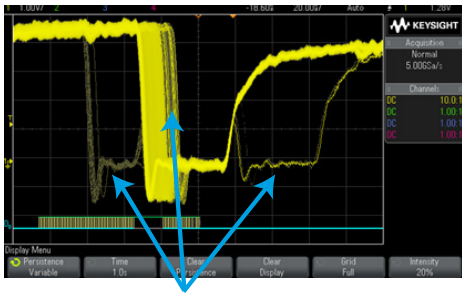
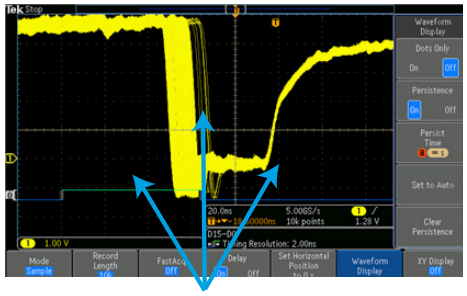
Uncompromised update rate

If you can't see the problem, you can't fix it.

- Keysight's 3000 X-Series maintains its industry-leading update rate whether you are using analog channels, digital channels and/or protocol decode.
- The MDO3000's update rate fluctuates wildly based on what features you are using. From 280 K wfms/s with the FastAcq mode down to 130 wfms/s with digital channels turned on.



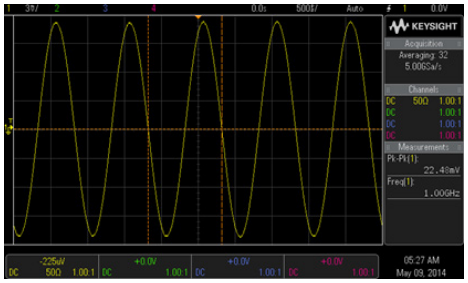
Infrequent glitches and signal jitter captured after 1 second on the 3000 X-Series with standard 1M wfms/s update rate.



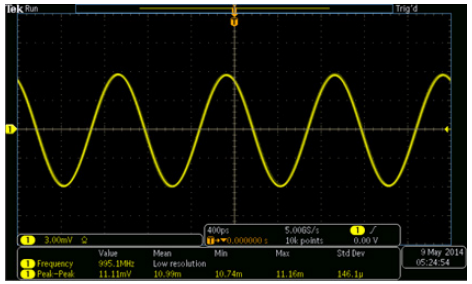
MDO3000 after 30 seconds with infinite persistence turned on. It shows limited signal jitter (middle arrow) and never sees the glitches due to its compromised slow update rate.

Uncompromised bandwidth

Poor signal integrity and noise performance forces the MDO3000 to compromise on bandwidth at lower volt/div settings.



3000 X-Series measures 22.4 mV p-p on a 1 GHz sine wave at 3 mV/div.



MDO3000 measures 11.1 mV p-p on the identical 1 GHz sine wave at 3 mV/div due to severe bandwidth limiting.

MDO3000's compromised update rate:

FastAcq doesn't work with:

- > 1 k of memory
- Measurements
- Math
- Serial decode
- Digital channels
- Wave inspector
- Reference waveforms

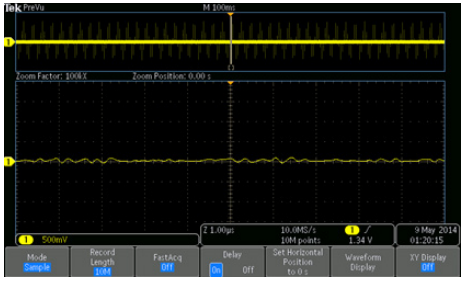
When not using FastAcq, the MDO3000 defaults to 10 k of memory

- More memory must be manually enabled to keep the MDO3000 from defaulting to sluggish performance

Smart memory

The 3000 X-Series' segmented smart memory (option) allows you to capture large periods of time at high resolution on bursty signals.

3000 X-Series captures 250 bursts and almost 1 second of time at 5 GSa/s with segmented smart memory, which allows the 3000 X-Series to easily reproduce the waveform without undersampling.



MDO3000's 10 M of memory can't maintain sufficient sample rate to accurately capture the 250 bursts over 1 second.

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