

MSO5000 Serial digital oscilloscope

Competition analysis

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1. Specifications

- Analog bandwidth: 70 MHz, 100 MHz, 200 MHz, and 350 MHz; bandwidth upgrade option supported
- 2 analog channels(Only 100MHz and 200MHz model support), 16 digital channels (only license activation)
- Up to 8 GSa/s real-time sample rate
- Up to 100 Mpts memory depth
- High waveform capture rate (over 500,000 waveforms per second)
- Up to 450,000 frames of hardware real-time and ceaseless waveforms recording and playback
- Integrates 7 independent instruments into 1, including digital oscilloscope, 16-channel logic analyzer, arbitrary waveform generator, FFT spectrum analyzer, digital voltmeter, 6-digit frequency counter and totalizer, and protocol analyzer
- A variety of serial protocol triggers and decodes
- Waveform histogram analysis (standard)
- 9-inch capacitive multi-touch screen, 256-level intensity grading display, with color
- Persistence Web Control remote command

2. Competition comparison

	RIGOL	Tektronix		Keysight	R&S	GWInstek	Siglent
performan ce	MSO5000	MSO/DPO 2000B	TBS2000	X2000A	RTB2000	GDS2000A	SDS2000X
Channel	✓ 2 or 4+16	2 or 4 +16	✗ 2 or 4	✗ 2 or 4 + 8	2 or 4 + 16	2or4 +8or16	2 or 4 + 16
BW	70MHz - 350MHz	70 MHz to 200 MHz	70MHz to 100MHz	70 MHz to 200 MHz	70 MHz to 300 MHz	70 MHz to 300 MHz	70 MHz to 300 MHz
Sample rate	✓ 8GSa/s	✗ 1GSa/s	✗ 1GSa/s	2 GSa/s	2.5 GSa/s	2 GSa/s	2 GSa/s
Max. Memory Depth	✓ 100Mpts	1 Mpts	20Mpts	✗ 100 kpts	20Mpts	2 Mpts	✓ 140Mpts
Max. Waveform Capture Rate[✓ 500kwfms/s	✗ 5,000 wfm/s	NA	50,000wfms/s	50,000wfms/s	80,000 wfm/s	140,000 wfms/s
Vertical Resolution	8 bits	8 bits	8 bits	8 bits	✓ 10 bits	8 bits	8 bits

Trigger Num.	✓ 23	13	✗ 3	12	13	12	15
Decode type	RS232/UART、I2C、SPI、CAN、LIN、FlexRay、I2S、MIL-STD1553	I2C、SPI、CAN、LIN RS-232/422/485/UART	N/A	CAN、LIN、I2C、SPI、RS232/422/485/UART	I2C, SPI, RS232/422/485/UART, CAN, LIN	I2C、SPI、UART	I2C,SPI,UART/RS-232/CAN/LIN
Function	✓ Logic analyzer, arbitrary waveform generator, FFT spectrum analyzer, digital voltmeter, 6-digit frequency counter and totalizer, and protocol analyzer	Logic analyzer and protocol analyzer	✗ N/A	Logic analyzer, function gerator, digital voltmeter, and protocol analyzer	Logic analyzer, function gerator, and protocol analyzer	Logic analyzer, function gerator, and protocol analyzer	Logic analyzer, function gerator, and protocol analyzer
Connectivity	Std: USB , LAN, HDMI, Trig out Opt: GPIB	Std: USB,LAN,,trig Out Opt: GPIB, video	Std: USB, LAN Opt: GPIB, WiFi	Std.: USB 2.0,Trig Out Opt.: GPIB、LAN (10/100Base-T)、WVGA Support USB keyboard	Std.: USB 、 LAN	Std.: RS232、USB、LAN、Go/NoGo Opt.: GPIB、SVGA	Std.: USB、LAN、 Pass/Fail, Trigger Out
Display	✓ 9 inch Touch	✗ 7 inch TFT	9 inch WVGA	8.5 inch WVGA	✓ 10.1 inch Touch	8 inch TFT	8 inch TFT
Price	From \$909	From \$1430	From \$1200	From \$ 1460	From €1230	From \$1143	From \$885

3. Competition analysis

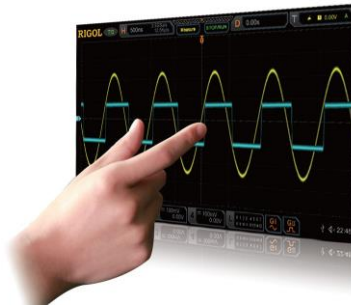
MS05000 series of digital oscilloscope is designed and developed by RIGOL, which is a new special ASIC chip, Based on a new technology platform of UltraVision II. The maximum sampling rate is up to 8GSa/s. The precise and accurate display of the real situation of the burr signal; The maximum storage depth is 100Mpts, and more waveform information is captured in one acquisition; The waveform capture rate is more than 500000wfms/s, which improves the ability of capturing abnormal signals; With regional triggering and color persistence, the Debug test efficiency is greatly improved; The 450 thousand frame is the hardware waveform recording and playback function, which can analyze and store the time information about the signal. Integrates 7 independent instruments into 1, including digital oscilloscope, 16-channel logic analyzer, arbitrary waveform generator, FFT spectrum analyzer, digital voltmeter, 6-digit frequency counter and totalizer, and protocol analyzer. It

provides a simple and economical test option for your complex test. 9 inch capacitive touch screen is used to support gesture operation and give you more friendly operation experience.

Tektronix MSO/DPO2000B

Touch

9 inch capacitive touch screen, while supporting gesture operation. It provides a more convenient and friendly operation for trigger template setting, waveform drag analysis and zoom and look. And DPO2000B can only be implemented by keystroke operation.



Signal Discover

The maximum waveform capture rate of MSO5000 is $> 500000 \text{ wfms/s}$, and it supports zone trigger function. It can quickly draw zone trigger conditions to trigger attention waveform according to the characteristics of the waveform. DPO2000B does not support zone trigger function, and the maximum waveform capture rate is only 5000 wfms/s .

Signal Analysis

MSO5000 has the largest 8 GSa/s sampling rate, and the maximum storage depth is 100 Mpts . It can keep waveform sampling and displaying for a longer time during single acquisition.

It supports the highest 450 thousand frames waveform recording and playback, and can search for specific events in complex signals that can be captured for a long time. By setting the trigger conditions, the user's attention signal is captured and stored selectively and the time is marked on the signal, which not only ensures the efficiency of the capture, but also further expands the total time of the waveform observation.

Enhanced FFT function, FFT analysis point upgrade to 1 Mpts . The peak search function is provided, which can automatically mark up to 11 peaks and display their frequency and amplitude information in a list form, and facilitate harmonic analysis and mixed domain analysis.

Built-in arbitrary waveform generator

Support dual channel 25 MHz arbitrary waveform generator, the maximum sampling rate of 200 MSa/s , arbitrary wave support the load channel waveform and the existing waveform, the maximum support for the 16 kpts waveform length editing. DPO2000B does not support arbitrary waveform generator.

More Integration function

With the development of electronic technology, the characteristics of circuit design need to be analyzed are becoming more and more complex, and a variety of test instruments are needed to

test and verify. Therefore, a test instrument with multiple test functions will bring great convenience in test time and operation.

	MSO/DS7000	MDO3000
Scope	✓ Standard	✓ Standard
FFT spectrum analyzer	✓ Standard	✓ Standard
Pass/Fail	✓ Standard	× N/A
DVM	✓ Standard	× N/A
Frequency counter and totalizer	✓ Standard	× N/A
16-channel logic analyzer	✓ Option	✓ Option
Arbitrary Waveform Generator	✓ Option	× N/A
Protocol Analyzer	✓ Option	✓ Option

	MSO5000	MDO3000
performance		
Channel	2 or 4+16	2 or 4 +16
BW	70MHz -350MHz	70 MHz to 200 MHz
Sample rate	✓ 8GSa/s	× 1GSa/s
Max. Memory Depth	✓ 100Mpts	× 1 Mpts
Max. Waveform Capture Rate	✓ 500kwfms/s	× 5,000 wfm/s
Decode type	RS232/UART、I2C、SPI、CAN、LIN、FlexRay、I2S、MIL-STD1553	× I2C、SPI、CAN、LIN RS-232/422/485/UART
Support decode number	✓ 4	× 1
Measure Num	✓ 41	× 29
zone touch trigger	✓ Yes	N/A ×
Record	✓ 450 thousand frame hardware waveform recording	N/A ×
6-digit frequency counter and totalizer	✓ Standard	N/A ×
Display	✓ 9" Capacitive touch screen, supporting gesture operation	7" LCD ×

Keysight X2000A

Touch

9 inch capacitive touch screen, while supporting gesture operation. It provides a more convenient and friendly operation for trigger template setting, waveform drag analysis and zoom and look. X2000A screen size is only 8.5 inches.

Signal Analysis

MSO5000 has the largest 8GSa/s sampling rate, and the maximum storage depth is 100Mpts. It can keep waveform sampling and displaying for a longer time during single acquisition. The maximum record length of X2000A is only 4Mpts.

It supports the highest 450 thousand frames waveform recording and playback, and can search for specific events in complex signals that can be captured for a long time. By setting the trigger conditions, the user's attention signal is captured and stored selectively and the time is marked on the signal, which not only ensures the efficiency of the capture, but also further expands the total time of the waveform observation.

Built-in arbitrary waveform generator

Support dual channel 25MHz arbitrary waveform generator, the maximum sampling rate of 200MSa/s, arbitrary wave support the load channel waveform and the existing waveform, the maximum support for the 16kpts waveform length editing. The maximum output frequency of X2000A is 20MHz, and does not support arbitrary waveform edition.



Lower cost of ownership

When you have an oscilloscope host, don't ignore the actual cost of functional use

	MSO/DS7000	3000T X
DVM/ frequency counter	Standard	Option
Pass/Fail	Standard	Option
LAN	Standard	Option

	MSO/DS7000	X2000A
performance		
Channel	2 or 4+16	✗ 2 or 4 + 8
BW	70MHz -350MHz	70 MHz to 200 MHz
Sample rate	✓ 8GSa/s	✗ 2 GSa/s

Max. Memory Depth	✓ 100Mpts	✗ 100 kpts
Max. Waveform Capture Rate	✓ 500kwfms/s	✗ 50,000wfms/s
Decode type	RS232/UART、I2C、SPI、CAN、LIN、FlexRay、I2S、MIL-STD1553	CAN、LIN、I2C、SPI、RS232/422/485/UART
Support decode number	✓ 4	✗ 1
Function	✓ Logic analyzer, arbitrary waveform generator, FFT spectrum analyzer, digital voltmeter, 6-digit frequency counter and totalizer, and protocol analyzer	✗ Logic analyzer, function gerator, digital voltmeter, and protocol analyzer
Connectivity	Std: USB , LAN, HDMI, Trig out Opt: GPIB	Std.: USB 2.0, Trig Out Opt.: GPIB、LAN (10/100Base-T)、WVGA Support USB keyboard
Display	✓ 9 inch Touch	✗ 8.5 inch WVGA

4. Application

Electronic Design and Measurement, Industrial

- Integrate 7 instruments (e.g. digital oscilloscope and logic analyzer) into 1, convenient for you to make complicated embedded circuit design analysis.
- Real-time sample rate: up to 8 GSa/s, memory depth up to 100 Mpts.
- Up to 500,000 wfms/s waveform capture rate, capable of discovering the infrequent signal quickly, greatly improving the debugging efficiency of the engineers.
- Up to 450,000 frames of hardware real-time and ceaseless waveforms recording and playback functions, capable of capturing and storing the desired signals of great interest by setting the trigger conditions.
- Compliant with LXI-C Standard, supporting programming controlled configuration and web control programming, capable of realizing convenient and efficient automatic configuration.

Auto Electronics, Serial Bus Protocol Analysis

- Standard configuration of serial bus analysis, such as RS232/UART, I2C, SPI, CAN, FlexRay, LIN, I2S, and MIL-STD-1553.

Power Supply Industry, Switch Power

- The built-in power analysis software can complete the power quality analysis and ripple analysis, helping engineers analyze the commonly used power parameters rapidly and accurately

Education

Bandwidth: 70MHz/100MHz/200MHz/350MHz; Maximum real-time sampling rate: 8 GSa/s; Storage depth: 100Mpts; Waveform capture rate: > 500,000 wfms/s; Various serial protocol triggering and decoding functions; 41 kinds of measurement items; Full memory hardware measurement, can fully meet the requirements of electronic, communication and physical experiment teaching.