

# DSO Series

Digital Storage Oscilloscope / DSO-1000/DSO-2000 Series of Digital Storage Oscilloscope

## Features

- Multi models for different applications
- Signal bandwidth: 25MHz/40MHz/60MHz/100MHz/200MHz
- Real-time sampling rate: Max. 200Msps/400Msps/1Gsps
- Equivalent sampling rate: Max. 20Gsps/40Gsps/50Gsps
- 5.7-inch Color/Black-white LCD display,multi-color schemes available
- 4k memory depth per channel
- Advanced triggering including edge, pulse width and Video line-signal
- Alternating trigger function available to stably display asynchronous phase signals
- Math functions including add, subtract, multiply and 2048-point FFT
- Max. 24 parameters automatic measuring
- Low-pass,high-pass,band-pass and band-stop digital filters available with adjustable cutoff frequency
- Advanced cursor modes: manual, auto and track
- Waveform record, and PASS/FAIL output
- Built-in 5-digit hardware counter
- Auto calibration
- Multi-language menu interface
- Real-time clock
- Internal 10 setups and waveforms storage, external storage for setup, waveform, BMP bitmap and CSV files
- Standard USB Host interface, supporting USB disk storage and USB printer(limited models)
- PRINT key pressed to hardcopy current display
- Standard USB Device interface
- Multi flexible and selectable expanding function modules:PASS/FAIL+RS232+GPIB, PASS/FAIL+RS232
- Bulky storage compartment for accessories & manual



## Application Fields

- Laboratory and training center in colleges and universities
- Measurement and quality inspection on production line
- Design and debugging in R&D department
- Maintenance and repair service

## Brief Introduction

DSO-1000/2000 series of digital storage oscilloscope offer you a new way of signal detection with excellent performance and strong functions.

The series provide 14 models with bandwidth ranging from 25MHz to 200MHz. Even as a diffusive product with middle or low price, it still provides some measurement functions of middle or high-and product, and it can meet your measurement requirement with affordable cost.

The series respectively provide real-time sampling rate of 200Msps, 400Msps and 1Gsps and equivalent sampling rates of 20Gsps, 40Gsps and 50Gsps, to guarantee accurate observation of signals. Many standard configured advanced characteristics make the measuring more convenient and quickly, such as multi trigger modes, auto measurement, digital filtering, waveform storage, math function, FFT, PASS/FAIL judgment, multi functional interface, etc.

Besides, in order to keep the operator desk clean, the instrument provides a big storage compartment to hold power cord, CD and probes in.

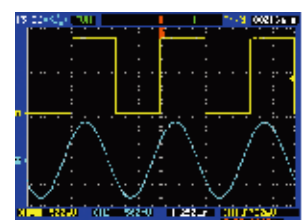
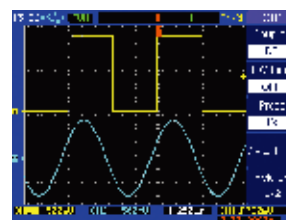
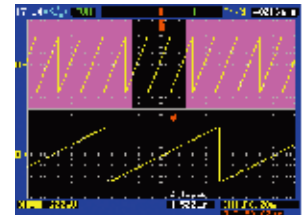


## Prominent Signal Measuring Capability

DSO-1000/2000 series has a black-white/color LCD display with large size of 5.7 inches and a resolution of 320 × 240 to allow you to quickly identify your signal.

**MENU ON/OFF** key helps you view more waveform information in menu display area.

When you want to see the enlarged picture but still get all the details, you can use the delayed sweep mode and dual display to zoom in on a particular area on your signal while still viewing the entire captured waveform.



## Powerful Measurement Functions

DSO-1000/2000 series include all the standard features you need to get your job done easier and faster.

**Auto scale** Auto scale lets you quickly display any active signals, automatically set the vertical, horizontal and trigger controls for the best signal display. It can be selected to display a signal under test with one single period or multi periods in

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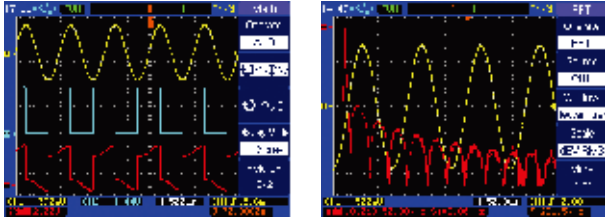
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current display window.

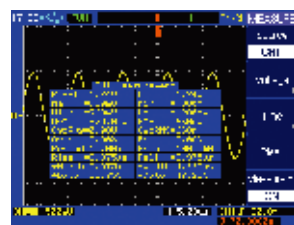
**Running control** RUN/STOP mode:to continuously observe waveform or freeze the current waveform on screen.

**SINGLE mode**:to automatically recognize signal meeting trigger conditions,and to immediately sample the signal to fixedly display,especially suitable to sample single signal.

**Waveform calculation** DSO-1000/2000 series provide some important math operations, including addition, subtraction, multiplication, and 2048-point FFT (Fast Fourier Transforms) with five"windows"(Rectangular, Hanning, Hamming, Blackman, Flat-Top).And spectrum amplitude of FFT analysis result can be displayed in linearity or dB(RMS).



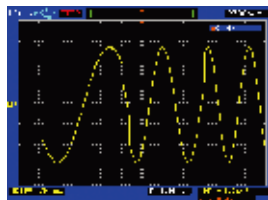
**24 waveform measurement functions** Almost all signal characteristics can be measured through waveform measurement. CPU calculates waveform data and displays



them on LCD to save time of eye observation and get accurate results. The product provides convenient setups of waveform measurement to achieve your required waveform measurement data without difficult operation.

## Convenient observation of all kinds of signals

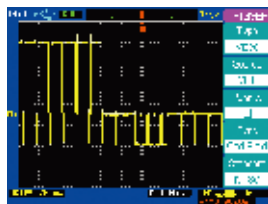
**Roll mode**:It's a best feature of DSO to accurately test low-speed signal.Through roll mode,the change of signal with very low speed can be observed.



**X-Y mode**:In this mode, horizontal axis indicates CH1 voltage,and vertical axis indicates CH2 voltage.Lissajou's figure can be displayed to calculate phase difference of same-frequency signal.



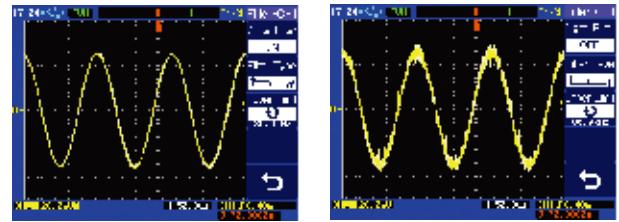
**Video trigger**:The instrument can synchronously trigger on line or field of NTSC and PAL/SECAM standard video signals to measure full-TV signal waveform.



## Digital filtering

The instrument provides many flexible digital filters, including low pass, high pass, band-pass and band-stop filters. It can deal with display signal to get expected result,such as using digital filter to simulate the effect of hardware filtering,and reject aliasing noise or error signal to clearly observe a signal

of interest,etc .And high limit or low limit of cutoff frequency can be randomly set.

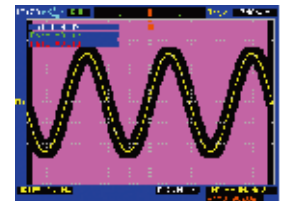


**Waveform recorded up and played back** When signal of an area needs to be recorded up and analyzed, the series may record data continuously for a long time and store them in the form of frames. And each frame has 4k or 5k points and the instrument can record up to 1,000 frames, that is 4M points, and time interval of frame can be set from minimum 1ms to maximum 1,000s. You can use the playback function quickly play through the sequence or observe any frame, and the playback can be displayed in persistence so that signal anomaly can be easily observed out.

**PASS/FAIL comparison and judgment** Signal detection on production line is usually performed to judge the quality, and the series automatically compares incoming signals with a pre-defined mask, clearly highlighting signal changes to easily tell the signal's quality, which is more convenient and quickly and reduces error of man-made judgment.

## Auto calibration

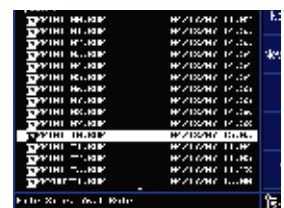
Automatically calibrates the oscilloscope's vertical and horizontal systems and makes the instrument work with the best measurement accuracy.



## Flexible Human-Machine Conversation

**Convenient and quick operation** 2 input channels, time base, trigger channel and function area being respectively in different operation areas make it easy to set up and use, and front-panel keys for main functions are also grounded to make your job easier.

Multi interface selections: The instrument provides multi interfaces, including USB HOST to store waveform files (BMP bitmap, CSV file format) in USB disk or directly print displayed image on LCD (one"PRINT" key pressed)or save it in USB, and USB DEVICE to communicate with computer system to control instrument or store data and edit measurement documents (saved files being marked with data and time). And expanding interfaces providing GPIB and RS232C connectivity and PASS/FAIL output are optional.Figure 14 Operation parts on the front panel Figure 15 Saved documents' format in Udisk.



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## Specifications

Model	DSO-1022A	DSO-2042A DSO-1042A/AE	DSO-1062A / 1062B DSO-2062A / 2062B	DSO-1102A / 1102B DSO-2102A / 2102B	DSO-1202B DSO-2202B
<b>Sampling System</b>					
Max. real-time sample rate	200Msps	400Msps/200Msps	400Msps/1Gsps		1Gsps
Max. equivalent sample rate	20Gsps	20Gsps	40Gsps/50Gsps		50Gsps
Memory	4kpts				
Vertical resolution	8 bits				
Sample mode	Sample, peak detect, averaging				
Auto setup	To automatically adjust vertical scale (V/div), horizontal time base (s/div), trigger mode is "AUTO"				
<b>Vertical System</b>					
Channels	2 analog input channels, 1 trigger input channel				
Bandwidth	25MHz	40MHz	60MHz	100MHz	200MHz
Coupling	DC, AC, GND				
Bandwidth limit (-3dB)	N/A	20MHz			
Calculated rise time	<14.0ns	<8.75ns	<5.83ns	<3.50ns	<1.75ns
Vertical scale (V/div)	2mV/div to 5V/div 1-2-5 step				
Vertical gain accuracy	2mV/div to 5mV/div $\pm 4\% \times \text{reading} \pm 0.1 \text{div} \times \text{V/div} + 0.5 \text{mV}$ ; 10mV/div to 5V/div $\pm 3\% \times \text{reading} \pm 0.1 \text{div} \times \text{V/div} + 1 \text{mV}$ ;				
Vertical position range	$\pm 8$ div away from screen center				
Probe attenuation factor	$\times 1, \times 10, \times 100, \times 1000$				
Input impedance	1M $\Omega$   19pF				1M $\Omega$   19pF, 50 $\Omega$
Delay differential	$\pm 150$ ps (scales and coupling setups of two channels are same)				
Max. input voltage	400V (DC+AC peak, @1M $\Omega$ )				5V (rms, @50 $\Omega$ )
Probe compensation output	3Vp-p, 1kHz				
<b>Horizontal System</b>					
Time base range	5ns—50s/div(1-2.5-5 step)		Suffix A 2.5ns—50s/div(1-2.5-5 step) Suffix B 2ns—50s/div(1-2-5 step)		
Horizontal mode	Main, Delayed, X-Y, Roll				
Time base accuracy	$\pm 0.01\%$				
XY mode	Input	X-axis input (horizontal) : CH1 ; Y-axis input (vertical) : CH2			
	Bandwidth	25MHz	40MHz	60MHz	100MHz 200MHz
	Phase error	$\pm 3^\circ$			
<b>Trigger System</b>					
Trigger source	CH1, CH2, EXT, EXT/5, EXT(50 $\Omega$ ) (DSO-1202B/2202B only), LINE, Alternating				
Mode	Auto, Normal, Single				
Trigger coupling	DC, AC, LF reject, HF reject				
Trigger mode	Edge, pulse width, video				
Trigger level range	Internal: $\pm 8$ div from screen center		EXT: $\pm 1.6$ V	EXT/5: $\pm 8$ V	
EXT input impedance	1M $\Omega$   19pF				1M $\Omega$   19pF, 50 $\Omega$
EXT max. input voltage	400V (DC+AC peak, @1M $\Omega$ )				5V (rms, @50 $\Omega$ )
<b>Signal Measurement</b>					
Voltage	Maximum, Minimum, Peak-to-peak, High, Low, Amplitude, Average, RMS, Overshoot, Breshoot, Cycle Average, Cycle RMS				
Time	Frequency, Period, Rise Time, Fall Time, +Width, -Width, +Duty, -Duty, Delay, Phase, X@MAX, X@MIN				
Math functions	CH1-CH2, CH1+CH2, CH1 $\times$ CH2, FFT (2K points)				
Cursor mode	Manual, auto, track				
Hardware counter	5-digit frequency counter up to maximum bandwidth				
<b>Storage &amp; Interface</b>					
Internal storage	10 setups, 10 waveforms				
File format	Setup, Waveform, BMP, CSV file, CSV file has the characteristics of date and time				
Interface	Standard	USB HOST (supporting single key pressed to print), USB DEVICE			
	Optional	RS232C+PASS/FAIL OUT, GPIB+RS232C+PASS/FAIL OUT			
<b>Display</b>					
Display type	STN LCD display, diagonal 145cm(5.7-inch)				
Resolution	320 (horizontal) $\times$ 240 (vertical) dot matrix				
Display color	DSO-2000 series: 256 VGA		DSO-1000 series: black-white		
Contrast adjustment	20 levels				
Selectable languages	English, Korean, Traditional Chinese, Simplified Chinese				

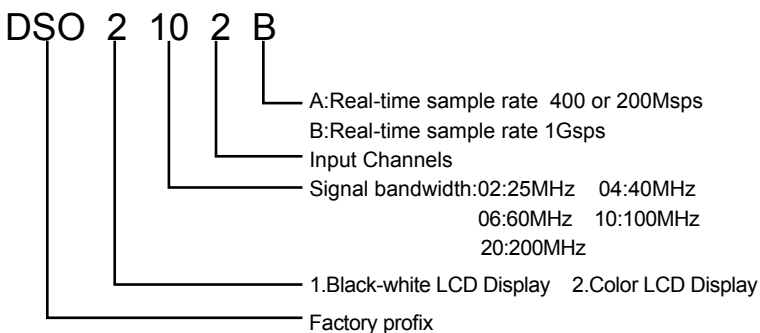
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Waveform Display	Range	Menu ON: 8div (vertical)×10div(horizontal), i.e., 200(vertical)×250(horizontal) dot matrix Menu OFF: 8div(vertical)×12div(horizontal), i.e., 200(vertical)×300(horizontal) dot matrix
	Type	Dot/vector
	Interpolation	(Sinx)/x, linear
	Persistence	Off/infinite
	Format	YT/XT
Real-time clock	Time, date (adjustable)	
Other Specifications		
Ambient temperature & humidity	0°C - 40°C, ≤90%RH	
Line voltage range	99V - 242V AC, 47Hz-440Hz	
Power consumption	≤50VA	
Instrument Dimension	310mm(W) × 147mm(H) × 269mm(D)	
Storage Compartment Dimension	225mm(W) × 189mm(H) × 57 mm(D)	
Net weight	Approx. 3.6kg	

## Ordering Information

Principle of naming model:



Model	Real-time sample rate	Equivalent sample rate	Memory depth	Bandwidth	Display
DSO-1022A	200Msps	20Gsps	4k	25MHz	black-white
DSO-1042AE	200Msps	20Gsps	4k	40MHz	black-white
DSO-1042A	400Msps	40GSa/s	4k	40MHz	black-white
DSO-1062A	400Msps	40GSa/s	4k	60MHz	black-white
DSO-1102A	400Msps	40GSa/s	4k	100MHz	black-white
DSO-1062B	1Gsps	50Gsps	4k	60MHz	black-white
DSO-1102B	1Gsps	50Gsps	4k	100MHz	black-white
DSO-1202B	1Gsps	50Gsps	4k	200MHz	black-white
DSO-2042A	400Msps	40Gsps	4k	40MHz	color
DSO-2062A	400Msps	40Gsps	4k	60MHz	color
DSO-2102A	400Msps	40Gsps	4k	100MHz	color
DSO-2062B	1Gsps	50Gsps	4k	60MHz	color
DSO-2102B	1Gsps	50Gsps	4k	100MHz	color
DSO-2202B	1Gsps	50Gsps	4k	200MHz	color

## Instrument Accessories

DSO-260XX	oscilloscope probe (XX said bandwidth)	2
3	Core Power Line (According to different regions)	1
CD	(included PC software and user's manual)	1

## Options

DSO-intex01	RS232C+PASS/FAIL
DSO-intex02	GPIO+RS232C+PASS/FAIL