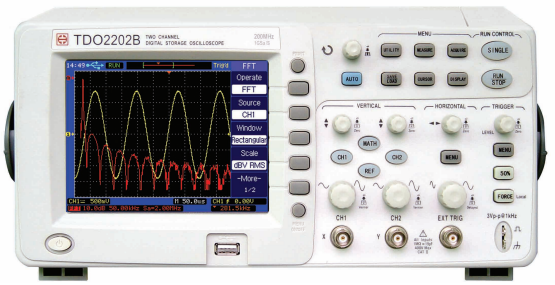
Digital Storage Oscilloscope

A. TDO1000/TDO2000 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-signel
- Alternating trigger function available to stably display asyn chronous 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/FASIL 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

TDO1000/2000 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.

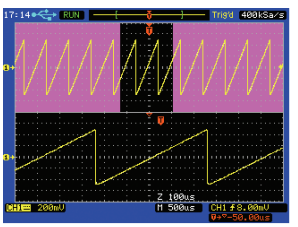
Besides, in order to keep the operator desk clean, the instrument provides a big storage compartment to hold power cord, operation manual and probes in.

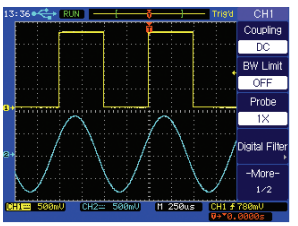
Prominent Signal Measuring Capability

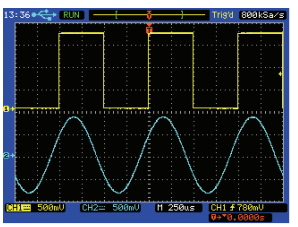
TDO1000/2000 series has a black-white/color LCD display with large size of 5.7 inches and a resolution of 320 × 240 to allow you to quickly identify your signal.

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

TDO1000/2000 series include all the standard features you need to get your job done easier and faster.

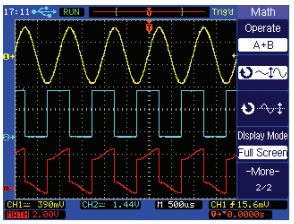
Auto scale Auto scale lets you quickly display any active signals, automatically set the vertical, horizontal and trigger controls for the best signal display.It can be selected to display a signal under test with one single period or multi periods in

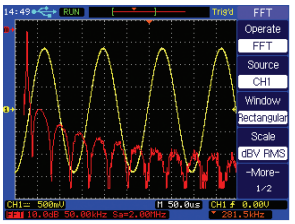
current display window.

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

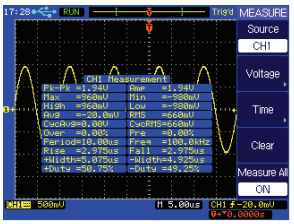
SINGLE mode:to automatically recognize signal meeting trigger conditions,and to immediately sample the signal to fixedly display,especially suitable to sample single signal.

Waveform calculation TDO1000/2000 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 amplitade of FFT analysis result can be displayed in linearity or dBV(RMS).



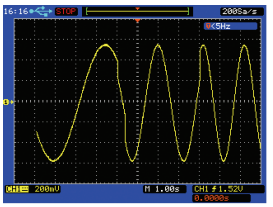


24 waveform measurement functions Almost all signal characteristics can be measured through waveform measurement. CPU calculates waveform data and displays them on LCD to save time of eye observation and get accurate results. The product provides convenient setups of waveform measurement to achieve your required waveform measurement data without difficult operation.

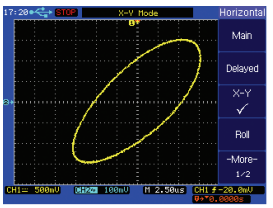


Convenient observation of all kinds of signals

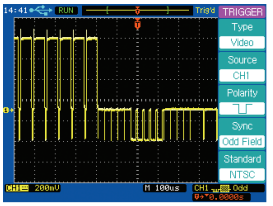
Roll mode:It`s a best feature of DSO to accurately test low-speed signal.Through roll mode,the change of signal with very low speed can be observed.



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

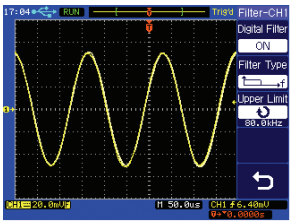


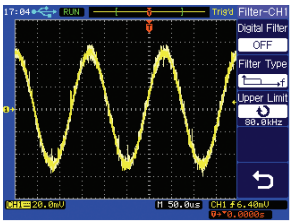
Video trigger:The instrument can synchronously trigger on line or field of NTSC and PAL/ SECAM standard video signals to measure full-TV signal waveform.



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 hareware 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.



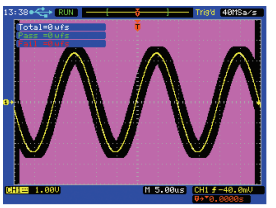


Waveform recorded up and played back When signal of an area needs to be recorded up and analyzed, the series may record data continuously for a long time and store them in the form of frames. And each frame has 4k or 5k points and the instrument can record up to 1,000 frames, that is 4M points, and time 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 anomaty 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

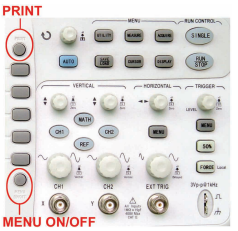
Automatically calibrates the oscilloscope's vertical and horizontal systems and makes the instrument work with the best measurement accuracy.

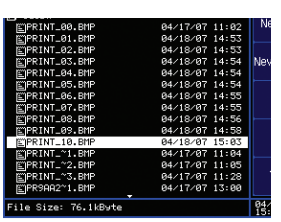


Flexible Human-Machine Conversation

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		TDO1022A	TDO2042A TDO1042A/AE	TDO1062A / 1062B TDO2062A / 2062B	TDO1102A / 1102B TDO2102A / 2102B	TDO1202B TDO2202B
Sampling System						
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”				
Vertical System						
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			
Caculated 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 ±4%×reading±0.1div×V/div+0.5mV; 10mV/div to 5V/div ±3%×reading±0.1div×V/div+1mV;				
Vertical position range		± 8 div away from screen center				
Probe attenuation factor		×1, ×10, ×100, ×1000				
Input impedance		1MΩ||19pF				1MΩ||19pF, 50Ω
Delay differential		±150ps (scales and coupling setups of two channels are same)				
Max. input voltage		400V (DC+AC peak,@1MΩ)				
		-------				5V (rms,@50Ω)
Probe compensation output		3Vp-p, 1kHz				
Horizontal System						
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		±0.01%				
XY mode	Input	X-axis input (horizontal) : CH1 ; Y-axis input (vertical) : CH2				
	Bandwidth	25MHz	40MHz	60MHz	100MHz	200MHz
	Phase error	±3°				
Trigger System						
Trigger source		CH1, CH2, EXT, EXT/5, EXT(50Ω) (TDO1202B/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: ±8 div from screen center EXT: ± 1.6V EXT/5: ± 8V				
EXT input impedance		1MΩ||19pF				1MΩ||19pF, 50Ω
EXT max. input voltage		400V (DC+AC peak, @1MΩ)				
		-------				5V (rms,@50Ω)
Signal Measurement						
Voltage		Maximum, Minimum, Peak-to-peak, High,Low, Amplitude, Average, RMS, Overshoot, Breshoot,Cyde 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×CH2,FFT (2K points)				
Cursor mode		Manual, auto, track				
Hardware counter		5-digit frequency counter up to maximum bandwidth				
Storage & Interface						
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				
Display						
Display type		STN LCD display, diagonal 145cm(5.7-inch)				
Resolution		320 (horizontal) × 240 (vertical) dot matrix				
Display color		TDO2000 series: 256 VGA TDO1000 series: black-white				
Contrast adjustment		20 levels				
Selectable languages		Simplified Chinese, Traditional Chinese, English, Korean,				

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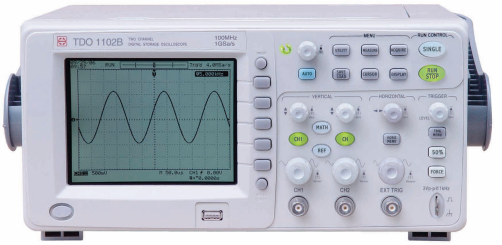
Waveform Display	Range	Menu ON: 8div (vertical)×10div(horizontal), i.e., 200(vertical)×250(horizontal) dot matrix Menu OFF: 8div(vertical)×12div(horizontal), i.e., 200(vertical)×300(horizontal) dot matrix
	Type	Dot/vector
	Interpolation	(Sinx)/x, linear
	Persistence	Off/infinite
	Format	YT/XT
Real-time 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 Dimention		310mm(W) × 147mm(H) × 269mm(D)
Storage Compartment Dimention		225mm(W) × 189mm(H) ×57 mm(D)
Net weight		Approx. 3.6kg

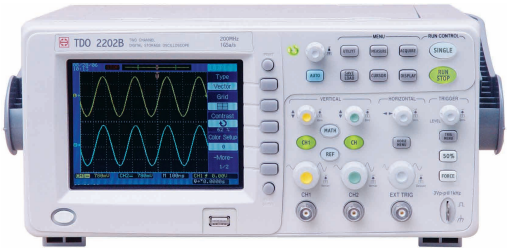
Ordering Information

Principle of naming model:

TDO 2 10 2 B

- B: A:Real-time sample rate 400 or 200Msps; B:Real-time sample rate 1Gsps
- 2: Input Channels
- 10: Signal bandwidth: 02:25MHz 04:40MHz 06:60MHz 10:100MHz 20:200MHz
- 2: 1.Black-white LCD Display 2.Color LCD Display
- TDO: Factory profix





Model	Real-time sample rate	Equivalent sample rate	Memory depth	Bandwidth	Display
TDO1022A	200Msps	20Gsps	4k	25MHz	black-white
TDO1042AE	200Msps	20Gsps	4k	40MHz	black-white
TDO1042A	400Msps	40GSa/s	4k	40MHz	black-white
TDO1062A	400Msps	40GSa/s	4k	60MHz	black-white
TDO1102A	400Msps	40GSa/s	4k	100MHz	black-white
TDO1062B	1Gsps	50Gsps	4k	60MHz	black-white
TDO1102B	1Gsps	50Gsps	4k	100MHz	black-white
TDO1202B	1Gsps	50Gsps	4k	200MHz	black-white
TDO2042A	400Msps	40Gsps	4k	40MHz	color
TDO2062A	400Msps	40Gsps	4k	60MHz	color
TDO2102A	400Msps	40Gsps	4k	100MHz	color
TDO2062B	1Gsps	50Gsps	4k	60MHz	color
TDO2102B	1Gsps	50Gsps	4k	100MHz	color
TDO2202B	1Gsps	50Gsps	4k	200MHz	color

Instrument Accessories

TDO260XX	oscilloscope probe (XX said bandwidth)	2
3 Core Power Line (According to different regions)		1
Manual		1

Options

TDO-comsoft01	Communication software
TDO-intex01	RS232C+PASS/FAIL
TDO-intex02	GPIB+RS232C+PASS/FAIL