RIGOL

Data Sheet

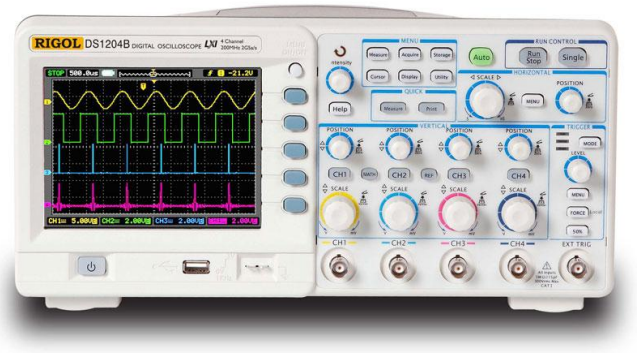
DS1000B Series Digital Oscilloscopes

DS1074B, DS1104B, DS1204B

Product Overview

DS1000B series oscilloscopes are designed with four analog channels and 1 external trigger channel, which can capture multi-channel signal simultaneously and meet industrial needs.

The powerful trigger and analyzer abilities make it easy to capture and analyze waves. Clear LCD displays and math operations enable users to view and analyze signal faster and more clearly.



Applications

- Electronic Circuit Design and Test
- View Transient Signal
- Manufacturing Test and Quality Control
- Education & Scientific Research
- Industry Control
- Design & Analysis of Mechanical and Electrical Products

Easy to Use Design

- Built-in help menu enables information getting more convenient
- Multiple Language menus, support Chinese & English input
- Support U disk and local files storage
- Waveform intensity can be adjusted
- To display a signal automatically by AUTO
- Pop-up menu makes it easy to read and use
- Provide a key measure, a key store/print shortcut keys

Main Features

- Four analog channels, 200MHz maximum bandwidth, 2GSa/s maximum real-time sample rate, 50GSa/s maximum equivalent sample rate
- 5.7 inch, QVGA (320×240), 64K colors TFT LCD and LED backlight source technology enable the wave displays more vivid with lower power dissipation and longer life
- Conform to LXI consortium instrument standard class C, which enable to create and reset testing system fast, economically and efficiently
- Abundant trigger types: Edge, Pulse Width, Video, Pattern and Alternative triggers
- Unique adjustable trigger sensitivity enables to meet different demands
- Enable to measure 22 types of wave parameters and track measurements via cursor automatically
- Unique waveform record and replay function
- Fine delayed scan function
- Built-in FFT function, hold practical digital filters
- Pass/Fail detection function
- Math operations available to multiple waves
- Powerful PC application software UltraScope
- Standard configure interface: USB Device, Dual USB Host, LAN, support U disk storage and PictBridge print standard
- Support for remote command control

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4 Analog Channels

4 analog channels

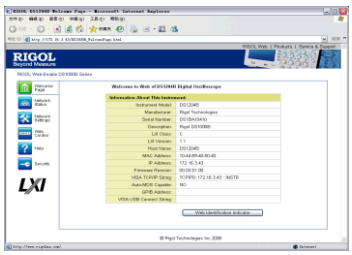
Users can view multi-channel signal simultaneously via the 4 analog channels, which can be operated independently. Each channel button, corresponding channel mark on screen and waveform will be separated by specific colors.

PictBridge Standard

PictBridge print standard

DS1000B series offer standard configure interface and support PictBridge print standard, there are two modes are available: "PictBridge" and "Normal", you can select the mode and setup corresponding parameters to finish printing operation.

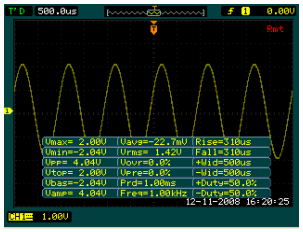
LXI Standard, Class C



LXI standard, class C

RIGOL DS1000B series digital oscilloscopes conform to LXI consortium instrument standard class C, which enable to create and reset testing system fast, economically and efficiently, in addition, the system integration function will be achieve more easily.

Automatically Measure 22 Wave Parameters

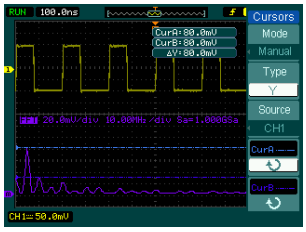


Automatic measure

DS1000B series oscilloscopes provide 22 types of wave parameters for automatically measuring which contains 10 Voltage and 12 Time parameters.

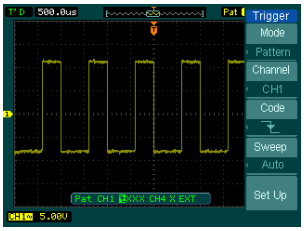
In cursor mode, users can easily measure by moving cursor. Besides, 3 types of cursor measurement are optional: Manual, Track and Auto.

Cursor Measure



FFT cursor measure

Multiple Trigger



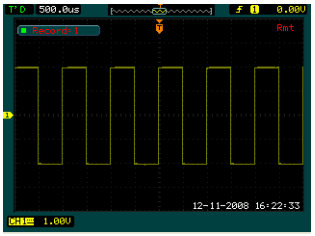
Pattern trigger

DS1000B contain abundant triggers: Edge, Pulse Width, Video, Pattern and Alternative triggers. Especially the pattern trigger achieves trigger operation according to the logic relationship among channels, which can capture special digital information.

Unique function of adjustable trigger sensitivity is good for filtering possible noise from signal in order to avoid false triggers.

Waveform Recording

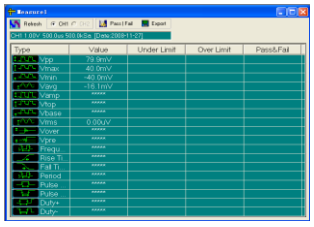
In virtue of waveform recording function from DS1000B series, not only the outputs from four channels could be recorded, but also the waves outputted by Pass/Fail test could be easily recorded. Totally, up to 1000 frames of waves are available to record. Besides, users can analyze waves according to recall or save transient waves so as to get more exact datum.



Waveform recording

UltraScope Software

RIGOL provides powerful PC application software: UltraScope, which enables to: Capture and measure wave; Perform local or remote operation; Save waves as ".bmp" format; Save files as ".txt" or ".xls" format; Print waveforms.



Measurement window

Specifications

All specifications apply to the DS1000B Series Oscilloscopes unless noted otherwise. To meet these specifications, two conditions must first be met:

- The instrument must have been operating continuously for thirty minutes within the specified operating temperature.
- Must perform Self Calibration operation, accessible through the Utility menu, if the operating temperature changes by more than 5°C.

All specifications are guaranteed unless noted "typical".

Technical Specifications

Acquisition		
Sample Modes	Real-Time Sample	Equivalent Sample
Sample Rate	2 GSa/s (half channel [1]) 1 GSa/s (each channel)	50 GSa/s[2]
Averages	A waveform will be displayed one time while all the channels finish N times sample, N could be selectable from 2, 4, 8, 16, 32, 64, 128 and 256	
Inputs		
Input Coupling	DC, AC, GND	
Input Impedance	1MΩ±2.0% The input capacity is 18pF±3pF	
Probe Attenuation Factors	0.001X, 0.01X, 0.1X, 1X, 2X, 5X, 10X, 20X, 50X, 100X, 200X, 500X, 1000X	
Maximum Input Voltage	Maximum Input Voltage of the analog channel: CAT I 300Vrms, 1000Vpk; transient overvoltage 1000Vpk CAT II 100Vrms, 1000Vpk RP2200 10:1, CAT II 300Vrms RP3200 10:1, CAT II 300Vrms RP3300 10:1, CAT II 300Vrms	
Time Delay between Channel (typical)	500ps	
Horizontal		
Sample Rate Range	3.65Sa/s-2GSa/s (Real-Time), 3.65Sa/s-50GSa/s (Equivalent-time)	
Waveform Interpolation	Sin(x)/x	
Record Length	Up to 16k samples for half channel[1] 8k samples for each channel	
Scanning Speed Range (Sec/div)	1ns/div~50s/div, DS1204B 2ns/div~50s/div, DS1104B 5ns/div~50s/div, DS1074B 1-2-5 Sequence	
Sample Rate and Delay Time Accuracy	±50ppm (any time interval ≥1ms)	
Delta Time Measurement Accuracy (Full Bandwidth)	Single: ±(1 sample interval + 50ppm × reading + 0.6 ns) >16 averages: ±(1sample interval + 50ppm × reading + 0.4 ns)	
Vertical		
A/D Converter	8-bit resolution, all channels sample simultaneously	
Volts/div Range	2mV/div-10V/div at input BNC	
Offset Range	±40V(245mV/div~10V/div)	

	±2V(2mV/div~245mV/div)
Equivalent Bandwidth	70MHz(DS1074B) 100MHz(DS1104B) 200MHz(DS1204B)
Single-shot Bandwidth	70MHz(DS1074B) 100MHz(DS1104B) 200MHz(DS1204B)
Selectable Analog Bandwidth Limit (typical)	20MHz
Lower Frequency Response (AC -3dB)	≤5Hz (at input BNC)
Rise Time at BNC (typical)	<1.75ns, <3.5ns, <5ns, On 200MHz, 100MHz, 70MHz respectively
DC Gain Accuracy	2mV/div~5mV/div: ±4% (Normal or Average acquisition mode) 10mV/div~10V/div: ±3% (Normal or Average acquisition mode)
DC Measurement Accuracy Average Acquisition Mode	When vertical displacement is zero, and N ≥16: ±(DC Gain Accuracy×reading+0.1div+1mV) When vertical displacement is not zero, and N ≥16: ±[DC Gain Accuracy×(reading+ vertical position)+(1% of vertical position)+0.2div] Add 2mV for settings from 1mV/div to 200 mV/div Add 50mV for settings from >200mV/div to 10V/div
Delta Volts Measurement Accuracy (Average Acquisition Mode)	Under same setting and condition, the voltage difference (△ V) between any two points in the waves coming from the average of more than 16 waves have been acquired: ±(DC Gain Accuracy×reading + 0.05 div)

Trigger		
Trigger Sensitivity	0.1div-1.0div (adjustable)	
Trigger Level Range	Internal	±6 divisions from center of screen
	EXT	±1.2V
	EXT/5	±6V
Trigger Level Accuracy (typical) applicable for the signal of rising and falling time ≥20ns	Internal	±(0.3div × V/div)(±4 divisions from center of screen)
	EXT	±(6% of setting + 40 mV)
	EXT/5	±(6% of setting + 200 mV)
Trigger Offset	In Normal mode: pre-trigger(storage depth/(2×sample) rate), delayed trigger 1s	
	In Slow Scan mode: pre-trigger 6div, delayed trigger 6div	
Trigger Holdoff Range	100ns~1.5s	
HF Rejection	100kHz ±20%	
LF Rejection	10kHz ±20%	
Set Level to 50% (typical)	When input signal frequency ≥50Hz	

Edge Trigger	
Edge Trigger Slope	Rising, Falling, Rising + Falling
Pulse Width Trigger	
Trigger Condition	(>, <, =) Positive pulse, (>, <, =) Negative pulse
Pulse Width Range	20ns ~10s
Video Trigger	
Video Standard Line Frequency	Support for standard NTSC, PAL and SECAM broadcast systems. Line number range: 1~525 (NTSC) and 1~625 (PAL/SECAM)

Pattern Trigger		
Pattern setup		H, L, X, ⊥, ⊤
Alternate Trigger		
Trigger on CH1, CH2, CH3, CH4		Edge, Pulse Width, Video
Measurements		
Cursor	Manual	Voltage difference between cursors (ΔV) Time difference between cursors (ΔT) Reciprocal of ΔT in Hertz (1/ΔT)
	Track	Voltage value for Y-axis waveform Time value for X-axis waveform
	Auto	Cursors are visible for Automatic Measurement
Auto Measure	Vpp, Vamp, Vmax, Vmin, Vtop, Vbase, Vavg, Vrms, Overshoot, Preshoot, Freq, Period, Rise Time, Fall Time, +Width, -Width, +Duty, -Duty, Delay A→B⊥, Delay A→B⊤， Phase A→B⊥,Phase A→B⊤	

Remarks:

[1] Half channel indicates selecting one of the channels in CH1 and CH2, or in CH3 and CH4.

[2] This is the highest specification, the specific specifications are as follows:

DS1204B: 50GSa/s

DS1104B: 25GSa/s

DS1074B: 10GSa/s

General Specifications

Display		
Display Type	5.7 inch. (145 mm) diagonal TFT Liquid Crystal Display	
Display Resolution	320 horizontal ×RGB×240 vertical pixels	
Display Color	64k color	
Display Contrast (typical)	150:1	
Backlight Brightness (typical)	300 nit	
Probe Compensator Output		
Output Voltage (typical)	Amplitude, ~3Vpp	
Frequency (typical)	1kHz	
Power Supply		
Supply Voltage	AC, 100~240 V, 45~440Hz, CAT II	
Power Consumption	Less than 50VA	
Fuse	2A, T rating, 250 V	
Environmental		
Ambient Temperature	Operating 10℃~ 40℃	
	Non-operating -20℃~ +60℃	
Cooling Method	Fan force air flow	
Humidity	+35℃ or below: ≤90% relative humidity	
	+35℃~ +40℃: ≤60% relative humidity	
Altitude	Operating 3,000 m or below	
	Non-operating 15,000 m or below	
Mechanical		
Dimensions	Width	325mm
	Height	159mm
	Depth	133 mm
Weight	Without package	3kg
	Packaged	4.3 kg
IP Protection		
IP2X		
Calibration Interval		
The recommended calibration interval is one year		

Ordering Information

Name of Product

RIGOL DS1000B series digital oscilloscopes

Standard Accessories

- Probe×4, 1:1, (10:1) Passive Probes
- A Power Cord that fits the standard of destination country
- An USB Cable
- A CD-ROM (including *User's Guide* an application software)
- A Quick Guide

Optional Accessories

- BNC Cable
- RS232 Cable
- DS1000B special convenient soft bag

Warranty

Thank you for choosing **RIGOL** products!

RIGOL Technologies, Inc. warrants that this product will be free from defects in materials and workmanship from the date of shipment. If a product proved defective within the respective period, **RIGOL** will provide repair or replacement as described in the complete warranty statement.

For the copy of complete warranty statement or maintenance, please contact with your nearest **RIGOL** sales and service office.

RIGOL do not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hint guarantee items related to tradable characteristic and any particular purpose. **RIGOL** will not take any responsibility in cases regarding to indirect, particular and ensuing damage.

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