



# DS80000 系列

## 高端数字示波器

数据手册  
DSA38000-1110  
2024.04



## 产品简介

DS80000系列高带宽实时数字示波器是RIGOL自主研发的第八代数字示波器，提供最高13GHz模拟带宽，最高40GSa/s实时采样率，存储深度最高可达每通道4Gpts，支持多种协议一致性分析功能，帮助您应对高速设计中的故障排除和验证难题。



## 客户价值

### 高性能

- 高达13GHz模拟带宽，更强大的高速信号分析能力
- 最高40GSa/s实时采样率，更强大的信号采集能力
- 高达4Gpts存储深度，更完整的信号细节还原能力

### 高易用性

- 倾角可电动调节的15.6英寸高清触摸大屏，支持多窗口手势操作
- 多功能高清智控反馈键盘：可扩展作为主屏幕窗口，可自定义快捷菜单
- 符合SCPI标准的程控指令集
- 提供USB/LAN/HDMI®等多种接口，满足更多测试应用场景

### 强大的分析能力

集成多种高级分析功能，包含各种一致性分析，抖动分析等。



## 典型应用

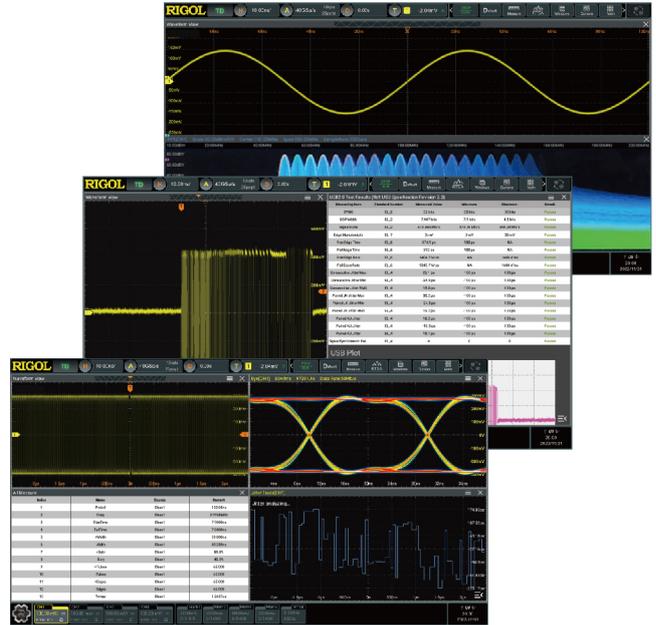
### ① 高速信号协议一致性分析

DS80000系列数字示波器通过高达13GHz带宽以及最高40GSa/s实时采样率，能够覆盖更多的高速信号协议一致性分析应用场景，提供更多一致性分析功能，包括但不限于：PCIe, USB2.0



### ② 高速器件及系统性能验证

DS80000系列提供高级抖动和眼图分析功能，通过完整的眼图和抖动分析指标，可在如下场景实现更完整的应用覆盖：复杂的嵌入式系统调试、高速串行和并行总线性能、时钟抖动及信号完整性、锁相环性能验证等



## DS80000选型表

产品型号(同订货号)	DS81304	DS80804
最大模拟带宽	13GHz	8GHz
每通道采样率	40GSa/s on all channel	
模拟通道数	4CH 13GHz on all channel	4CH 8GHz on all channel
通道间隔离度	>60dB	
垂直分辨率	8bit 9~16bit(High Resolution Mode)	
垂直档位范围	1mV/div~1V/div	
波形刷新率	250,000 wfms/s	
最大存储深度	4Gpts/CH(opt.)	
输入阻抗	50Ω	
连接器类型	3.5mm Input	
接口	HDMI、LAN、USB3.0 Host&Device	
屏幕	15.6 inch Touch Screen	
程控标准	SCPI Standard	

# Product Features

## Features

- Equipped with RIGOL's new self-developed core module
- Number of channels: 4 analog channels, 1 EXT channel
- Analog channel bandwidth: up to 13 GHz
- Maximum real-time sampling rate: 40 GSa/s
- Maximum storage depth: 4 Gpts (optional)
- Maximum waveform capture rate: 250,000 wfms/s
- Vertical resolution: 8 bits~16 bits adjustable
- Vertical sensitivity range: 1mV/div to 1V/div (50 $\Omega$ )
- Time base range: 20ps/div~1ks/div
- Combines multiple independent instruments into one, including: oscilloscope, digital voltmeter, 8-bit frequency counter and totalizer, protocol analyzer (option)
- Rich trigger functions: zone trigger, edge, pulse width, slope, video, pattern, duration, timeout, runt pulse, overshoot, delay, setup and hold, Nth edge trigger, RS232/UART, I2C, SPI, CAN, FlexRay, LIN, I2S, MIL-STD-1553
- Rich serial bus decoding functions (optional): RS232/UART, I2C, SPI, CAN, CAN-FD, FlexRay, LIN, I2S, MIL-STD-1553, USB2.0, support 4 decoding channels
- Supports Ethernet, USB2.0 and other protocol consistency analysis functions (optional)
- Up to 41 types of waveform parameters can be automatically measured, and full memory hardware measurement function is also provided
- Various mathematical operations: addition, subtraction, multiplication, division, FFT, AND, OR, NOT, XOR, Intg, Diff, Lg, Ln, Exp, Sqrt, Abs, AX+B, low-pass filter, high-pass filter, band-pass filter, band-stop filter, built-in peak search function
- Supports optional real-time eye diagram and jitter analysis functions (optional)
- Up to 2,000,000 frames of hardware real-time waveform non-stop recording and playback
- Rich interfaces: USB Host & Device, LAN (LXI), HDMI, AUX OUT, support Web Control remote control
- 15.6-inch high-definition multi-touch screen, the screen tilt can be electrically adjusted, and the flexible screen supports multi-window split-screen display
- The knob uses a photoelectric encoder, which can guarantee a service life of more than 100,000 presses and 1 million rotations, greatly improving the service life.
- HD intelligent feedback keyboard
- Support online version upgrade function

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The DS80000 series high-bandwidth real-time digital oscilloscope is the eighth generation of digital oscilloscopes independently developed by RIGOL. It provides up to 13 GHz analog bandwidth, up to 40 GSa/s real-time sampling rate, up to 250,000 wfms/s waveform capture rate in real-time mode, and up to 4 Gpts storage depth. It supports multiple protocol consistency analysis functions to help you deal with troubleshooting and verification problems in high-speed designs.

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## Overview of RIGOL's mid-range and high-end oscilloscope series

	<b>MSO8000/A</b>	<b>DS70000</b>	<b>DS80000</b>
Analog Channels	4	4	4
Digital Channels	16	none	none
Analog bandwidth	600 MHz~3 GHz	3 GHz~5 GHz	8 GHz~13 GHz
Maximum sampling rate	10 GSa/s	20 GSa/s	40 GSa/s
Maximum storage depth	500 Mpts	2 Gpts (optional)	4 Gpts (optional)
Waveform capture rate	> 600,000 wfms/s	> 1,000,000 wfms/s	> 250,000 wfms/s
Maximum waveform recording frames	450,000 frames	2,000,000 frames	2,000,000 frames
<b>monitor</b>	10.1-inch multi-touch capacitive screen	15.6-inch multi-touch flip screen	15.6-inch multi-touch flip screen
<b>Hardware Mask Testing</b>	Standard	Standard	Standard
Arbitrary Waveform Generator	2 CH, 25 MHz (optional)	none	none
<b>Digital voltmeter</b>	Standard	Standard	Standard
<b>Hardware Counters</b>	6-digit frequency counter + totalizer	8-bit frequency counter + accumulator	8-bit frequency counter + accumulator
Search and Navigation	Support list display	none	Support list display
Power supply analysis	Built-in UPA (optional) + PC	none	none
Real-time eye diagram	Optional	Optional	Optional
<b>Jitter Analysis</b>	Optional	Optional	Optional
Protocol consistency analysis	none	USB2.0 (optional), LAN (Optional)	USB2.0 (optional), LAN (Optional)
Serial protocol analysis (optional match)	RS232/UART, I2C, SPI, CAN, LIN, FlexRay, I2S, MIL-STD-1553	RS232/UART, I2C, SPI, CAN, CAN-FD, LIN, FlexRay, I2S, MIL-STD-1553	RS232/UART, I2C, SPI, CAN, CAN-FD, FlexRay, LIN, I2S, MIL-STD-1553, USB2.0
<b>Waveform Color Afterglow</b>	Standard	Standard	Standard
<b>Histogram</b>	Standard	none	Standard
<b>FFT</b>	FFT, standard	FFT, standard	FFT, standard
<b>MATH</b>	Display 4 functions simultaneously	Display 4 functions simultaneously	Display 4 functions simultaneously
Connectivity	Standard: USB, LAN, HDMI	Standard: USB, LAN, HDMI	Standard: USB, LAN, HDMI

# Supported RIGOL Oscilloscope Probe Adapters

## Probe adapter

<b>name</b>	<b>type</b>	<b>describe</b>
BNC Adapter Input 50Ω	Precision BNC Adapter	50 Ω to 3.5 mm female to precision BNC female connector
High Impedance Adapter	High impedance probe adapter	3.5mm to BNC (1MΩ)

# Technical Parameters

Except for the parameters marked with "Typical Values", all parameters are guaranteed and the oscilloscope must be operated continuously for more than 30 minutes at the specified operating temperature.

## DS80000 Series Technical Specifications Overview

DS80000 Series Technical Specifications Overview		
model	DS80804	DS81304
Number of analog channels	4 CH	4 CH
Maximum analog bandwidth	8 GHz <sup>[1]</sup>	13 GHz <sup>[1]</sup>
Total sampling rate	160GSa/s	160GSa/s
Channel sampling rate	40 GSa/s <sup>[1]</sup>	40 GSa/s <sup>[1]</sup>
Maximum storage depth	Standard: 500 Mpts, Optional: 4 Gpts <sup>[1]</sup>	
Sampling method	Real-time sampling	
Rise time	$\leq 55\text{ps}$ (8GHz); $\leq 33\text{ps}$ (13GHz) (Input impedance 50Ω, 10%-90%, typical value)	
Maximum waveform capture rate	250,000 wfms/s	
Vertical resolution	8 bits~16 bits adjustable	
Hardware real-time waveform	Up to 2,000,000 frames	
Recording and playback		
Peak Detection	Capture glitches as narrow as 100ps	
Display	Main screen: 15.6-inch multi-touch capacitive screen, supports electric flip Secondary screen: 3.5-inch multi-touch capacitive screen, supports touch vibration feedback	
Display resolution	Main screen: 1920×1080, secondary screen: 480×320	

## Vertical system analog channels

Vertical system analog channels	
Input Impedance	50Ω ± 3%
Input coupling	Direct current (DC) <sup>[2]</sup>

## Vertical system analog channels

Probe attenuation coefficient setting	Probe ratio	0.0001X, 0.0002X, 0.0005X, 0.001X, 0.002X, 0.005X, 0.01X, 0.02X, 0.05X, 0.1X, 0.2X, 0.5X, 1X, 2X, 5X, 10X, 20X, 50X, 100X, 200X, 500X, 1000X, 2000X, 5000X, 10000X, 20000X, 50000X
	Attenuation ratio	±60 dB
Maximum input voltage	50Ω	$\leq 10\text{mV/Div}$ Scale: $2 V_{\text{rms}}$ $> 10\text{mV/Div}$ : $5V_{\text{rms}}$
	Remark	Probe technology allows higher voltage testing, with or without the use of probes, no transient overvoltage conditions are allowed; use this instrument only for measurements within the specified measurement category (not applicable to CAT II, III, IV)
Vertical resolution		8 bits 9 bit to 16 bit adjustable (high resolution mode)
Vertical sensitivity range <sup>[3]</sup>	50Ω	1mV/div to 1V/div
Offset Range	50Ω	$\pm 0.6\text{ V}$ ( $\leq 60\text{ mV/div}$ ) $\pm 2.5\text{ V}$ ( $\leq 60\text{mV/div}$ , $\leq 200\text{mV/div}$ ) $\pm 4\text{ V}$ ( $\leq 200\text{mV/div}$ , $\leq 1\text{V/div}$ )
Dynamic Range		±5 div (8 bit)
DC gain accuracy <sup>[3]</sup>		± 2% Full Scale
DC offset accuracy		$\leq 200\text{mV/div}$ ( $\pm 0.1\text{ div} \pm 2\text{mV} \pm 1.5\%$ offset) $> 200\text{mV/div}$ ( $\pm 0.1\text{ div} \pm 2\text{mV} \pm 1.0\%$ offset)
Channel Isolation		≥60 dB

## Horizontal system - analog channel

### Horizontal system - analog channel

	8 GHz	13 GHz
Time base range	50ps/div~1ks/div	20ps/div~1ks/div
	Support time base fine-tuning	
Time base resolution	0.2ps	
Time base accuracy	±0.2 ppm (initial calibration accuracy) ±1 ppm/year (aging rate)	

### Horizontal system - analog channel

Time base delay range	Before triggering	- 5 div
	After triggering	Maximum storage depth time
Time interval ( $\Delta T$ ) measurements (using cursors)	$\pm$ (time base accuracy $\times$ reading) $\pm$ (0.001 $\times$ screen width) $\pm$ 20ps	
Inter-channel deskew range	Range $\pm$ 100ns, accuracy $\pm$ 1ps	
Analog channel-to-channel delay (typical)	$\leq$ 50ps[4]	
Horizontal Mode	YT	default
	XY	Channel 1/2/3/4
	SCAN	Time base $\geq$ 200ms/div
	ROLL	Time base $\geq$ 50ms/div, you can automatically enter or exit ROLL mode by adjusting the horizontal time base knob

### Acquisition system

Acquisition system		
Maximum analog channel sampling rate	40 GSa/s[1]	
Maximum analog channel memory depth	Standard: 500 Mpts, Optional: 4 Gpts[1]	
How to get it	ordinary	default
	Peak Detection	Capture glitches as narrow as 100ps
	Average Mode	Optional 2, 4, 8, 16...65536
	high resolution	Can be set from 9 bit to 16 bit

### Vertical resolution

Vertical resolution						
Resolution	9 bits	10 bits	12 bit	14 bits	16 bit	
bandwidth	40 GSa/s	4GHz	2GHz	1GHz	400MHz	200MHz
	20 GSa/s	2GHz	1GHz	500MHz	200MHz	100MHz

### Trigger system

Trigger system	
Trigger source	Analog channel (CH1~CH4), EXT TRIG

## Trigger system

Trigger Mode	Automatic, Normal, Single	
Trigger coupling	DC	DC coupled trigger
	communicate	AC coupled trigger
	High frequency suppression	High frequency suppression, cut-off frequency ~75kHz (internal trigger only)
	Low frequency suppression	Low frequency suppression, cut-off frequency ~75kHz (internal trigger only)
Noise Suppression	Adds hysteresis to the trigger circuit (internal trigger only), selectable on or off	
Trigger bandwidth	Internal trigger	Oscilloscope analog bandwidth
	External trigger	200MHz
Trigger sensitivity	Internal trigger	1.5 div, $\leq 5\text{mV/div}$
		1 div, 5mV/div to 50mV/div
	0.5 div, $\geq 50\text{mV/div}$	
		When the trigger range is 500mV/div, the trigger sensitivity is 0.75 div or 0.8 div
EXT Trigger	External trigger	500mVpp (DC to 200MHz)
	Input resistance	1 M $\Omega$ $\pm$ 1%, SMA connector
	Trigger jitter	$\leq 1\text{ns}_{\text{rms}}$
(Typical value)		Normal sampling mode, edge trigger, the trigger level is near 50% of the EXT input signal
Trigger level range	Internal trigger	$\pm 5$ divs from the center of the screen
	External trigger	$\pm 4\text{ V}$

## Trigger Type

### Trigger Type

Trigger Type	Standard: edge, pulse width, slope, video, pattern, duration, timeout, runt pulse, overshoot, delay, setup and hold, Nth edge trigger
	Optional: RS232/UART, I2C, SPI, CAN, FlexRay, LIN, I2S, MIL-STD-1553
edge	Trigger on the threshold of the specified edge of the input signal. The edge type includes rising edge, falling edge, or any edge.
	Source channel: CH1~CH4 or EXT

## Trigger Type

Trigger on a positive or negative pulse of a specified width, a pulse width above or below a certain value, or within a certain time range

Pulse Width

Source channel: CH1~CH4

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Slope

Trigger on a positive or negative slope within a specified time (200ps~10s), when the slope time is above or below a certain value, or within a certain time range

Source channel: CH1~CH4

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video

Trigger on all lines, specified lines, odd fields, or even fields that match the video standard; supported video standards include NTSC, PAL/SECAM, 480p/60Hz, 576p/50Hz, 720p/60Hz, 720p/50Hz, 720p/30Hz, 720p/25Hz, 720p/24Hz, 1080p/60Hz, 1080p/50Hz, 1080p/30Hz, 1080p/25Hz, 1080p/24Hz, 1080i/60Hz, 1080i/50Hz

Source channel: CH1~CH4

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Code Type

Identify trigger conditions by searching for a specified pattern; the pattern is an AND combination of multiple selected sources, and the logical pattern of each source is H, L, X, rising edge, or falling edge

Source channel: CH1~CH4

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Duration

Trigger when the specified pattern meets the specified duration condition; the pattern is an AND combination of multiple selected sources, and the logical pattern of each source is H, L, X; the duration is higher or lower than a certain value, or is within a certain time range, or is outside a certain time range

Source channel: CH1~CH4

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time out

Trigger when the time from an event to the start exceeds the specified time (200ps~10s); the event can be specified as a rising edge, falling edge, or any edge

Source channel: CH1~CH4

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Runt pulse

Trigger on a pulse signal whose pulse amplitude crosses one threshold but not the other

Source channel: CH1~CH4

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Super-amplitude pulse

Trigger on a specified over-limit state when the rising edge of the signal crosses the high threshold or the falling edge crosses the low threshold; the over-limit state can be over-limit entry, over-limit exit, or specified over-limit time

Source channel: CH1~CH4

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Delay

Trigger when the time difference between the specified edge of source A and the specified edge of source B meets the specified time condition; the delay time is higher or lower than a certain value, or is within a certain time range, or is outside a certain time range

Source channel: CH1~CH4

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Establish and maintain

Trigger when the setup time or hold time between the input clock signal and data signal is less than the specified time (200ps~10s)

Source channel: CH1~CH4

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**Trigger Type****Nth edge**

Trigger on the Nth specified edge after a specified idle time; the edge can be specified as a rising edge or a falling edge

Source channel: CH1~CH4

**RS232/UART  
(option)**

DS80000-EMBDA Option

Trigger on Start of Frame, Error Frame, Parity Error, or Data on RS232/UART buses up to 20 Mb/s

Source channel: CH1~CH4

**I2C (option)**

DS80000-EMBDA Option

Trigger on Start, Stop, Restart, Missing Ack, Address (7-bit, 8-bit, or 10-bit), Data, or Address Data of an I2C bus

Source channel: CH1~CH4

**SPI (option)**

DS80000-EMBDA Option

Trigger on a specified pattern with a specified data bit width (4 to 32) on the SPI bus; supports chip select (CS) and timeout

Source channel: CH1~CH4

**CAN (option)**

DS80000-AUTOA Option

Trigger on frame start, frame end, remote frame ID, overload frame, data frame ID, data frame data, data and ID, error frame, bit stuffing error, response error, check error, format error and any error of CAN bus signals up to 5 Mb/s; supported CAN bus signal types include CAN\_H, CAN\_L, send/receive, differential

Source channel: CH1~CH4

**FlexRay  
(option)**

DS80000-AUTOA Option

Trigger on Position (TSS End, FSS\_BSS End, FES End, DTS End), Frame (Null, Sync, Start, All), Symbol (CAS/MTS, WUS), Error (Header CRC Error, Trailer CRC Error, Decode Error, Any Error) on FlexRay bus signals up to 10 Mb/s

Source channel: CH1~CH4

**LIN (option)**

DS80000-AUTOA Option

Trigger on Sync, Identifier, Data (selectable length), Data and ID, Wakeup Frame, Sleep Frame, Error Frame on LIN bus signals up to 20 Mb/s

Source channel: CH1~CH4

**I2S (option)**

DS80000-AUDIOA Option

Trigger audio left channel, right channel or any channel data (=, ≠, >, <, <>, ><); alignment standard supports I2C standard, left alignment, right alignment

Source channel: CH1~CH4

## Trigger Type

### DS80000-AEROA Option

#### MIL-STD-1553 (option)

Trigger on MIL-STD-1553 bus signal synchronization (data frame synchronization, command/status synchronization, all frame synchronization), data word, RTA, RTA+11Bit, error (synchronization error, check error)

Source channel: CH1~CH4

## Waveform Measurement

### Waveform Measurement

Number of cursors 2 pairs of XY cursors

Voltage difference between cursors ( $\Delta Y$ )

Manual Mode Time difference between cursors ( $\Delta X$ )

Reciprocal of  $\Delta X$  (Hz) ( $1/\Delta X$ )

#### cursor

Tracking Mode Fixed Y-axis tracking of voltage and time values of X waveform points

Fixed X-axis tracking of voltage and time values of Y waveform points

Automatic measurement cursors Allows cursors to be displayed during automatic measurements

XY Mode Measure the voltage parameters of the corresponding channel waveform in XY time base mode

X = Channel 1, Y = Channel 2

## Waveform Measurement

Measurement quantity	41 automatic measurements, up to 14 measurements displayed simultaneously
Measurement source	CH1~CH4, Math1~Math4
Measurement Mode	Supports common measurement (software implementation) and hardware measurement (W). Hardware measurement only supports analog channels.
Measuring range	Main time base, extended time base, cursor area, full memory
All measurements	Displays 41 measurement items of the current measurement channel, with measurement results continuously updated and the measurement channel can be switched
vertical	Maximum value, minimum value, peak-to-peak value, top value, bottom value, amplitude value, high value, middle value, low value, average value, effective value, cycle effective value, overshoot, preshoot, area, single cycle area, AC effective value
level	Period, frequency, rise time, fall time, positive pulse width, negative pulse width, positive duty cycle, negative duty cycle, number of positive pulse widths, number of negative pulse widths, number of rising edges, number of falling edges, maximum value moment, minimum value moment, positive slope, negative slope
other	Delay (A ↑ -B ↑), Delay (A ↑ -B ↓), Delay (A ↓ -B ↑), Delay (A ↓ -B ↓), Phase (A ↑ -B ↑), Phase (A ↑ -B ↓), Phase (A ↓ -B ↑), Phase (A ↓ -B ↓)
analyze	Frequency meter, DVM, histogram, area trigger, eye diagram analysis (optional), jitter analysis (optional)
statistics	Statistics: current value, average value, maximum value, minimum value, standard deviation, count value Supports up to 1000 statistics

## Waveform Operation

### Waveform Operation

Number of math functions	4, can display 4 mathematical functions simultaneously
Operation	Addition, subtraction, multiplication, division, FFT, AND, OR, NOT, XOR, Intg, Diff, Lg, Ln, Exp, Sqrt, Abs, AX+B, low-pass filter, high-pass filter, band-pass filter, band-stop filter
Color Temperature	Support FFT color temperature display
Record length	Max. 10 Mpts
Window Type	Rectangular, Blackman, Hanning (default), Hamming, Flat-top, Triangular
Peak Search	Up to 15 peaks, based on user-adjustable threshold and excursion thresholds

## FFT

Waveform analysis

Waveform analysis	
	The measured signal is stored in segments according to the trigger events. That is, when each trigger event occurs, all the acquired waveform data is saved as a segment in the volatile storage space. The maximum number of segments collected is up to 2,000,000 frames.
Waveform Recording	<p>source All enabled analog channels</p> <hr/> <p>analyze Supports frame-by-frame or continuous playback, and can perform calculations, measurements and decoding on the played waveform</p>
Pass the test	<p>Compares the tested signal to user-defined rules (templates) and provides pass, fail and total number of tests; pass/fail events can trigger immediate stop, buzzer and screenshot</p> <hr/> <p>source Any analog channel</p>
Histogram	<p>The waveform histogram provides a set of data values representing the total number of hits within the defined area on the display; the waveform histogram is both a visual representation of the hit distribution and an array of numbers that can be measured</p> <hr/> <p>source Any analog channel</p> <hr/> <p>type Horizontal and vertical</p> <hr/> <p>Measurement Statistics: number of times, peak value, maximum value, minimum value, peak-to-peak value, average value, median value, mode value, Bin Width, standard deviation</p>
Color Temperature	<p>Provides a three-dimensional view of waveform intensity, with color temperature levels &gt; 16 levels and 256 levels of color gradation display</p> <hr/> <p>source Any analog channel</p> <hr/> <p>Color Theme Temperature and brightness</p> <hr/> <p>model Support all modes</p>
Real-time eye diagram (option)	<p>Based on the recovered clock cycle, the collected fixed-length data is accumulated and displayed in a color persistence manner.</p> <hr/> <p>source Any analog channel</p> <hr/> <p>Clock Recovery Support software clock recovery, support constant, first-order PLL, second-order PLL, external clock clock recovery</p> <hr/> <p>Rate Mode Automatic, semi-automatic, manual</p> <hr/> <p>Eye diagram measurement items Support: 1 level, 0 level, eye height, eye width, eye amplitude, eye crossing ratio, Qfactor, extinction ratio, duty cycle distortion, eye rise time, eye fall time, eye bit rate, etc.</p>

## Waveform analysis

Measure clock or data signals over a long period of time and analyze changes in their technical indicators

source Any analog channel

Clock Recovery Including constants, phase-locked loop, external clock recovery

Rate Mode Automatic, semi-automatic, manual

Jitter Measurement TIE, cycle-cycle, positive pulse width-positive pulse width, negative pulse width-negative pulse width, jitter measurement can be selected peak-to-peak, 6-sigma, RMS

Jitter Analysis Separate jitter components, related measurements include: Tj, Rj, Dj, Pj, DDj, DCD, ISI, BR, TIE, cycle-cycle, positive pulse width-positive pulse width, negative pulse width-negative pulse width

Measurement display Jitter trend graph, jitter spectrum graph, jitter histogram, bathtub curve

Jitter Analysis  
(option)

## Search navigation

### Search, Navigation, and Lists

type Edge, pulse width

Source Analog Channels

copy Can be copied to or from trigger settings, or can be set independently, including threshold settings and search condition settings

Results The time, pulse width, data, address and other related information of each event are displayed in a sub-window in a table format.  
Search results can be exported to external storage or internal storage in csv format

navigation Time navigation: View acquired waveforms in chronological order

Event Navigation: Automatically scroll through search results with the help of navigation buttons

## Serial decoding

### Serial decoding

Decoding number 4, can support four protocol types simultaneous decoding and switching

Standard: GPIO

Decoding Type Options: RS232/UART, I2C, SPI, CAN, CAN-FD, FlexRay, LIN, I2S, MIL-STD-1553, USB2.0

GPIO Up to 4-bit parallel bus decoding, supports any analog channel; supports custom clock and automatic clock configuration

Source channel: CH1~CH4

	DS80000-EMBDA Option
RS232/UART (option)	Decodes data (5~9 bits) of RS232/UART bus TX/RX signals up to 20 Mb/s, supports parity bit (odd, even or no parity) and stop bit (1~2 bits) settings  Source channel: CH1~CH4
I2C (option)	DS80000-EMBDA Option  Decodes the address (with or without the read/write bit), data, and ACK of the I2C bus  Source channel: CH1~CH4
SPI (option)	DS80000-EMBDA Option  Decode SPI bus MISO/MOSI data (4~32 bits); mode supports timeout and chip select (CS)  Source channel: CH1~CH4
CAN (option)	DS80000-AUTOA Option  Decodes remote frames (ID, number of bytes, CRC), overload frames and data frames (standard/extended ID, control field, data field, CRC, ACK) of CAN buses up to 5 Mb/s; supports CAN bus signal types such as CAN_H, CAN_L, send/receive, differential  Supports CAN-FD bus decoding with variable rate up to 10 Mb/s  Source channel: CH1~CH4
FlexRay (option)	DS80000-AUTOA Option  Decodes frame ID, PL (payload length), Header CRC, Cycle count, data, Tail CRC, and DTS (dynamic end sequence) for FlexRay buses up to 10 Mb/s; signal types support BP, BM, RX/TX  Source channel: CH1~CH4
LIN (option)	DS80000-AUTOA Option  Decodes LIN bus versions 1.X or 2.X at speeds up to 20 Mb/s; decode displays Sync, Identifier, Data, Checksum  Source channel: CH1~CH4
I2S (option)	DS80000-AUDIOA Option  Decode the left and right channel data of the I2S audio bus, support 4~32 bits, and support the standard I2S, left alignment and right alignment  Source channel: CH1~CH4
MIL-STD-1553 (option)	DS80000-AEROA Option  Decodes the data word, command word and status word (address + last 11 bits) of the MIL-STD-1553 bus signal  Source channel: CH1~CH4

Serial decoding

USB2.0 (option)

Parse the USB 2.0 bus's SNYC, PID, and packet content data frames, and complete CRC verification.  
Source channel: CH1~CH4

Protocol consistency analysis

Protocol consistency analysis (option)

DS80000-USBC Option

USB 2.0

Test items: Sync domain, end domain, signal rate, edge rise time, edge fall time, monotonic, edge rise rate, edge fall rate, JK pair jitter, KJ pair jitter, continuity jitter, eye diagram template measurement

100Base-T

DS80000-ENETC Option

Test items: output voltage amplitude, output voltage amplitude symmetry, rise/fall time, rise/fall time symmetry, waveform overshoot, duty cycle distortion, eye diagram, transmission jitter

1000Base-T

DS80000-ENETC Option

Mode 1 test items: peak voltage, maximum attenuation and template

Mode 2 test item: master mode jitter

Mode 3 test item: slave mode jitter

Mode 4 test items: transmission distortion and common mode output voltage

Analytical protocol

Analytical Report

Measurement item data includes: measurement items (in Chinese and English), measurement results, data range, reference specification chapters and measurement judgment results;  
Supports exporting reports in HTML format

automatic

automatic

AutoScale

Minimum voltage greater than 10mVpp, duty cycle > 1% (35Hz to 10GHz periodic signal)

Digital voltmeter

Digital voltmeter

source

Any analog channel

Function

DC, AC+DCrms, A.C.rms

Resolution

ACV/DCV: 3 digits

Limit warning

Support upper and lower limit settings, over-limit condition settings and over-limit prompts

Range measurement

Graphically display the latest measurement results and the extreme values within the previous 3 seconds, supporting measurement trend graphs

## High Precision Frequency Meter

High Precision Frequency Meter		
source	Any analog channel	
Measurement	Frequency, period, accumulation	
counter	Resolution	3 bits to 8 bits, user-settable
	Maximum frequency	Maximum analog bandwidth
accumulator		64-bit up-counter
		Count rising edges
Time reference	Internal reference	

## Command Set

Command Set	
Common command support	Support standard SCPI command set
Error message definition	Error Message
Support status reporting mechanism	Status Reporting
Support synchronization mechanism	Synchronization

## show

show	
Display	Electric adjustable tilt 15.6-inch multi-touch capacitive screen, support gesture operation
Display resolution	1920×1080 (screen area) 16:9
Grid	10 horizontal grids × 8 vertical grids
afterglow	Afterglow off, infinite afterglow, adjustable afterglow time (100ms~10 s)
Brightness level	256 brightness levels (LCD, HDMI)

## Processor system

Processor system	
processor	Cortex-A72, 1.8GHz, dual-core
System Memory	4 GB RAM

## Processor system

operating system Android

Internal non-volatile memory 128 GB

## Interface specifications

### Interface specifications

USB3.0 Host port 2, 1 on the rear panel, 1 on the front panel

USB3.0 Device port 1, rear panel

LAN Port 1, rear panel, 1000 Base-T, LXI-C capable

Web Remote Control Support, Web Control interface (enter the IP address of the oscilloscope on the web browser to display the oscilloscope operation interface)

AUX Output  
Front panel SMA output  
 $V_o(H) \geq 2.5\text{ V}$  open circuit,  $\geq 1.0\text{ V}$  50 $\Omega$  to ground  
 $V_o(L) \leq 0.7\text{ V}$  to load  $\leq 4\text{ mA}$ ,  $\leq 0.25\text{ V}$  50  $\Omega$  to ground

Rise time  $\leq 1\text{ ns}$

Input Interface 1, rear panel SMA connector

Output Interface 1, rear panel SMA connector

10M Reference Clock

Input/Output  
Input Interface 50 $\Omega$ , amplitude 130mVpp to 4.1 Vpp (-10dBm, 20dBm), frequency 10MHz  $\pm$  1 ppm

Output Interface 50 $\Omega$ , 1.5 Vpp sine wave

HDMI high-definition video output 1, rear panel, HDMI 1.4, A plug; connects to external monitor or projector

Probe compensation output Frequency 1kHz, amplitude 3 Vpp, square wave

## power supply

### power supply

Supply voltage 100 to 127 V, 200 to 240 V, 50/60 Hz

power Maximum 2000 W (connected to various interfaces, USB flash drive, active probe)

environment

**environment**

Temperature range	Work	0°C~+50°C
	Non-working	-30°C~+70°C
Humidity range		+30°C or below, ≤90% relative humidity (no condensation)
	Work	+30°C~+40°C, ≤75% relative humidity (no condensation)
		+40°C~+50°C, ≤45% relative humidity (no condensation)
	Non-working	Below 65°C, ≤90% relative humidity (no condensation)
Altitude	Work	Below 3,000 m
	Non-working	Below 15,000 m

Warranty and calibration intervals

**Warranty and calibration intervals**

Warranty	3 years (excluding probes and accessories)
Recommended calibration interval	18 months

Regulatory standards	
	Complies with the EMC Directive (2014/30/EU), meeting or exceeding the requirements of IEC61326-1:2013/EN61326-1:2013 Group 1 Class A standards
	CISPR 11/EN 55011
	IEC 61000-4-2:2008/EN 61000-4-2 ±4.0 kV (contact discharge), ±8.0 kV (air discharge)
	IEC 61000-4-3:2002/EN 61000-4-3 3 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz)
Electromagnetic compatibility	IEC 61000-4-4:2004/EN 61000-4-4 1 kV power line
	IEC 61000-4-5:2001/EN 61000-4-5 0.5 kV (phase-neutral voltage); 1 kV (phase-ground voltage); 1 kV (neutral-ground voltage)
	IEC 61000-4-6:2003/EN 61000-4-6 3 V, 0.15 to 80 MHz
	IEC 61000-4-11:2004/EN 61000-4-11 Voltage drop: 0% UT during half cycle; 0% UT during 1 cycle; 70% UT during 25 cycles Short power failure: 0% UT during 250 cycles
	EN 61010-1:2019
	EN 61010-031:2015
	IEC 61010-1:2016
	IEC 61010-2-030:2017
Safety regulations	UL 61010-1:2012 R7
	UL 61010-2-31:2017 R2
	CAN/CSA-22.2 No. 61010-1-12:2017
	CAN/CSA-22.2 No. 61010-2-30:2018
	CAN/CSA-22.2 No. 61010-031-07:201
	Complies with GB/T 6587, Category 2 random vibration
vibration	Meets MIL-PRF-28800F and IEC60068-2-6, Class 3 Random Vibration

## Regulatory standards

Complies with GB/T 6587-2012, Class 2 random vibration

oscillation

Meets MIL-PRF-28800F and IEC 60068-2-27, Class 3 Random Oscillation

Non-operating conditions: 30 g, half-sine wave, 11 ms duration, 3 oscillations along the major axis/axis, 18 oscillations in total

## Mechanical specifications

### Mechanical specifications

size 448 mm (width) × 310 mm (height) × 522.6 mm (depth)

Rack mount configuration 7U

weight[5] Without packaging: 28kg

Including packaging: 29.5kg

## Non-volatile memory

### Non-volatile memory

	Settings/Image	Settings (*.stp), images (*.png, *.bmp, *.jpg)
Data/File Storage	Waveform data	CSV waveform data (*.csv), binary waveform data (*.bin), list data (*.csv), reference waveform data (*.ref, *.csv, *.bin)
Internal capacity		125 GB user space
Reference Waveform		Display 10 internal waveforms
set up		Storage is limited by capacity
USB drive capacity		Standard USB storage device

### illustrate:

[1]: CH1/CH2/CH3/CH4 are all independent channels. The instrument can achieve the highest performance indicators by turning on any one or more of the CH1/CH2/CH3/CH4 channels.

[2]: When the input impedance is 50Ω, the input coupling is DC only.

[3]: 1mV/div and 2mV/div are digital magnifications of 4mV/div. For vertical accuracy calculation, the fullscale vertical sensitivity of 1mV/div and 2mV/div is calculated using 32mV.

[4]: Any two channels, input impedance 50Ω, DC coupling, same vertical scale, 100 mV/div or 200 mV/div, same Volts/div.

[5]: Standard configuration.

# Ordering information and warranty period

## Ordering Information

Ordering Information	Order Number
<b>Host model</b>	
8 GHz, 40 GSa/s, 4-channel oscilloscope mainframe	DS80804
13 GHz, 40 GSa/s, 4-channel oscilloscope mainframe	DS81304
<b>Standard accessories</b>	
A power cord that complies with the country's standards	— —
USB data cable	— —
<b>Adapter options</b>	
Precision BNC Adapter 3.5mm to BNC (50Ω)	BNC Adapter Input 50Ω
High impedance probe adapter 3.5mm to BNC (1MΩ)	High Impedance Adapter
<b>Upgrade options</b>	
2Gpts storage depth upgrade option	DS80000-RLU-20
4Gpts storage depth upgrade option	DS80000-RLU-40
<b>Measurement and Analysis Options</b>	
Advanced Eye Diagram and Jitter Analysis Measurement Options	DS80000-JITTA
<b>Conformance Test Option</b>	
100M/1000M Ethernet Conformance Test	DS80000-ENETC
USB 2.0 Compliance Testing	DS80000-USBC
<b>Serial protocol decoding option</b>	
Embedded serial bus triggering and decoding (RS232/UART, I2C, SPI)	DS80000-EMBDA
Automotive serial bus triggering and decoding (CAN, CAN-FD, LIN, FlexRay)	DS80000-AUTOA
Audio serial bus triggering and decoding (I2S)	DS80000-AUDIOA
MIL-STD-1553 Serial Bus Triggering and Decode	DS80000-AEROA

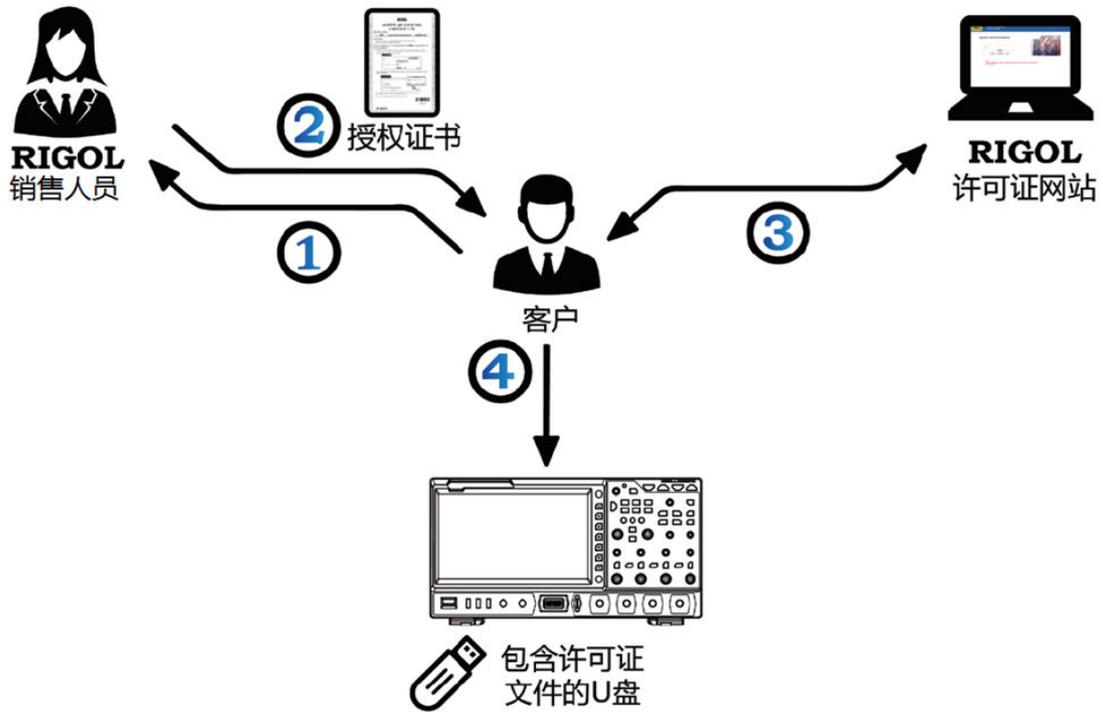
### illustrate:

Please order all the mainframes, accessories and options from your local RIGOL office.

## Warranty

The main unit is warranted for 3 years, excluding probes and accessories.

# Option Ordering and Installation Process



1. According to the use requirements **RIGOL Sales Personnel** Place an order to purchase the corresponding functional options and provide the serial number of the instrument host on which the options need to be installed.

2. **RIGOL** After the factory receives the option order, it will mail the paper software product authorization certificate to the address provided in the order.

3. Use the software key and instrument host serial number provided in the authorization certificate to **RIGOL** Register on the official website to obtain the option authorization code and option authorization Rights file.

4. Download the option authorization file to the root directory of the USB flash drive and correctly connect the USB flash drive to the instrument. **Option Installation** The menu is activated, click

Click this menu to install the option.

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- 第三代半导体
- 太阳能光伏电池

- 新能源汽车
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- 电源测试
- 汽车电子

## 为行业客户提供测试测量产品和解决方案

### RIGOL开放实验室

地址：北京、苏州、深圳、西安  
开放时间：工作日 9:00 am~6:00 pm  
预约方式：实验室工程师小源 18061921901  
实验室微信号 18061921901  
RIGOL客服热线：400-620-0002  
官网预约网址：  
<https://www.rigol.com/quote/Lab-appoint.html>



RIGOL开放实验室微信号



RIGOL实验室视频号

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