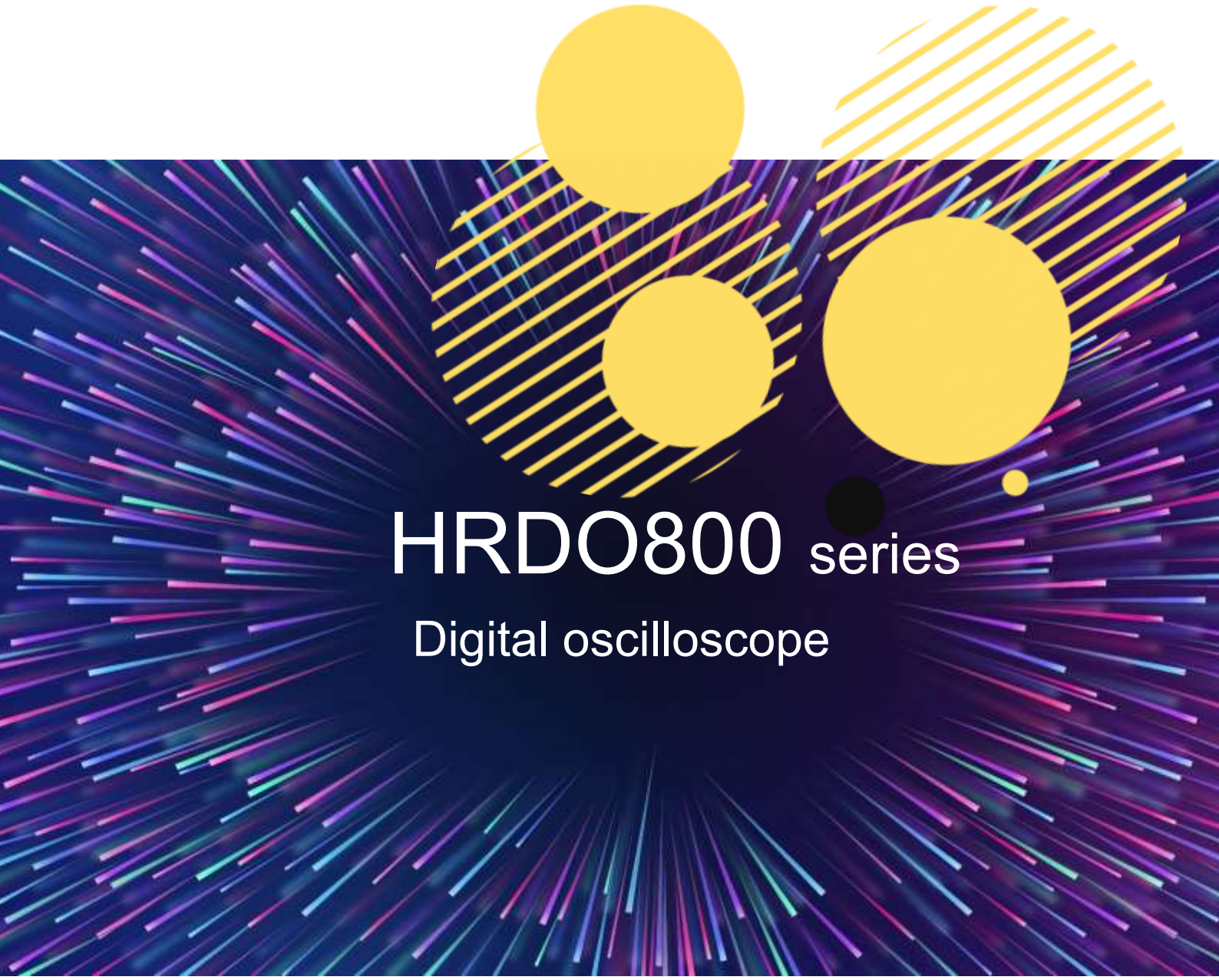
Hantek



HRDO800 series

Digital oscilloscope

Data Manual

202607

Warranties and Declarations

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Product certification

Hantek certified HRDO800 series oscilloscope to meet China's national industry standards and has passed the CE certification.

Contact us

If you have any questions when using the products of Qingdao Hantek Electronic Co., LTD., you can obtain service and support through the following ways:
Email: service@hantek.com, support@hantek.com
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1 Product Overview

Product features

- The sampling rate of the entire system is 1.25GSa/s, with a maximum bandwidth of 300MHz, 12-bit vertical resolution;
- Maximum 125M storage depth;
- Built in arbitrary waveform generator, capable of outputting 5 standard waveforms, supports custom arbitrary waveform output, and supports burst output;
- Protocol Trigger: Comes with five standard serial protocol triggers and decoding, supporting protocols including UART, LIN, CAN, SPI, IIC, making it easy to analyze serial bus data;
- 32 automatic measurement and threshold measurement functions, with test results supporting statistical analysis;
- Standard SCPI remote control instructions, convenient for users to build testing systems;
- Save and export function, which can save settings CSV, Information such as images, reference waveforms, and waveforms;
- Four sampling methods: normal, average, peak, and high-precision;
- There are two cursor measurement modes: manual and tracking, and the Math function also supports cursor measurement;
- 500uV-10V vertical measurement gear, 300VCAT Ⅱ withstand voltage input;
- FFT scale display, convenient for reading results;
- Manual, single time, one click AUTO measurement, simple and fast waveform measurement;
- XY mode supports dual window display, making it easy to understand waveform phase changes;

HRDO800 series digital oscilloscope has comprehensive functions and outstanding performance, with a sampling rate of 1.25GSa/s and a maximum bandwidth of 300MHz across the entire range. Built in arbitrary waveform generator, capable of outputting 5 standard waveforms and supporting custom arbitrary waveform output; Standard configuration includes 7 triggering modes including edge, pulse, slope, timeout, window, interval, and under amplitude, as well as 5 bus analysis and protocol decoding functions including UART, LIN, CAN, SPI, and IIC; 32 automatic measurement and threshold measurement functions, with test results supporting statistical analysis;

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Standard SCPI remote control instructions, convenient for users to build testing systems.

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2 Specifications

All technical specifications are applicable to the HRDO800 series oscilloscope, as detailed in the last part of this chapter. To verify whether the oscilloscope meets technical specifications, the oscilloscope must first meet the following conditions:

- Within the specified operating temperature, the oscilloscope must have been operating continuously for more than twenty minutes.
- If the operating temperature changes by more than 5 degrees Celsius, a self calibration operation must be performed, which can be done through the **[Utility]** menu.
- The oscilloscope must be within the factory calibration period.

Model

Model	Channel	Sampling Rate	Bandwidth	Signal Source
HRDO802X	2	1.25GSa/s	80MHz	-
HRDO804X	4	1.25GSa/s	80MHz	-
HRDO812X	2	1.25GSa/s	120MHz	-
HRDO822X	2	1.25GSa/s	250MHz	-
HRDO824X	4	1.25GSa/s	250MHz	-
HRDO832X	2	1.25GSa/s	300MHz	-
HRDO834X	4	1.25GSa/s	300MHz	-
HRDO802XG	2	1.25GSa/s	80MHz	1
HRDO804XG	4	1.25GSa/s	80MHz	1
HRDO812XG	2	1.25GSa/s	120MHz	1
HRDO814XG	4	1.25GSa/s	120MHz	1
HRDO822XG	2	1.25GSa/s	250MHz	1
HRDO824XG	4	1.25GSa/s	250MHz	1
HRDO832XG	2	1.25GSa/s	300MHz	1

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Model	Channel	Sampling Rate	Bandwidth	Signal Source
HRDO834XG	4	1.25GSa/s	300MHz	1
HRDO824X	4	1.25GSa/s	250MHz	-

Specifications

No. of Input Channels	2 analog channel input/4 analog channel input 1 EXT channel input 1 GEN OUT channel(HRDO800XG series)
Sampling Mode	Real-time sampling
Max. Sample Rate of Analog Channel	1.25GSa/s(single-channel) 625MSa/s(dual-channel) 312.5MSa/s(all channels)
Max. Memory Depth	125Mpts(single-channel), 50Mpts(dual-channel) 25Mpts(all-channel)
Peak Detection	Under all the time base settings, capture 1ns glitches
LCD Size and Type	7-inch display screen
Display Resolution	1024*600

Vertical System Analog Channel

Input Coupling	DC, AC, GND
InputImpedance	1 MΩ ± 1%
Input Capacitance	17pF±3pF
Maximum Input Voltage	CAT Ⅱ 300 VRMS, 400Vpk; Transient overvoltage 1600 Vpk
Vertical Resolution	12bit
Vertical Sensitivity Range	500uV/div ~ 10 V/div
Offset Range	500 μ V/div~20mV/div, ±400mV 50mV/div~200mV/div, ±2V 500mV/div~2V/div, ±40V 5V/div~10V/div, ±50V
Dynamic Range	±5div (12bit)

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Bandwidth Limit	20MHz； selectable for each channel
DC Gain Accuracy	± 3% FullScale
DC Offset Accuracy	<200mV/div (±0.1 div±2 mV±1.5%of offset value) >200mV/div (±0.1 div±2 mV±1.0%of offset value)
Channel-to-Channel Isolation	40dB, from DC to maximum rated bandwidth of each model
ESD	±4kV

Horizontal System--Analog Channel

Range of Time Base	500ps/div-1ks/div
Time Base Accuracy	±50ppm±1ppm/year
Time Base Delay Range	before triggering: 8 × SEC/DIV
	after triggering: 10 × SEC/DIV
Time Interval (△T)	Measurement±(1 sample interval)±(2ppm×readout)±50ps
Horizontal Mode	YT:Default
	XY:X1=CH1,Y1=CH2,X2=CH3,Y2=CH4
	SCAN:Time base≥100ms/div,available to enter or exit the SCAN mode by rotating the Horizontal SCALE.
	ROLL:Time base≥100ms/div,available to enter or exit ROLL mode by accessing the menu.

Acquisition System

Max. Sample Rate of Analog Channel	1.25GSa/s(single-channel) 625MSa/s(dual-channel) 312.5MSa/s(all channels)	
Max. Memory Depth	125Mpts(single-channel), 50Mpts(dual-channel) 25Mpts(all-channel)	
Acquisition Mode	Normal	Default
	Peak Detection	Capture 1ns glitches
	Average Mode	2, 4, 8, 16…128 are available for you to choose, averaging point by point
	High Resolution	16 bits (max.)

Trigger System

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Trigger Source	Analog channel(CH1-CH4), EXT	
Trigger Mode	Auto, Normal, Single	
Holdoff Range	8ns-10s	
Trigger Sensitivity	CH1-CH4	1 div or 5 mVpp, whichever is larger, <10mV/div 0.5 div, ≥10mV/div
Trigger Level Range	CH1-CH4	± 4 div from the center of the screen
	EXT	-1.3V~6.5V

Trigger Type

Trigger Type	Edge trigger, Pulse trigger, Slope trigger, Overtime trigger, Window trigger, Internal trigger, Under Amp trigger, UART trigger, LIN trigger, CAN trigger, SPI trigger, IIC trigger
Edge trigger	Identify triggers by searching for specified edges (rising edge, falling edge, double edge) and voltage levels on the waveform. Source channel: CH1~CH4, EXT.
Pulse trigger	Set the oscilloscope to trigger on positive or negative pulses of a specified width. You can set the trigger source, polarity (positive, negative), trigger conditions, and pulse width in this menu. Source channel: CH1~CH4.
Slope trigger	Set the oscilloscope to trigger a positive or negative slope from one level to another within a specified time. Source channel: CH1~CH4.
Overtime trigger	Triggered when the time interval (△ T) from the rising edge (or falling edge) of the input signal through the trigger level to the adjacent falling edge (or rising edge) through the trigger level is greater than the set timeout. Source channel: CH1~CH4.
Window trigger	Window triggering provides high and low triggering levels. When the input signal passes through a high or low trigger level, the oscilloscope triggers. Source channel: CH1~CH4.
Internal trigger	Triggered when the interval between two consecutive rising (or falling) edges satisfies the set time condition (<,>,!=,=). Source channel: CH1~CH4.
Under Amp trigger	Used to trigger a pulse that crosses one trigger level but does not cross another trigger level. Source channel: CH1~CH4.
UART trigger	Triggering of frame start, frame end, data, checksum errors, and acceptance errors when UART signals are detected. Source channel: CH1~CH4.

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LIN trigger	Triggered on the synchronization field of LIN signal, or on specified identifiers, data, or frames. Source channel: CH1~CH4.
CAN trigger	Triggered at the beginning of a CAN signal frame, on a specified type of frame (such as remote frame, data frame, etc.), or on a specified type of error frame. Source channel: CH1~CH4.
SPI trigger	When the timeout condition is met, the oscilloscope triggers when it searches for the specified data. Source channel: CH1~CH4.
I2C trigger	Triggered on the start bit, stop bit, no response, address, restart, address, and data of the I2C bus. Source channel: CH1~CH4.

Waveform Measurement

Cursor	Number of Cursors	2 pairs of XY cursors
	Manual Mode	Voltage deviation between cursors Time deviation between cursors Reciprocal of dX (1/dX)
	Track Mode	Fix Y-axis to track X-axis waveform point's voltage and time values Fix X-axis to track Y-axis waveform point's voltage and time values
	XY Mode	Measure the voltage parameters of the corresponding channel waveforms in XY time base mode. X1=CH1,Y1=CH2,X2=CH3,Y2=CH4
Auto Measurement	Number of Measurements	Up to 4 measurements can be displayed at a time.
	Measurement Source	CH1-CH4
	All Measurement	Display 32 measurement items for the current measurement channel, with continuously updated measurement results and switchable measurement channels.
	Type	PKPK, Freq, Average, Vmax, Vmin, Period, Vtop, Vmid, Vbase, Vamp, RMS, OverShoot, PreShoot, PrdRms, PrdAvg, RiseTime, FallTime, +Width, -Width, +Duty, -Duty, FRR, FFF, FOV, FPRE, BWidth, FRF, FFR, LRR, LRF, LFR, LFF
	Statistics	Cur, Avg, Max, Min, Rmse, Count

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Waveform Calculation

Operation	A+B, A-B, A*B, A/B, FFT,	
Source	CH1-CH4	
FFT	Window Type	Rectangle, Hanning, Hamming, Blackman, Bartlett, Flattop

Serial Decoding

Decoding Type	UART, IIC, SPI, LIN, CAN
UART	Decode the data of 20 Mb/s UART bus TX/RX signals (5-9 bits), supporting check bit (no parity, odd parity, and even parity) and stop bit (1bit, 1.5bit, 2bit) settings.
IIC	Decode the address (with or without read/write bits), data, and ACK of the I2C bus.
SPI	Decoding SPI bus data.
LIN	Decode 2. X LIN bus, with a maximum speed of 20Mb/s.
CAN	Decode remote frames, overloaded frames, and data frames from a 5 Mb/s CAN bus.

DVM

Source	CH1-CH4
Mode	DC, AC+DC RMS, and AC RMS

Arbitrary Waveform Generator(Opiton)

Sample Rate	200MSa/s	
Vertical Resolution	12bit	
Max. Frequency	25MHz	
Standard Waveform	Sine, Square, Ramp, Exp, Noise, DC	
Arb Waveform	Arb1-Arb4	
Sine	Frequency Range	0.1Hz-25MHz
Square	Frequency Range	0.1Hz-10MHz

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Ramp	Frequency Range	0.1Hz-1MHz
Exp	Frequency Range	0.1Hz-5MHz
Arb	Frequency Range	0.1Hz-25MHz
Waveform Length	4K	
Frequency	Accuracy	100 ppm (<10 kHz), 50 ppm (>10 kHz)
	Resolution	100 mHz or 4 bits (whichever is greater)
Amplitude	Output Range	10mVpp-7Vpp(HighZ)
		5mVpp-3.5Vpp(50Ω)
DC Offset	Range	±3.5V, HighZ
		±1.75V, 50Ω
	Resolution	100 uV or 3 bits (whichever is greater)
	Accuracy	2%(1KHz)
Output Impedance	50Ω±1%	
Modulation	AM, FM	
	AM	Modulating Waveforms: Sine, Square, Triangle
		Modulation Frequency: 1Hz-50KHz
		Modulation Depth: 0%-120%
	FM	Modulating Waveforms: Sine, Square, Triangle
		Modulation Frequency:1Hz-50KHz
		Modulation Offset:0.1Hz-1KHz
Burst	N Cycle, Gate	
	Trigger Source	Internal, Manual

Display

LCD	7-inch capacitive multi-touch screen
Resolution	1024*600
Persistence	Off, adjustable time afterglow (1s, 5s, 10s, 30s), infinite afterglow
Display Type	vector or point
Waveform Intensity	adjustable
Screen Grid	Dot, Line, and Close

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Grid Brightness	adjustable
Screen Brightness	adjustable

I/O

USB HOST	1 on the front panel
USB DEVICE	1 on the rear panel

Power

Power Voltage	100-120V, 50/60Hz; 100-240V, 50/60Hz
Power	Max.29W
Fuse	2 A, 250 V

Environment

Temperature Range	Operating	0℃~+50℃
	Non-operating	-30℃~+70℃
Humidity Range	Operating	Below +30℃, ≤90%RH (without condensation) +30 ℃ ~+40 ℃ , ≤75%RH (without condensation) +40 ℃ ~+50 ℃ , ≤45%RH (without condensation)
	Non-operating	Below 65℃, ≤90%RH (without condensation)
Altitude	Operating	Below 3,000
	Non-operating	Below 15,000

Mechanical Characteristics

Dimensions	320mm(L)*125mm(W)*152mm(H)	
Weight	Package Excluded	~2.1kg

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3 Order Information and warranty period

3.1 Order Information

Order information	Order number
Host model	
1.25GSa/S, 80MHz 2-channel oscilloscope	HRDO802X
1.25GSa/S, 80MHz 4-channel oscilloscope	HRDO804X
1.25GSa/S, 120MHz 2-channel oscilloscope	HRDO812X
1.25GSa/S, 120MHz 4-channel oscilloscope	HRDO814X
1.25GSa/S, 250MHz 2-channel oscilloscope	HRDO822X
1.25GSa/S, 250MHz 4-channel oscilloscope	HRDO824X
1.25GSa/S, 300MHz 2-channel oscilloscope	HRDO832X
1.25GSa/S, 300MHz 4-channel oscilloscope	HRDO834X
1.25GSa/S, 80MHz 2-channel oscilloscope + AWG	HRDO802XG
1.25GSa/S, 80MHz 4-channel oscilloscope+ AWG	HRDO804XG
1.25GSa/S, 120MHz 2-channel oscilloscope+ AWG	HRDO812XG
1.25GSa/S, 120MHz 4-channel oscilloscope+ AWG	HRDO814XG
1.25GSa/S, 250MHz 2-channel oscilloscope+ AWG	HRDO822XG
1.25GSa/S, 250MHz 4-channel oscilloscope + AWG	HRDO824XG
1.25GSa/S, 300MHz 2-channel oscilloscope+ AWG	HRDO832XG

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Order information	Order number
1.25GSa/S, 300MHz 4-channel oscilloscope+ AWG	HRDO834XG
Standard accessories	
USB cable	1
power Line	1
Oscilloscope probe	The 2-channel machine comes standard with 1 probe. The 4-channel machine comes standard with 2 probes.
Crocodile Clip Line	2-channel machines come standard with 1 cable clamp. 4-channel machines come standard with 2 cable clamps. (Additional cable clamp for machines with signal source function)
Product Qualification Certificate	1

3.2 Warranty Period

Mainframe warranty for 3 years, excluding probes and accessories.

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