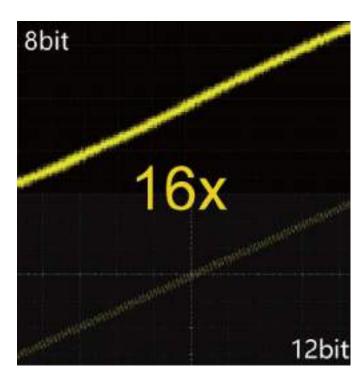


Bandwidth: 70/100/200 MHz

Highlights

- Ultra-low noise floor for cleaner signals, measuring small signals more accurately.
- 12-bit resolution (2¹² = 4096) to see the most signal detail.
- Up to 2 GSa/s real-time sample rate.
- A maximum of 100 Mpts memory depth, capturing more detailed signals over longer time spans.
- Standard serial decoding: SPI, I2C, RS232/UART, CAN, and LIN.
- 10.1-inch large HD touch display (1280x800) designed for better touch interactions.
- Front panel flex knobs, bringing smoother interaction and easier measurements.



Entry Level

High Resolution
Digital Oscilloscope



Applications



An oscilloscope is an important tool for making power supply measurements. With up to 12-bit vertical resolution, the DHO 1000 series makes it easy for you to perform ripple measurement and quality test.



This series redefines what you can expect in an entry level oscilloscope by providing excellent noise performance and 12 bit high resolution, providing basic functionality for higher education.



The 10.1 inch large HD touch display enables better view of signals. Large memory depth and the Autoscale function make it ready for testing of embedded system designs.



With standard CAN and LIN serial decoding functions, it provides a more affordable solution for automotive electronics testing.



Features

- Ultra low noise floor for cleaner signals, measuring small signals accurately.
- 12 bit vertical resolution.
- 70/100/200 MHz analog bandwidth (selectable), 2/4 analog channels, and 1 EXT channel.
- Up to 2 GSa/s real time sample rate.
- Max. memory depth: 100 Mpts (optional).
- Vertical sensitivity range: 500 μV/div to 10 V/div.
- Up to 1,500,000 wfms/s waveform capture rate with the UltraAcquire mode.
- 10.1" 1280x800 HD touch display.
- User friendly flex knobs, bringing smoother interaction.
- Standard photoelectric encoder operating knobs, effectively prolonging its service.
- Standard USB Device & Host, LAN, and HDMI interfaces.

DHO1000 series digital oscilloscope is designed to meet the designing, debugging, and testing requirements of the mainstream oscilloscope market. This series achieves a fast waveform capture rate of 1,500,000 wfms/s with the UltraAcquire mode, 100 Mpts memory depth, 12-bit vertical resolution, all combined with excellent noise floor performance and vertical accuracy to meet your requirements for more accurate measurements, bringing extraordinary T&M experience for you.

Technical Specifications

All the specifications are guaranteed except the parameters marked with "Typical" and the oscilloscope needs to operate for more than 30 minutes under the specified operation temperature.

Overview of the DHO1000 Series Technical Specifications

Overview of the D Specifications	HO1000 Ser	ies Technical	ŧ.			
Model	DHO1072	DHO1074	DHO1102	DHO1104	DHO1202	DHO1204
Analog Bandwidth (-3 dB)	70 MHz	70 MHz	100 MHz	100 MHz	200 MHz	200 MHz
Input Channels	2+EXT	4+EXT	2+EXT	4+EXT	2+EXT	4+EXT
Rise Time						
(10% to 90%, Typical)	≤5 ns	≤5 ns	≤3.5 ns	≤3.5 ns	≤1.75 ns	≤1.75 ns
Sampling Mode	Real-time sampling					
Max. Sample Rate of Analog Channels	2-channel model: 2 GSa/s (single channel ^[1]), 1 GSa/s (all channels ^[3]) 4-channel model: 2 GSa/s (single channel ^[1]), 1 GSa/s (half channels ^[2]), 500 MSa/s (all channels ^[3])					
Standard Memory Depth	2-channel model: 50 Mpts (single channel ^[1]), 25 Mpts (all channels ^[3]) 4-channel model: 50 Mpts (single channel ^[1]), 25 Mpts (half channels ^[2]), 12.5 Mpts (all channels ^[3])					
Optional Memory Depth	2-channel model: 100 Mpts (single channel ^[1]), 50 Mpts (all channels ^[3]) 4-channel model: 100 Mpts (single channel ^[1]), 50 Mpts (half channels ^[2]), 25 Mpts (all channels ^[3])					
Max. Waveform	50,000 wfms/s (Vector Mode)					
Capture Rate	1,500,000 wfms/s (UltraAcquire Mode)					
Vertical Resolution	12 bits					
Hardware Real- time Waveform Recording and Playing	Up to 500,000 frames					
Peak Detect	Capture glitches as narrow as 2 ns					



Overview of the DHO1000 Series Technical Specifications

Display Size and

Type.

10.1-inch capacitive multi-touch display

Display Resolution 1280 × 800

Vertical System Analog Channels

Vertical System An	alog Channels	
Input Coupling		DC, AC, or GND
Input Impedance		1 MΩ ± 1%
Input Capacitance		19 pF ± 3 pF
Probe Attenuation Ratio		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
0		CAT I 300 V _{rms} , 400 V _{pk} (DC + V _{peak})
Maximum Input		No transient overvoltage allowed whether the probe is used or not.
Voltage	Remarks	Use this instrument only for measurements within its specified measurement category (not rated for CAT II, III, IV).
Vertical Resolution		12 bits
Effective Number of Bits (ENOB, Typical)		>8
Input Sensitivity Range ^[4]		500 μV/div to 10 V/div
		±1 V(≤65 mV/div)
Officet Banga		±10 V (>65 mV/div, ≤270 mV/div)
Offset Range		±20 V (>270 mV/div, ≤2.75 V/div)
		±100 V (>2.75 V/div, ≤10 V/div)
Dynamic Range		±4 div (12 bits)
Bandwidth Limit (Typical)		20 MHz, FULL; selectable for each channel



Vertical System Analog Cha	nneis
DC Vertical Gain Accuracy ^[4]	±2% full scale
DC Vertical Offset	\leq 200 mV/div (± 0.1 div ± 2 mV ± 1.5% of offset setting)
Accuracy	>200 mV/div (\pm 0.1 div \pm 2 mV \pm 1.0% of offset setting)
Channel-to-channel Isolation	≥100:1
ESD Tolerance	±8 kV (for input BNC)

Horizontal System Analog Channels

Horizontal System Ana	log Channel	5	
T B B		2 ns/div to 1 ks/div	
Time Base Range		Time base fine adjustment setting available	
Time Base Resolution		400 ps	
Time Base Accuracy		±5 ppm ± 1 ppm/year	
	Pre-trigger	-5 div	
Time-base Delay Time Range	Post- trigger	1 s or 100 div, whichever is greater	
Δ Time Accuracy		\pm (time base accuracy x reading) \pm (0.001 x screen width) \pm 50 ps	
Channel-to-channel Deskew		Channel-to-channel deskew range: ±100 ns, accuracy: ±1 ps	
Analog Channel-to- Channel Delay (Typical)		≤2 ns ^[5]	
5-	YT	Default mode	
	XY	On channel 1/2/3/4	
Horizontal Mode	SCAN	Time base ≥ 200 ms/div	
	ROLL	Time base ≥ 50 ms/div or ≥ 100 ms/div (selectable), available to enter or exit the ROLL mode by turning the horizontal timebase knob	



Acquisition System

Acquisition System					
May Famula Bata of	2-channel model: 2 GSa/s (single channel ^[1]), 1 GSa/s (all channels ^[3])				
Max. Sample Rate of Analog Channels	4-channel model: 2 GSa/s (single channel ^[1]), 1 GSa/s (half channels ^[2]), 500 MSa/s (all channels ^[3])				
2	2-channel model (standard): 50 Mpts (single channel ^[1]), 25 Mpts (all channels ^[3])				
Max. Memory Depth	2-channel model (optional): 100 Mpts (single channel ^[1]), 50 Mpts (all channels ^[3])				
of Analog Channels	4-channel model (standard): 50 Mpts (single channel ^[1]), 25 Mpts (half channels ^[2]), 12.5 Mpts (all channels ^[3])				
		odel (optional): 100 Mpts (single channel ^[1]), 50 Mpts (half 25 Mpts (all channels ^[3])			
i.	Normal	Default mode			
	Peak Detect	Capture glitches as narrow as 2 ns			
Acquisition Mode	Average	Selectable from 2, 4, 8, 16to 65,536			
	High Resolution	14 bits, 16 bits			
	UltraAcquire	Up to 1,500,000 wfms/s waveform capture rate			

Trigger System

Trigger System		
Trigger Sources		Analog channel (1~4), EXT TRIG, AC Line
Trigger Mode		Auto, Normal, and Single
	DC	DC coupled trigger
	AC	AC coupled trigger
Trigger Coupling	HF Reject	High frequency reject, cutoff frequency ~75 kHz (internal trigger only)
	LF Reject	Low frequency reject, cutoff frequency ~75 kHz (internal trigger only)



Trigger System		
Noise Rejection		Increase delay for the trigger circuit (internal trigger only), on/off
Trigger Holdoff Range		8 ns to 10 s
Trigger	Internal	Analog bandwidth
Bandwidth	External	200 MHz
2	lancarat .	0.50 div, ≥50 mV/div
T.: C::: 14.	Internal	0.7 div (with noise rejection enabled)
Trigger Sensitivity	External	200 mVpp, from DC to 100 MHz
		500 mVpp, from 100 MHz to 200 MHz
<u> </u>	Input Impedance	1 MΩ±1%, BNC connector
EXT TRIG	Trigger Jitter	< 1 ns _{rms}
	(Typical)	Normal acquisition, Edge trigger, trigger level located near 50% of EXT input signal
	Internal	±5 div from center screen
Trigger Level Range	External	±5 V
marrado en	AC Line	fixed 40%-60%

Trigger Type

Trigger Type			
Trigger Type	Edge trigger, Pulse trigger, Slope trigger, Video trigger, Pattern trigger, Duration trigger, Timeout trigger, Runt trigger, Window trigger, Delay trigger Setup/Hold trigger, Nth Edge trigger, I2C, SPI, RS232/UART, CAN, LIN		
Edge	Triggers on the threshold of the specified edge of the input signal. The edge types can be Rising, Falling, or Either.		
	Source channel: CH1~CH4, EXT, or AC Line		
Pulse Width	Triggers on the positive or negative pulse, whose time duration is less than a value, greater than a value, or inside a time range.		
	Source channel: CH1~CH4		



Trigger Type	
Slope	Triggers on the positive or negative slope of the specified time, whose time is less than a value, greater than a value, or inside a time range.
	Source channel: CH1~CH4
Video	Trigger on all lines, specified line, odd/even fields that conform to the video standards. The 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/25Hz, 1080p/24Hz, 1080i/60Hz, and 1080i/50Hz.
	Source channel: CH1~CH4
Pattern	Identifies a trigger condition by searching for a specified pattern. The pattern is a combination of multiple selected channel sources. The logic pattern of each channel is H, L, X, Rising, or Falling.
	Source channel: CH1~CH4
Duration	Triggers when the specified pattern meets the specified duration condition. The pattern is a combination of multiple selected channel sources. The logic pattern of each channel is H, L, and X. The duration is less than a value, greater than a value, inside a time range, or outside a time range.
	Source channel: CH1~CH4
Timeout	Triggers when duration of a certain event exceeds the specified time. The event can be specified as Rising, Falling, or Either.
	Source channel: CH1~CH4
Runt	Triggers when the pulses pass through one threshold but fail to pass through another threshold.
3	Source channel: CH1 ~CH4
Window	Triggers in a specified window state when the rising edge of the signal crosses the upper threshold or the falling edge crosses the lower threshold. The window state can be Enter, Exit, or Time.
)	Source channel: CH1~CH4
Delay	Triggers when the time difference between the specified edges of Source A and Source B meets the preset time. The delay time is less than a value, greater than a value, inside a time range, or outside a time range.
	Source channel: CH1~CH4
Setup/Hold	When the setup time or hold time between the input clock signal and the data signal is smaller than the specified time.
	Source channel: CH1~CH4
Nth Edge	Triggers on the Nth edge after the specified idle time. The edge can be specified as Rising or Falling.
3r07034-6534	Source channel: CH1~CH4



Trigger Type	
RS232/UART	Triggers on the Start, Error, Check Error, or Data frame of the RS232/UART bus (up to 20 Mb/s). Source channel: CH1~CH4
I2C	Triggers on the Start, Stop, Restart, MissedACK, Address (7 bits, 8 bits, or 10 bits), Data, or Address Data of the I2C bus. Source channel: CH1~CH4
SPI	Triggers on the specified pattern of the specified data width (4 to 32) of SPI bus. CS and Timeout are supported. Source channel: CH1~CH4
CAN	Triggers on the start of a frame, end of a frame, Remote ID, Overload, Frame ID, Frame Data, Data&ID, Frame Error, Bit Fill, Answer Error, Check Error, Format Error, and Random of the CAN signal (up to 5 Mb/s). The supported CAN bus signal types include CAN_H, CAN_L, TX/RX, and DIFF.
8	Source channel: CH1~CH4
LIN	Triggers on the Sync, ID, Data (length settable), Data&ID, Wakeup, Sleep, and Error of the LIN bus signal (up to 20 Mb/s).
	Source channel: CH1~CH4

Search & Navigate

Search & Naviga	ite	
Туре	Edge, pulse width	
Source	Analog channels	
Сору	Copy to/from trigger; independent settings including threshold and trigger condition setup	
Result Display	Event list or be exported to external/internal memory	
Navigate	Time: view acquired waveforms in time order	
	Event: use the navigation controls to go to found search events	
	Segments: use the navigation controls to play through the acquired segments in UltraAcquire mode	

Waveform Measurement

Waveform M	leasurement	
	Number of Cursors	2 pairs of XY cursors
	220-22200	Voltage deviation between cursors (ΔY)
	Manual Mode	Time deviation between cursors (ΔX)
		Reciprocal of ΔX (Hz) (1/ΔX)
Cursor	Track Mode	Fix Y-axis to track X-axis waveform point's voltage and time values
	Track Mode	Fix X-axis to track Y-axis waveform point's voltage and time values
	Auto Measurement	Allow to display cursors during auto measurement
	XY Mode	Measures the voltage parameters of the corresponding channel waveforms in XY time base mode
		X = Channel 1, Y = Channel 2



Waveform Meas	surement	
	Number of Measurements	41 auto measurements; and up to 14 measurements can be displayed at a time.
	Measurement Source	CH1 to CH4, Math1 to Math4
	Measurement Range	Main, Zoom
	All Measurements	Displays 33 measurement items (vertical and horizontal) for the current measurement channel; the measurement results are updated continuously.
Auto Measurement	Vertical	Vmax, Vmin, Vpp, Vtop, Vbase, Vamp, Vupper, Vmid, Vlower, Vavg, VRMS, Per. VRMS, Overshoot, Preshoot, Area Period Area, and AC RMS.
	Horizontal	Period, Frequency, Rise Time, Fall Time, +Width, -Width, +Duty, -Duty, Positive Pulse Count, Negative Pulse Count, Rising Edge Count, Falling Edge Count, Tymax, Tymin, +Slew Rate, and -Slew Rate
	Others	Delay (A1-B1), Delay (A1-B1), Delay (A1-B1), Delay (A1-B1), Phase (A1-B1), Phase (A1-B1), Phase (A1-B1)
	Statistics	Items: Current, Average, Max, Min, Standard Deviation, Count
		Statistical times settable

Waveform Math

Waveform Math	
Number of Math Functions	4, displays 4 math functions simultaneously
Arithmetic	A+B, A-B, A×B, A/B, FFT, A&&B, A B, A^B, !A, Intg, Diff, Lg, Ln, Exp, Sqrt, Abs, AX+B, LowPass, HighPass, BandPass, and BandStop
Color Grade	FFT supported



Waveform	WIGHT	
FFT	Record Size	Up to 1 Mpts
	Window Type	Rectangular, Blackman-Harris, Hanning (default), Hamming, Flattop, and Triangle
	Peak Search	A maximum of 15 peaks, confirmed by the settable threshold and offset threshold set by users

Waveform Analysis

Waveform Anal	ysis	
Waveform		Store the signal under test in segments according to the trigger events, i.e. save all the sampled waveform data as a segment to the RAM for each trigger event. The maximum number of the sampled segments reaches 500,000.
Recording	Source	All enabled analog channels
	Analysis	Support playing frame by frame or continuous playing; capable of calculating, measuring, and decoding the played waveforms
Pass/Fail Test		Compare the signal under test with the user-defined mask to provide the test results: the number of successful tests, failed tests, and the total number of tests. The pass/fail event can enable immediate stop, beeper, and the screenshot.
	Source	Any analog channel
Color Grade		A dimensional view for color grade waveforms, color grade >16, 256-level color scale display
	Source	Any analog channel
	Color Theme	Temperature and intensity
	Mode	All modes available

Serial Decoding

Serial Decoding		
No. of Decodings	4, decodes and enables/disables four protocol types simultaneously	
Decoding Type	Standard: Parallel, RS232/UART, I2C, SPI, LIN, CAN	



Serial Decoding		
Parallel	Up to 4 bits of Parallel decoding, available for any analog channel. User- defined clock and auto clock settings are supported.	
	Source channel: CH1~CH4	
RS232/UART	Decodes the RS232/UART (up to 20 Mb/s) bus's TX/RX data (5 to 9 bits), parity (Odd, Even, or None), and stop bits (1 to 2 bits)	
	Source channel: CH1~CH4	
12C	Decodes the address (with or without the R/W bit) of the I2C bus, data, and ACK.	
	Source channel: CH1~CH4	
SPI	Decodes the MISO/MOSI data (4 to 32 bits) of the SPI bus. Timeout and CS are supported.	
	Source channel: CH1~CH4	
CAN	Decodes the remote frame (ID, byte number, CRC), overload frame, and data frame (standard/extended ID, control domain, data domain, CRC, and ACK) of the CAN bus (up to 5 Mb/s). The supported CAN bus signal types include CAN_H, CAN_L, TX/RX, and DIFF.	
	Source channel: CH1~CH4	
LIN	Decodes the protocol version (1.X or 2.X) of the LIN bus (up to 20 Mb/s). The decoding displays sync, ID, data, and check sum.	
	Source channel: CH1~CH4	
Auto		
Auto		

AutoScale Minimum voltage greater than 10 mVpp, duty cycle greater than 1%, and frequency over 35 Hz

Digital Voltmeter

Digital Voltmeter		
Source Any analog channel		
Function DC, AC+DC _{rms} , AC _{rms}		
Resolution ACV/DCV: 4 bits		
Limits Beeper Support upper/lower limit settings; sounds an alarm when the vo		



Precision Counter

Precision Count	er		
Source		Any analog channel and EXT	
Measurement		Frequency, period, totalize	
Totalizer	Resolution	3 to 6 digits, user-defined	
	Max. Frequency	Maximum analog bandwidth	
Totalizer		48-bit totalizer	
	Ş	Counts the number of the rising edges	
Time Reference		Internal Reference	

Command Set

Standard SCPI commands	
Error Message	
Status Reporting	
Synchronization	
	Error Message Status Reporting

Display

10.1-inch capacitive multi-touch gesture-enabled display
1280 x 800 (Screen Region) 16:9
10 horizontal divisions x 8 vertical divisions
Off, Infinite, variable persistence (100 ms to 10 s)
256 intensity levels (LCD, HDMI)

Processor System

Processor System		
Processor	Cortex-A72, 1.8 GHz, hexa-core	
System Memory	4 GB RAM	



Processor System		
Operating System Internal Non-volatile Memory		Android
		8 GB
1/0		
1/0		
USB3.0 Host		2 on the front panel
USB3.0 Device		1 on the rear panel
LAN Port		1 on the rear panel, 10/100/1000 Base-T, supporting LXI-C
Web Control		Support Web Control interface (input the IP address of the oscilloscope into the Web browser to display the operation interface of the oscilloscope)
***		BNC output on the rear panel
		Vo (H) \geq 2.5 V open circuit, \geq 1.0 V 50 Ω to GND
		Vo (L) \leq 0.7 V to load \leq 4 mA; \leq 0.25 V 50 Ω to GND
AUX Out	Trig Out	Output a pulse signal when the oscilloscope is triggered
	Pass/Fail	Output a pulse signal when a pass/fail event occurs. Support user-defined pulse polarity and pulse time (100 ns to 10 ms)
	Rise Time	≤ 1.5 ns
):	Input Interface	1, BNC connector on the rear panel
10 MHz Reference	Output Interface	1, BNC connector on the rear panel
Clock In/Out	Input Mode	50 Ω , with the amplitude 130 mVpp to 4.1 Vpp (-10 dBm, 20 dBm), frequency 10 MHz \pm 10 ppm
	Output Mode	50 Ω, 1.5 Vpp sine waveform
HDMI Video Output		1 on the rear panel, HDMI 1.4, A plug; used to connect an external monitor or projector
Probe Compensation Output		1 kHz frequency, 0 to 3 V amplitude, Square



Power

Power	
Power Voltage	AC 100 to 240 V, 50 to 60 Hz
Power	400 VA maximum (connect various interfaces, USB storage device, and active probes)
Fuse	3.15 A, T degree, 250 V

Environment

Environment			
Temperature	Operating	0°C to +50°C	
Range	Non-operating	-30°C to +60°C	



Mechanical Characteristics

Mechanical Characteristics		
Dimensions	358.14 mm (W) x 214.72 mm (H) x 120.62 mm (D)	
Rack Mount Kit	4U	
	Net: 3.8 kg	
Veight ^[6]	Shipping: 5.37 kg	

Non-volatile Memory

Non-volatile Memory			
	Setup/Image	setup (*.stp), image (*.png, *.bmp, *.jpg)	
Data/File Storage	Waveform Data	CSV waveform data (*.csv), binary waveform data (*.bin,), list data (*.csv), and reference waveform data (*.ref, *.csv, *.bin)	
Internal Capacity		8 GB	
Reference Waveform		Displays 10 internal waveforms	
Setting		Limited by size of USB drive	
USB Capacity		Industry standard flash drives	

NOTE:

- [1]: If any one of the channels is enabled, it is called single channel mode.
- [2]: For 4-channel models, if two of the channels are enabled, it is called half channels mode.
- [3]: For 2-channel models, if two channels are enabled, it is called all channels mode. For 4-channel models, if any three channels or all four channels are enabled, it is called all channels mode.
- [4]: 500 µV/div is a magnification of 1 mV/div setting. For vertical accuracy calculations, use full scale of 8 mV for sensitivity setting.
- [5]: For any channel, under the same input impedance with DC-coupled, the Volts/div setting is the same for 100 mV/div and 200 mV/div setting.



Order Information

Order Information	Order No.
Model	
70 MHz, 2 GSa/s, 50 Mpts, 2CH DHO	DHO1072
70 MHz, 2 GSa/s, 50 Mpts, 4CH DHO	DHO1074
100 MHz, 2 GSa/s, 50 Mpts, 2CH DHO	DHO1102
100 MHz, 2 GSa/s, 50 Mpts, 4CH DHO	DHO1104
200 MHz, 2 GSa/s, 50 Mpts, 2CH DHO	DHO1202
200 MHz, 2 GSa/s, 50 Mpts, 4CH DHO	DHO1204
Standard Accessories	
Power cord (based on destination country)	1
USB Cable	(
4 Passive HighZ Probes (350 MHz) Standard for DHO1204, 2 Passive HighZ Probes (350 MHz) Standard for DHO1202	PVP2350
4 Passive HighZ Probes (150 MHz), Standard for DHO1104/ DHO1074	PVP3150
2 Passive HighZ Probes (150 MHz), Standard for DHO1102/ DHO1072	PVP3150
Bandwidth Upgrade Option	
70 MHz to 100 MHz Upgrade Option	DHO1000-BWU7T10
70 MHz to 200 MHz Upgrade Option	DHO1000-BWU7T20
100 MHz to 200 MHz Upgrade Option	DHO1000-BWU10T20
Memory Depth Upgrade Option	
100 Mpts Memory Depth Upgrade Option	DHO1000-RLU-01