HDSO 1000B Series Oscilloscope

(70MHz / 100MHz / 150MHz / 200MHz, 1GSa/s, 2M Memory Depth)

Key Features

- Six in one: Oscilloscope/Recorder/DMM/ Spectrum Analyzer/Frequency Counter/Arbitrary Waveform generator.
- IP-51 rated for dust, drip and shake proof to withstand harsh environments.
- Large fuse confirms to European Safety Standard.
- Battery indicator with easy-changed connect points.
- Anti-theft lock hole, tripod fixed hole, hang rope, FLASH light that can be used in darkness.
- Replaceable BNC safety joints, and additional one set of joints.
- High bandwidth 70MHz-200MHz Oscilloscope, 1GSa/s sample rate, 2M Memory depth.
- 25Mz Arb. Waveform Generator, 200 Mesa/s DDS, 12 bit vertical resolution, easy for simulating transducer
- 6000 Counts DMM, AC/DC voltage, AC/DC current, resistance, break, capacitance, and diode function.
- FFT spectral analysis; Waveform Math: add, subtract, multiply and divide; X-Y mode; more than 20 automatic measurements; PASS/FAIL Check function, apply to engineering application.
- Abundant trigger function, double timebase sampling, easy to observe two waveforms in different frequency.
- Record and replay of more than 1000 waveforms.
- Large 5.6 inch TFT Color LCD Display; High Resolution(640*480)
- USB Host/Device 2.0 full-speed interface; support removable disk; WIFI/LAN Option, easy to control by PC or long-distance.
- Waveform data can be output in WORD，EXCEL, BMP, JPG as time and voltage.

Typical Applications

- On site Test
- Education and training
- Manufacturing Test and Quality Control
- Service and Repair
- Electronic Circuit Designing and Testing

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Horizontal

Sample Rate Range	1GS/s	
Waveform Interpolation	(sin x)/x	
Record Length	Maximum 2M samples per single-channel; maximum 1M samples per dual-channel (4K, 40K, 512K, 1M optional)	
TIME/DIV Range	HDSO1072 & HDSO1102	HDSO1152 & HDSO1202
	4ns/div to 2Ks/div, in a 2, 4, 8 sequence	2ns/div to 2Ks/div, in a 2, 4, 8 sequence
Sample Rate and Delay Time Accuracy	±50ppm over any ≥1ms time interval	
Delta Time Measurement Accuracy (Full Bandwidth)	Single-shot, Normal mode ± (1 sample interval +100ppm × reading + 0.6ns)	
	>16 averages ± (1 sample interval + 100ppm × reading + 0.4ns)	
	Sample interval = s/div ÷ 200	
Position Range	HDSO1072 & HDSO1102	
	4ns/div to 8ns/div	(-8div × s/div) to 20ms
	20ns/div to 80μs/div	(-8div × s/div) to 40ms
	200μs/div to 2Ks/div	(-8div × s/div) to 2Ks
	HDSO1152 & HDSO1202	
	2ns/div to 10ns/div	(-4div × s/div) to 20ms

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Vertical

A/D Converter	8-bit resolution, each channel sampled simultaneously			
VOLTS Range	2mV/div to 100V/div at input BNC			
Position Range	±400V(100V/div-20V/div); ±50V(10V/div-5V/div) ±40V(2V/div-500mV/div); ±2V(200mV/div-50mV/div) ±400mV(20mV/div-2mV/div)			
Selectable Analog Bandwidth Limit, typical	20MHz			
Low Frequency Response (-3db)	≤10Hz at BNC			
Rise Time at BNC, typical	HDSO1072	HDSO1102	HDSO1152	HDSO1202
	<5.0ns	< 3.5ns	≤2.3ns	<1.8ns
DC Gain Accuracy	±3% for Normal or Average acquisition mode, 100V/div to 10mV/div ±4% for Normal or Average acquisition mode, 5mV/div to 2mV/div			
DC Measurement Accuracy, Average Acquisition Mode	Measurement Type: Average of ≥16 waveforms with vertical position at zero Accuracy: ± (3% × reading + 0.1div + 1mV) when 10mV/div or greater is selected			
	Measurement Type: Average of ≥16 waveforms with vertical position not at zero Accuracy: ± [3% × (reading + vertical position) + 1% of vertical position + 0.2div] Add 2mV for settings from 2mV/div to 200mV/div; add 50mV for settings from 200mV/div to 5V/div			
Volts Measurement Repeatability, Average Acquisition Mode	Delta volts between any two averages of ≥16 waveforms acquired under same setup and ambient conditions			

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Trigger

<table>
<tr><td rowspan="6">Trigger Sensitivity
(Edge Trigger Type)</td><td>Coupling</td><td colspan="3">Sensitivity</td></tr>
<tr><td rowspan="3">DC</td><td>Source</td><td>HDSO1072 HDSO1102</td><td>HDSO1152 HDSO1202</td></tr>
<tr><td>CH1
CH2</td><td>1div from DC to 10MHz;
1.5div from 10MHz to Full</td><td>1.5div from 10MHz to 100MHz;
2div from 100MHz to Full</td></tr>
<tr><td>EXT/5</td><td>1V from DC to Full</td><td>1V from DC to 100MHz;
1.75V from 100MHz to Full</td></tr>
<tr><td>AC</td><td colspan="3">Attenuates signals below 10Hz</td></tr>
<tr><td>HF Reject</td><td colspan="3">Attenuates signals above 80kHz</td></tr>
<tr><td>LF Reject</td><td colspan="3">Same as the DC-coupled limits for frequencies above 150kHz; attenuates signals below 150kHz</td></tr>
<tr><td rowspan="3">Trigger Level Range</td><td>Source</td><td colspan="3">Range</td></tr>
<tr><td>CH1, CH2</td><td colspan="3">±8 divisions from center of screen</td></tr>
<tr><td>EXT/5</td><td colspan="3">±6V</td></tr>
<tr><td rowspan="3">Trigger Level Accuracy, typical
(Accuracy is for signals having rise and fall times ≥20ns)</td><td>Source</td><td colspan="3">Accuracy</td></tr>
<tr><td>CH1, CH2</td><td colspan="3">0.2div × volts/div within ±4 divisions from center of screen</td></tr>
<tr><td>EXT/5</td><td colspan="3">± (6% of setting + 200mV)</td></tr>
<tr><td>Set Level to 50%, typical</td><td colspan="4">Operates with input signals ≥50Hz</td></tr>
</table>

Note: Bandwidth reduced to 6MHz when using a 1X probe.

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Video Trigger Type	Source	Range
	CH1, CH2	Peak-to-peak amplitude of 2 divisions
	EXT/5	2V
Signal Formats and Field Rates, Video Trigger Type	Supports NTSC, PAL and SECAM broadcast systems for any field or any line	
Holdoff Range	100ns to 10s	

Pulse Width Trigger	
Pulse Width Trigger Mode	Trigger when < (Less than), > (Greater than), = (Equal), or ≠ (Not Equal); Positive pulse or Negative pulse
Pulse Width Trigger Point	Equal: The oscilloscope triggers when the trailing edge of the pulse crosses the trigger level. Not Equal: If the pulse is narrower than the specified width, the trigger point is the trailing edge. Otherwise, the oscilloscope triggers when a pulse continues longer than the time specified as the Pulse Width. Less than: The trigger point is the trailing edge. Greater than (also called overtime trigger): The oscilloscope triggers when a pulse continues longer than the time specified as the Pulse Width.
Pulse Width Range	Selectable from 20ns to 10s

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Slope Trigger	
Slope Trigger Mode	Trigger when < (Less than), > (Greater than), = (Equal), or ≠ (Not Equal); Positive slope or Negative slope
Slope Trigger Point	Equal: The oscilloscope triggers when the waveform slope is equal to the set slope. Not Equal: The oscilloscope triggers when the waveform slope is not equal to the set slope. Less than: The oscilloscope triggers when the waveform slope is less than the set slope. Greater than: The oscilloscope triggers when the waveform slope is greater than the set slope.
Time Range	Selectable from 20ns to 10s
Overtime Trigger	The leading edge: Rising edge or Falling edge; Time Setting: 20-10s

Alter Trigger	
CH1	Internal Trigger: Edge, Pulse Width, Video, Slope
CH2	Internal Trigger: Edge, Pulse Width, Video, Slope

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Trigger Frequency Counter	
Readout Resolution	6 digits
Accuracy (typical)	±30ppm (including all frequency reference errors and ±1 count errors)
Frequency Range	AC coupled, from 4Hz minimum to rated bandwidth
Signal Source	Pulse Width or Edge Trigger modes: all available trigger sources The Frequency Counter measures trigger source at all times, including when the oscilloscope acquisition pauses due to changes in the run status, or acquisition of a single shot event has completed. Pulse Width Trigger mode: The oscilloscope counts pulses of significant magnitude inside the 1s measurement window that qualify as triggerable events, such as narrow pulses in a PWM pulse train if set to < mode and the width is set to a relatively small time. Edge Trigger mode: The oscilloscope counts all edges of sufficient magnitude and correct polarity. Video Trigger mode: The Frequency Counter does not work.

Acquisition

Acquisition Modes	Normal, Peak Detect, and Average	
Single Sequence	Acquisition Mode	Acquisition Stop Time
	Normal, Peak Detect	Upon single acquisition on all channels simultaneously
	Average	After N acquisitions on all channels simultaneously, N can be set to 4, 8, 16, 32, 64 or 128

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Inputs

Input Coupling	DC, AC or GND	
Input Impedance, DC coupled	1MΩ±2% in parallel with 20pF±3pF	
Probe Attenuation	1X, 10X	
Supported Probe Attenuation Factors	1X, 10X, 100X, 1000X	
Maximum Input Voltage	Overvoltage Category	Maximum Voltage
	CAT I and CAT II	$300V_{RMS}$ (10×), Installation Category
	CAT III	$150V_{RMS}$ (1×)

Measurements

Cursors	Voltage difference between cursors: △V Time difference between cursors: △T Reciprocal of △T in Hertz (1/ΔT)
Automatic Measurements	Frequency, Period, Mean, Peak-to-peak, Cycle RMS, PRMS, Minimum, Maximum, Rise Time, Fall Time, + Width, - Width, + Duty, - Duty, Base, Top, Middle, Amplitude, Overshoot, Preshoot, Pmean, FOVShoot, RPREShoot, BWidth, Delay 1-2 ↑, Delay 1-2 ↓, LFF, LFR, LRF, LRR, FFR, EFRF

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General Specifications

Display	
Display Type	5.6 Inch width TFT Display
Display Resolution	480 (Vertical) X 640 (Horizontal) pixels
Display Contrast	Adjustable (16 gears) with the progress bar
Probe Compensator Output	
Output Voltage, typical	About 2Vpp into ≥1MΩ load
Frequency, typical	1kHz
Power Supply	
Switching Adatper	AC Input:100-240VAC_{RMS},1.5A MAX,50Hz/60Hz; DC Output:12V, 3000mA
Power Consumption	<30W
Environmental	
Temperature	Operating: 32℉ to 122℉ (0℃ to 50℃)
	Nonoperating: -40℉ to 159.8℉ (-40℃ to +71℃)
Humidity	+104℉ or below (+40℃ or below): ≤90% relative humidity
	106℉ to 122℉ (+41℃ to 50℃): ≤60% relative humidity
Altitude	3,000m (10,000 feet)

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Mechanical	
Size	260 x 220 x 75(mm)
Weight	2.5 Kg

Waveform Generator

Frequency Range	1Hz(DC)~25MHz
DAC Clock	2K~200MHz adjustable
Memory Depth	4KSa
Vertical Resolution	12 Bits
Stability	<30ppm
Amplitude	±3.5V Max.
Output Impedance	50 Ω
Output Current	50mA Ipeak=50mA
System Bandwidth	25M
Harmonic Wave Distortion	-50dBc(1KHz), -40dBc(10KHz)

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Meter Mode

Maximum Resolution	6000 Counts
DMM Testing Modes	Voltage, Current, Resistance, Capacitance, Diode & Continuity
Maximum Input Voltage	AC: 600V DC: 800V
Maximum Input Current	AC: 10A DC: 10A
Input Impedance	10MΩ

Meter Specification

Range		Accuracy	Resolution
DC Voltage	60.00mV(manual)	±1%±3digit	10uV
	600.0mV		100uV
	6.000V		1mV
	60.00V		10mV
	600.0V		100mV
	800V		1V

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AC Voltage	60.00mV(manual)	±1%±3digit	10uV
	600.0mV(manual)		100uV
	6.000V		1mV
	60.00V		10mV
	600.0V		100mV
DC Current	60.00mA	±1%±5digit	10uA
	600.0mA	±1.5%±5digit	100uA
	6.000A		1mA
	10.00A		10mA
AC Current	60.00mA	±1%±5digit	10uA
	600.0mA	±1.5%±5digit	100uA
	6.000A		1mA
	10.00A		10mA

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Resistance	600.0	±1%±3digit	0.1Ω
	6.000K		1Ω
	60.00K		10Ω
	600.0K		100Ω
	6.000M		1KΩ
	60.00M	±1.5%±3digit	10KΩ
Capacitance	40.00nF	±1%±5digit	10pF
	400.0nF		100pF
	4.000uF		1nF
	40.00uF		10nF
	400.0uF		100nF
	Attention: The smallest capacitance value that can be measured is 5nF.		
Diode	0V~2.0V		
On-off Test	< 10Ω		

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Standard Package

- Main Machine x 1
- Passive Probe x2
- USB cable x 1
- Multimeter Probes x 2
- BNC to BNC cable x1
- Power adapter x1
- Velcro Hanger x1
- Replaceable BNC Head x1
- CD x1

Note: *Information will conduct the necessary updates，the contents of this document are subject to change without notice*

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