GW INSTEK
Simply Reliable

GDS-2000HD/HG Series

12 Bit 250/350/500 MHz Digital Storage Oscilloscope

CE | USB high Speed | PC Software | Labview Driver | Ethernet



* up to 500 Mpts in single-channel mode
* 2.5 GSa/s (single channel) ; 2.5 GSa/s (dual channel) ; 1.25 GSa/s (full channel)

MODEL	GDS-2504HD	GDS-2354HD	GDS-2254HD	GDS-2504HG	GDS-2354HG	GDS-2254HG
Bandwidth	500 MHz	350 MHz	250 MHz	500 MHz	350 MHz	250 MHz
Channels	4 Ch + EXT	4 Ch + EXT	4 Ch + EXT	4 Ch + EXT	4 Ch + EXT	4 Ch + EXT
Bandwidth Limit	20 MHz	20 MHz	20 MHz	20 MHz	20 MHz	20 MHz
Record Length	Max. 500 M / ch *	Max. 500 M / ch *	Max. 100 M / ch	Max. 500 M / ch *	Max. 500 M / ch *	Max. 100 M / ch
Real Time Sample Rate *	Max. 2.5 Gsa/s	Max. 2.5 Gsa/s	Max. 2.5 Gsa/s	Max. 2.5 Gsa/s	Max. 2.5 Gsa/s	Max. 2.5 Gsa/s
Calculated Rise Time	0.7 ns	1 ns	1.75 ns	0.7 ns	1 ns	1.75 ns
Built-in	X	X	X	AFG	AFG	AFG

FEATURES

* Bandwidth: 250 MHz, 350 MHz, 500 MHz
* Vertical Accuracy: ≥ 5 mV ± 1.5 %
* Horizontal Accuracy: ± 2 ppm
* Maximum Real-time Sampling Rate: 2.5 GS/s
* Maximum Memory Depth: 500 Mpts (350/500 MHz); 100 Mpts(250 MHz)
* 1 Mpt FFT Analysis
* Built-in Digital Voltmeter (DVM), 6-digit Frequency Counter, and Digital Filters
* Thoughtful Design to Prevent Human Error
* 14 Trigger Types + 43 Automatic Measurement Parameters (with Statistics)
* Standard 5 Serial Bus Trigger & Decode Functions: RS232/UART, I²C, SPI, CAN, or LIN
* Easy to Learn and Use: Built-in 11 Languages

APPLICATIONS

* Engineering Verification and Testing
* Switching Mode Power Supply Measurement
* Product Development and Debugging

Different application scenarios often define distinct market segments. Laboratories demand high precision - often at the expense of size and cost. Field applications require lightweight portability - typically sacrificing accuracy. Educational environments, tasked with delivering correct measurement concepts, must often compromise on features due to limited budgets. In other words, it's difficult to have it all. The GDS-2000HD/HG, with its 12-bit hardware high resolution and compact form factor, satisfies the needs of all application scenarios while delivering excellent cost-performance value, along with an innovative Android-based smart user experience. Whether for demanding power design, complex in-vehicle communication validation, seamless transitions between laboratory and field testing environments, or digitalized teaching scenarios, it accompanies you every step of the way. With unparalleled precision and intuitive operation, it becomes your most reliable measurement hub on the path to achieving excellence.

Core Advantages That Break The Limits

12-bit Hardware High Resolution: Details make all the difference - say goodbye to corse waveforms filled with quantization noise. The GDS-2000HD/HG features a newly designed 12-bit analog-to-digital converter (ADC), delivering 4096 levels of vertical quantization to enhance dynamic range and waveform clarity. 1.5 % Vertical Accuracy: Faithful Reproduction, No Compromise. We've pushed DC gain accuracy to a stringent 1.5 %. This ensures that what you see on your screen is exactly what's happening on the board when performing rigorous power loss calculations or amplifying weak medical electronic signals. 2 ppm Horizontal Accuracy: Time base accuracy is the foundation of frequency and phase analysis. Most competitors offer 5 ppm or 10 ppm accuracy, but the GDS-2000HD/HG, with its 2 ppm internal clock accuracy, is your most reliable timing verification solution.

All-in-One Analysis: Simplifying Complexity for Powerful Debugging

No more paying extra for essential features. The most commonly used debugging tools come standard, delivering a true all-in-one measurement experience: Featuring standard 5-protocol decoding (RS232/I²C/SPI/CAN/LIN) and 1M-point FFT analysis , this device excels at identifying communication errors and EMI. It integrates 43 parameters, a DVM, and a frequency counter into a single, comprehensive system verification tool.

Breaking Spatial Limitations: Born for Field Testing and Modern Teaching, A Portable Lab (Supports Type-C Power)

Weighing only approximately 3.2 kg, this lightweight design breaks the traditional limitation of oscilloscopes confined to a lab bench. Supporting Type-C power allows you to easily perform mobile measurements in automotive road tests, outdoor electromechanical equipment maintenance, or industrial settings simply by carrying a power bank.

Smart Android System, Reshaping Digital Teaching Scenarios

Equipped with a smooth Android system, this oscilloscope is not just a measurement tool, but also a powerful teaching and presentation center: With built-in WPS Office and multimedia support, this oscilloscope directly handles documents, videos, and PDFs. It features a multi-touch interface with screen recording, peripheral support, and Web Control for remote operation, significantly enhancing efficiency in research and education.

Flagship Upgrade: HG Models (Built-in Arbitrary Waveform Generator)

For advanced applications requiring complete stimulus and response testing, the HG models offer a more comprehensive solution: Featuring a 50 MHz Arbitrary Waveform Generator, this device offers 28 standard waveforms and a one-key copy function to replicate real-world anomalies for stress testing. It also supports "Frequency Response Analysis", providing intuitive Bode plots to verify the stability and phase margin of power supplies and filter circuits.

Website | Facebook | Catalog

SPECIFICATIONS

MODEL	GDS-2254HD/HG	GDS-2354HD/HG	GDS-2504HD/HG
Bandwidth	250 MHz	350 MHz	500 MHz [1]
Channels	4 Ch + EXT	4 Ch + EXT	4 Ch + EXT
Bandwidth Limit	20 MHz	20 MHz	20 MHz
Calculated Rise Time	1.75 ns	1 ns	0.7 ns
VERTICAL SENSITIVITY			
Resolution	12 bit ; 1 MΩ : 500 µV/div to 10 V/div ; 50 Ω : 500 µV/div to 1 V/div [2]		
Input Coupling	AC, DC, GND		
Input Impedance	1 MΩ ± 2 % ; in parallel with 15 pF ± 5 pF ; 50 Ω ± 2 %		
DC Gain Accuracy	≤ 1 mV ± 3 % ; 2 mV ± 2 % ; ≥ 5 mV ± 1.5 %		
Polarity	Normal & Invert		
Maximum Input Voltage	1 MΩ ≤ 300 Vrms, CAT II ; 50 Ω ≤ 5 Vrms		
Offset Position Range	For 1 MΩ input impedance : 500 µV/div to 50 mV/div : ± 2 V ; 100 mV/div to 500 mV/div : ± 20 V ; 1 V/div to 10 V/div : ± 200 V For 50 Ω input impedance : 500 µV/div to 50 mV/div : ± 2 V ; 100 mV/div to 1 V/div : ± 5 V		
Waveform Signal Process	+, -, ×, ÷, FFT, User Defined Expression, FFT : 1 Mpts ; FFT : Spectral magnitude, Set FFT Vertical Scale to Vrms, dBVrms, Radians or Degrees, FFT Window Displays : Rectangle, Hamming, Hanning, Blackman, Bartlett or Kaiser		
TRIGGER			
Source	CH1, CH2, CH3, CH4, EXT TRIG, AC Lines		
Trigger Mode	Auto、Normal、Single		
Trigger Type	Edge, Pulse Width(Glitch), Video, Pulse Runt, Rise & Fall(Slope), Windows, Nth Edge, Logic, Time out, Bus(I²C, SPI, RS232/UART, CAN, LIN)		
Holdoff Range	100 ns to 10 s		
Coupling	AC, DC, HF		
Sensitivity	0.3 div to 10 div		
EXT TRIGGER			
Range	EXT ±2 V ; EXT/5 ±10 V		
Sensitivity	DC to 5 MHz EXT : 150 mV ; DC to 5 MHz EXT/5 : 750 mV		
Input Impedance	1 MΩ ± 2 % ; in parallel with 15 pF ± 5 pF		
HORIZONTAL			
Time Base Range	500 ps/div to 1000 s/div (1-2-5 increments)		
Pre-trigger	10 div maximum		
Post-trigger	80,000,000 div maximum		
Time Base Accuracy	± 2 ppm , about ± 1 ppm increase in error per year		
Peak Detection	0.8 ns (typical)		
SIGNAL ACQUISITION			
Real Time Sample Rate	2.5 GSa/s (half channels) [3] ; 1.25 GSa/s (all channels)		
Record Length	Max. 500 Mpts / CH [4]		
Acquisition Mode	Sample, Peak, High Res, Average, Segmentation		
Average	4, 16, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536 selectable		
X-Y MODE			
X-Axis Input	User defined		
Y-Axis Input	User defined		
Phase Shift	±3 degrees at 100 kHz		
CURSORS AND MEASUREMENT			
Cursors	Amplitude, Time, Gating available ; FFT [5] ; Unit : Seconds(s), Hz (1/s), Phase(degree), Ratio(%), FFT Vrms(V), FFTdBVrms(dB), FFT Radians(RAD), FFT Degrees(°)		
Automatic Measurement	43 sets : Period, Frequency, +Width, -Width, Rise Time, Fall Time, Scr Duty, +Duty, -Duty, Vavg, Vpp, VRMS, Overshoot, Vmax, Vmin, Vtop, CycRms, Vbase, Vamp, Preshoot, Std Dev, +Pulse Cnt, -Pulse Cnt, Rise Cnt, Fall Cnt, Area, Cyc Area, Delay(A ↑ -B ↑), Delay(A ↑ -B ↓), Delay(A ↓ -B ↑), Delay(A ↓ -B ↓), Phase(A ↑ -B ↑), Phase(A ↑ -B ↓), Phase(A ↓ -B ↑), Phase(A ↓ -B ↓), FRR(A ↑ -B ↑), FRF(A ↑ -B ↓), FFR(A ↓ -B ↑), FFF(A ↓ -B ↓), LRR(A ↑ -B ↑), LRF(A ↑ -B ↓), LFR(A ↓ -B ↑), LFF(A ↓ -B ↓)		
Cursors Measurement	Manual mode : Voltage difference between cursors(ΔV) Time difference between cursors(ΔT) Tracing mode : The voltage value and time value of the X waveform point are tracked by fixing the Y-axis The fixed X-axis tracks the voltage value and time value of the Y waveform point		
Auto Counter	6 digits, range from 2 Hz minimum to the rated bandwidth		
CONTROL PANEL FUNCTION			
Autoset	Single button, automatic setup of all channels for vertical, horizontal and trigger systems, with "Undo Autoset"		
Save Setup	10 sets		
Save Waveform	Maximum 3 GB of available internal storage space [6]		
Save Reference Waveform	100 sets		
AFG SPECIFICATIONS (GDS-2000HG series)			
Channel	2		
Sample Rate	160 MSa/s		
Vertical Resolution	14 bit		
Max. Frequency	50 MHz		
Waveforms	Sine wave, square wave, ramp wave, pulse wave, Noise wave, Butterworth, X∧2 and EOG etc 28 built-in waveforms		
Output Range	High Z : 2 mVpp to 10 Vpp (≤ 10 MHz) ; 2 mVpp to 5 Vpp (≤ 50 MHz)		
Output Resolution	1 mVpp or 5 bits		
Output Accuracy	± (1 % of setting + 1 mVpp) （typical 1 kHz sine, 0 V offset ）		
Offset Range	High Z : ± 5 Vpk – Amplitude Vpp/2 (≤10 MHz) ; ± 2.5 Vpk – Amplitude Vpp/2 (≤50 MHz)		
Offset Resolution	1 mVpp		

SPECIFICATIONS

MODEL	GDS-2254HD/HG	GDS-2354HD/HG	GDS-2504HD/HG
SINE			
Frequency Range	1 μHz to 50 MHz		
Flatness	≤ 10 MHz : ± 0.3 dB ; ≤ 50 MHz : ± 0.5 dB		
Harmonic Distortion	Typical value (0 dBm) ; DC to 1 MHz: < –65 dBc ; 1 MHz to 50 MHz: < –50 dBc		
Stray (Non-harmonic)	Typical value (0 dBm) ; ≤ 10 MHz : < –70 dBc ; > 10 MHz : < –70 dBc + 6 dBC/octave		
Total Harmonic Distortion	< 0.2 %, 10 Hz to 20 kHz, 1 Vpp		
S/N Ratio	40 dB [7]		
SQUARE/PULSE			
Frequency Range	Square : 1 μHz to 20 MHz ; Pulse : 1 μHz to 10 MHz		
Rise/Fall Time	< 15 ns		
Overshoot	< 5 %		
Duty Cycle	Square : 50 % ; Pulse : 0.1 % to 99.9 %		
Min. Pulse Width	≥ 64 ns		
Jitter	200 ps +25 ppm		
RAMP			
Frequency Range	1 μHz to 1 MHz		
Linearity	< the 1 % of maximum output (typical value 1 kHz, 1 Vpp, symmetry 50 %)		
Symmetry	0 % to 100 %		
DISPLAY			
TFT LCD Type	10.1 inch , LCD		
Display Resolution	1024 horizontal × 600 vertical pixels		
Interpolation	Auto, Sin(x)/x, x		
Waveform Display	Dots, vectors, variable persistence (1 s、2 s、5 s), infinite persistence		
Waveform Capture Rate	Real-time acquire : 50,000 wfms/s ; Segment acquire : 500,000 wfms/s [8]		
Display Graticule	10 x 18 divisions		
Display Mode	YT, XY		
INTERFACE			
USB port	USB 2.0 High speed host port X3, USB 2.0 High speed device port X1		
Ethernet Port (LAN)	RJ45 connector X1, 10/100 Mbps with HP Auto MDIX		
Power Supply	Type-C power supply interface [9]		
MISCELLANEOUS			
Multi-language Menu	Available		
Operation Environment	Working Temperature : 0 °C to 40 °C ; Storage temperature: -20 °C to 60 °C ; Relative Humidity ≤ 90 %		
Line Voltage Range	Power Supply : AC 100 V to 240 VACRMS, 50 Hz to 60 Hz ; Power Consumption : Without generator <35 W, With generator <50 W		
Dimensions & Weight	325 mm(W) × 209.5 mm(H) × 111.5 mm(D) ; Approx. 3.2 kg		

NOTE : [1] 500 MHz bandwidth is available in the following cases: only one channel is enabled in each channel pair (CH1/CH2 and CH3/CH4).
[2] 500 μV/div is a digital magnification of 1 mV/div.
[3] Limited to four-channel models, the maximum real-time sampling rate of two channels should meet one of the following conditions: only one channel of CH1 and CH2 can be turned on, and only one channel of CH3 and CH4 can be turned on.
[4] Bandwidth 350 MHz and 500 MHz : up to 500 Mpts in single-channel mode, 250 Mpts in dual-channel mode ; Bandwidth 250 MHz: up to 100 Mpts.
[5] The measurement function supports cursors, available in the measurement menu settings.
[6] Waveform data up to 100 MB memory length can be stored in internal memory. Waveform data exceeding 100 MB memory length must be saved to an external USB drive or external hard drive.
[7] Tested under 10 MHz, 0 dBm conditions.
[8] Test conditions: single channel, 1 k memory depth.
[9] The adapter or battery should support the 12 V handshake protocol, with a power requirement of 48 W.

Specifications subject to change without notice. DS-2000HD/HGGD1BH

ORDERING INFORMATION

GDS-2254HD	**250 MHz, 4-Chanel, Digital Storage Oscilloscope**
GDS-2354HD	**350 MHz, 4-Channel, Digital Storage Oscilloscope**
GDS-2504HD	**500 MHz, 4-Channel, Digital Storage Oscilloscope**
GDS-2254HG	**250 MHz, 4-Channel, Digital Storage Oscilloscope + 50MHz, Arbitrary Function Generator**
GDS-2354HG	**350 MHz, 4-Channel, Digital Storage Oscilloscope + 50MHz, Arbitrary Function Generator**
GDS-2504HG	**500 MHz, 4-Channel, Digital Storage Oscilloscope + 50MHz, Arbitrary Function Generator**

ACCESSORIES

Power cord x 1, USB Cable x 1, BNC Cable x 1 (GDS-2254HG, GDS-2354HG, GDS-2504HG), Passive Probe (one probe per channel 250 MHz and 350 MHz models provided 350 MHz probes; 500 MHz models provided 500 MHz probes)

OPTIONAL ACCESSORIES

GCP-300	300 kHz / 200 A Current probe	**GTL-110**	Test lead, BNC to BNC connector
GCP-500	500 kHz / 150 A Current probe	**GTL-246**	USB 2.0 cable, A-B type,1800 mm
GCP-530	50 MHz / 50 A Current probe	**GTP-033A**	35 MHz 1:1 Passive probe
GCP-0275	2 MHz / 750 A Current probe	**GTP-350A-2**	350 MHz (10:1/1:1) Switching passive probe, BNC(P/M)
GCP-0550	5 MHz / 500 A Current probe		
GCP-1000	1 MHz / 70 A Current probe		
GCP-1030	100 MHz / 50 A Current probe		
GCP-2525	25 MHz / 250 A Current probe		
GDP-025	25 MHz High voltage differential probe		
GDP-050	50 MHz High voltage differential probe		
GDP-100	100 MHz High voltage differential probe		
GDP-1020P	1 GHz High frequency differential probe		
GDP-2035H	200 MHz High voltage differential probe		

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PC Software OpenWave software **Driver** LabView driver

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