

# GDS-2000HD/HG 系列

## 12 Bit 250/350/500 MHz 數位儲存示波器



**GW INSTEK**  
Simply Reliable



\* 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             |

### 特 點

- \* 頻寬：250 MHz, 350 MHz, 500 MHz
- \* 垂直準確度： $\geq 5 \text{ mV} \pm 1.5 \%$
- \* 水平準確度： $\pm 1 \text{ ppm}$
- \* 最大即時取樣率：2.5 GS/s
- \* 最大記憶深度：500 Mpts (350/500 MHz);  
100 Mpts (250 MHz)
- \* 1 Mpt 快速傅立葉轉換分析
- \* 內建數位電壓表 (DVM), 6 位數計頻器及數位濾波器
- \* 避免人為誤差的精心設計
- \* 14 種觸發型態 + 43 自動參數量測(並具統計功能)
- \* 標配五種串列匯流排觸發與解碼功能：  
RS232/UART, I<sup>2</sup>C, SPI, CAN 及 LIN
- \* 內建 11 國語言，易學易用

### 應用範圍

- \* 工業界及教育研發實驗室
- \* 產品訓練及品質保證測試
- \* 電源供應器及串列匯流排設計
- \* 系統整合及產品偵錯
- \* 日常保養及維修服務

不同的應用場景切割出不同的市場區隔，實驗室需要精準的儀器，便需要妥協體積與價格、戶外場域需要輕巧的可攜式儀器，便需要犧牲準確度，傳遞正確測量觀念的教學現場又要因有限的預算而犧牲功能，正所謂魚與熊掌難以兼得，GDS-2000HD/HG 以 12 位元硬體高解析度及輕巧的機身，滿足全應用場景及性價比，創新的 Android 智慧操作體驗。無論是嚴苛的電源設計、複雜的車載通訊驗證，能伴隨您穿梭於實驗室與戶外測試場域，亦或是數位化教學場景，它都能以無與倫比的精準度與直覺化操作，讓您在追求極致的道路上，成為您最可靠的量測中樞。

**12 位元硬體高解析度：**細節決定一切，告別充滿量化雜訊的粗糙波形。GDS-2000HD/HG 搭載全新設計的 12 位元類比數位轉換器 (ADC)，提供 4096 階的垂直量化等級，提高動態範圍與波形清晰度。

**1.5 % 垂直準確度：**忠實還原，絕不妥協。我們將直流增益準確度推向了嚴苛的 1.5 %。在進行嚴密的功率損耗計算或微弱的醫療電子訊號放大時，確保您螢幕上看到的，就是電路板上真實發生的。

**1 ppm 水平準確度：**時基準確度是頻率與相位分析的基礎，同業的準確度大多是 5 ppm 或 10 ppm，GDS-2000HD/HG 憑藉 1 ppm 的內部時鐘精準度，是您最可靠的時序驗證後盾。

#### 全能分析：化繁為簡的除錯利器

不再需要為了特定功能額外付費，將最常用的除錯工具列為標準配備，打造 All-in-One 的量測體驗：標配 RS232/I<sup>2</sup>C/SPI/CAN/LIN 五種協議解碼與 1M 點 FFT 頻域分析，能精確排除通訊錯誤與 EMI 干擾。同時整合 43 種自動量測、DVM 及計頻器，提供全方位的系統驗證功能。

#### 隨身攜帶的實驗室(支援 Type-C 供電)

重量僅約 3.2 公斤的輕量化機身，打破傳統示波器只能困在實驗桌的限制。支援 Type-C 供電，讓您只需帶著行動電源，就能輕鬆完成汽車道路實測、戶外機電設備維護或工業現場的機動性量測。

#### 智慧 Android 系統，重塑數位教學場景

搭載流暢的安卓系統，讓示波器不僅是量測工具，更是強大的教學與簡報中心：內建 WPS Office 與多媒體播放功能，可直接處理各類文件、影音與 PDF；其具備多點觸控與多國語言介面，並支援螢幕錄影、鍵盤滑鼠操作及 Web Control 遠端遙控，大幅提升教學與研發效率。

#### 旗艦進階：HG 機種(內建任意波形產生器)

針對需要完整激勵與響應測試的進階應用，HG 機種為您提供更全面的解決方案：本設備內建 50 MHz 任意波形產生器，提供 28 種常用波形與一鍵複製功能，可重製真實異常訊號進行壓力測試；同時具備 FRA 頻率響應分析，能直觀生成波德圖以驗證電源與濾波電路的系統穩定性。



產品操作影片



最新活動訊息



產品綜合目錄



| 規 格   |   |               |                        |
|---|---|---------------|------------------------|
| MODEL   | GDS-2254HD/HG   | GDS-2354HD/HG | GDS-2504HD/HG          |
| Bandwidth                                     | 250 MHz   | 350 MHz       | 500 MHz <sup>[1]</sup> |
| 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                 |
| <b>VERTICAL SENSITIVITY</b>                   |   |               |                        |
| Resolution                                    | 12 bit ; 500 $\mu$ V/div to 10 V/div <sup>[2]</sup>   |               |                        |
| Input Coupling                                | AC, DC, GND   |               |                        |
| Input Impedance                               | 1 M $\Omega$ $\pm$ 2 % ; in parallel with 15 pF $\pm$ 5 pF ; 50 $\Omega$ $\pm$ 2 %  |               |                        |
| DC Gain Accuracy                              | $\leq$ 1 mV $\pm$ 3 % ; 2 mV $\pm$ 2 % ; $\geq$ 5 mV $\pm$ 1.5 %  |               |                        |
| Polarity                                      | Normal & Invert   |               |                        |
| Maximum Input Voltage                         | 1 M $\Omega$ $\leq$ 300 Vrms, CAT II ; 50 $\Omega$ $\leq$ 5 Vrms  |               |                        |
| Offset Position Range                         | For 1 M $\Omega$ input impedance :<br>500 $\mu$ V/div to 50 mV/div : $\pm$ 2 V ; 100 mV/div to 500 mV/div : $\pm$ 20 V ; 1 V/div to 10 V/div : $\pm$ 200 V<br>For 50 $\Omega$ input impedance :<br>500 $\mu$ V/div to 50 mV/div : $\pm$ 2 V ; 100 mV/div to 1 V/div : $\pm$ 5 V   |               |                        |
| Waveform Signal Process                       | +, -, x, $\div$ , 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  |               |                        |
| <b>TRIGGER</b>                                |   |               |                        |
| 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(I <sup>2</sup> C, SPI, RS232/UART, CAN, LIN)  |               |                        |
| Holdoff Range                                 | 100 ns to 10 s  |               |                        |
| Coupling                                      | AC, DC, HF  |               |                        |
| Sensitivity                                   | 0.3 div to 10 div   |               |                        |
| <b>EXT TRIGGER</b>                            |   |               |                        |
| Range   | EXT $\pm$ 2 V ; EXT/5 $\pm$ 10 V  |               |                        |
| Sensitivity                                   | DC to 5 MHz EXT : 150 mV ; DC to 5 MHz EXT/5 : 750 mV   |               |                        |
| Input Impedance                               | 1 M $\Omega$ $\pm$ 2 % ; in parallel with 15 pF $\pm$ 5 pF  |               |                        |
| <b>HORIZONTAL</b>                             |   |               |                        |
| 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                            | $\pm$ 1 ppm , about $\pm$ 1 ppm increase in error per year  |               |                        |
| Peak Detection                                | 0.8 ns (typical)  |               |                        |
| <b>SIGNAL ACQUISITION</b>                     |   |               |                        |
| Real Time Sample Rate                         | 2.5 GSa/s (half channels) <sup>[3]</sup> ; 1.25 GSa/s (all channels)  |               |                        |
| Record Length                                 | Max. 500 Mpts / CH <sup>[4]</sup>   |               |                        |
| Acquisition Mode                              | Sample, Peak, High Res, Average, Segmentation   |               |                        |
| Average                                       | 4, 16, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536 selectable  |               |                        |
| <b>X-Y MODE</b>                               |   |               |                        |
| X-Axis Input                                  | User defined  |               |                        |
| Y-Axis Input                                  | User defined  |               |                        |
| Phase Shift                                   | $\pm$ 3 degrees at 100 kHz  |               |                        |
| <b>Cursors AND MEASUREMENT</b>                |   |               |                        |
| Cursors                                       | Amplitude, Time, Gating available ; FFT <sup>[5]</sup> ; Unit : Seconds(s), Hz (1/s), Phase(degree), Ratio(%), FFT Vrms(V), FFTdBVrms(dB), FFT Radians(RAD), FFT Degrees( $^{\circ}$ )  |               |                        |
| 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 $\uparrow$ -B $\uparrow$ ), Delay(A $\uparrow$ -B $\downarrow$ ), Delay(A $\downarrow$ -B $\uparrow$ ), Delay(A $\downarrow$ -B $\downarrow$ ), Phase(A $\uparrow$ -B $\uparrow$ ), Phase(A $\uparrow$ -B $\downarrow$ ), Phase(A $\downarrow$ -B $\uparrow$ ), Phase(A $\downarrow$ -B $\downarrow$ ), FRR(A $\uparrow$ -B $\uparrow$ ), FRF(A $\uparrow$ -B $\downarrow$ ), FFR(A $\downarrow$ -B $\uparrow$ ), FFF(A $\downarrow$ -B $\downarrow$ ), LRR(A $\uparrow$ -B $\uparrow$ ), LRF(A $\uparrow$ -B $\downarrow$ ), LFR(A $\downarrow$ -B $\uparrow$ ), LFF(A $\downarrow$ -B $\downarrow$ ) |               |                        |
| Cursors Measurement                           | Manual mode : Voltage difference between cursors( $\Delta$ V) Time difference between cursors( $\Delta$ T)<br>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  |               |                        |
| <b>CONTROL PANEL FUNCTION</b>                 |   |               |                        |
| 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 <sup>[6]</sup>   |               |                        |
| Save Reference Waveform                       | 100 sets  |               |                        |
| <b>AFG SPECIFICATIONS (GDS-2000HG series)</b> |   |               |                        |
| 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, Xa2 and EOG etc 28 built-in waveforms   |               |                        |
| Output Range                                  | High Z : 2 mVpp to 10 Vpp ( $\leq$ 10 MHz) ; 2 mVpp to 5 Vpp ( $\leq$ 50 MHz)   |               |                        |
| Output Resolution                             | 1 mVpp or 5 bits  |               |                        |
| Output Accuracy                               | $\pm$ ( 1 % of setting + 1 mVpp ) ( typical 1 kHz sine, 0 V offset )  |               |                        |
| Offset Range                                  | High Z : $\pm$ 5 Vpk - Amplitude Vpp/2 ( $\leq$ 10 MHz) ; $\pm$ 2.5 Vpk - Amplitude Vpp/2 ( $\leq$ 50 MHz)  |               |                        |
| Offset Resolution                             | 1 mVpp  |               |                        |

| 規 格                       |  |               |               |
|---------------------------|--|---------------|---------------|
| 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 <sup>[7]</sup>   |               |               |
| 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 <sup>[8]</sup>  |               |               |
| Display Graticule         | 10 × 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 <sup>[9]</sup>   |               |               |
| 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 VAC RMS, 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 T2 V handshake protocol, with a power requirement of 48 W.

規格若有局部變更，恕不另行通知！ DS-2000HD/HGCD1DS

#### 訂購資訊

|                   |  |
|-------------------|--|
| <b>GDS-2254HD</b> | 250 MHz, 4通道, 數位儲存示波器                  |
| <b>GDS-2354HD</b> | 350 MHz, 4通道, 數位儲存示波器                  |
| <b>GDS-2504HD</b> | 500 MHz, 4通道, 數位儲存示波器                  |
| <b>GDS-2254HG</b> | 250 MHz, 4通道, 數位儲存示波器 + 50MHz, 任意函數產生器 |
| <b>GDS-2354HG</b> | 350 MHz, 4通道, 數位儲存示波器 + 50MHz, 任意函數產生器 |
| <b>GDS-2504HG</b> | 500 MHz, 4通道, 數位儲存示波器 + 50MHz, 任意函數產生器 |

#### 標準配件

Power cord x 1, USB Cable x 1, BNC Cable x 1 (GDS-2254HG, GDS-2354HG, GDS-2504HG), Probe x 4

#### 選購配件

|                 |   |                  |   |
|-----------------|---|------------------|---|
| <b>GTP-033A</b> | 35 MHz 1:1 Passive probe                | <b>GTL-248</b>   | GPIB Cable, Double Shielded, 2000 mm        |
| <b>GTP-352R</b> | 350 MHz 20:1 Passive probe              | <b>GTL-110</b>   | Test lead, BNC to BNC connector             |
| <b>GDP-025</b>  | 25 MHz High voltage differential probe  | <b>GTL-232</b>   | RS-232C cable, 9-pin female to 9-pin female |
| <b>GDP-050</b>  | 50 MHz High voltage differential probe  | <b>GTL-246</b>   | USB 2.0 cable, A-B type, 1800 mm            |
| <b>GDP-100</b>  | 100 MHz High voltage differential probe | <b>GRA-443</b>   | Rack Adapter Panel                          |
| <b>GCP-300</b>  | 300 kHz/200 A Current probe             | <b>GKT-100</b>   | Deskew Fixture                              |
| <b>GCP-500</b>  | 500 kHz/150 A Current probe             | <b>GTP-1501R</b> | 1.5 GHz 10:1 Passive probe                  |
| <b>GCP-530</b>  | 50 MHz/30 A Current probe               | <b>GCP-0275</b>  | 2 MHz / 750 A Current probe                 |
| <b>GCP-1000</b> | 1 MHz/70 A Current probe                | <b>GCP-0550</b>  | 5 MHz / 500 A Current probe                 |
| <b>GCP-1030</b> | 100 MHz/30 A Current probe              | <b>GCP-2525</b>  | 25 MHz / 250 A Current probe                |

#### 選購附件

**PC Software** OpenWave software      **Driver** LabView driver

#### 固緯電子實業股份有限公司

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# GW INSTEK

Simply Reliable



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產品綜合目錄