



**VPO**  
Visual Persistence Oscilloscope

## GDS-2000A Series

### FEATURES

- 300/200/100/70MHz Bandwidth, 2 or 4 Input Channels
- 2GSa/s Maximum Real-Time Sampling Rate and 100GSa/s Equivalent Time Sampling Rate
- 2M points Maximum Record length
- VPO Technology to Display Less-Frequently-Occurred Signals
- Fast Update Rate of 80,000 Waveform Per Second
- Segmented Memory Acquisition and Waveform Search Function
- Standard Model Provides I<sup>2</sup>C, UART, SPI Serial Bus Trigger and Analysis Functionality
- Optional 8 or 16 Additional Digital Channels with Logic Analyzer(MSO)
- Upgradable CAN/LIN Bus, DVM, H-Expansion, Data Log and Advanced Logic Functionality
- Optional 5MHz & 25MHz Function Generator
- Flexible Remote Control Connectivity (Standard : USB ; Optional : LAN/GPIB)

The GDS-2000A Series DSO comes along with a high-value design framework, including 2G Sa/s sampling rate, 2M points record length, 2 or 4 input channels and a large screen color LCD display, to perform very fast waveform acquisition and procession at 80,000 wfms/s update rate utilizing VPO (Visual Persistence Oscilloscope) technology.

The GDS-2000A Series, carrying bandwidths of 300MHz, 200MHz, 100MHz and 70MHz and inputs of 2 and 4 channels, makes up a family of 8 in the whole series. The 2M points record length not only enables the long time waveform storage but also plays the role as a huge database of the input signals for the post-storage waveform analysis. Two powerful functions, Waveform Search and Segmented Memory are available of the GDS-2000A Series to facilitate the search the event of interest from the long record length. Waveform search defines the waveform types for the search whereas segmented memory divides the whole record length into a number of segments. Therefore, the process of searching particular waveforms can be easier and faster.

The ping-pong waveform acquisition design and the advanced VPO-technology-based waveform procession system, greatly enhance the speed and the quality of waveform display of GDS-2000A Series at a very fast update rate of 80,000 waveforms per second, GDS-2000A also provides I<sup>2</sup>C, UART, SPI serial bus trigger and decoding functionalities free of charge. Users via GDS-2000A not only to measure basic waveform but also available to analysis the low speed serial bus.

The optional logic analyzer function allows the signal acquisition through logic triggering and enables the logic waveforms and the analog waveforms to be shown on the same screen for comparison and time correlation analysis. This Mixed Signal Oscilloscope (MSO) function is field-installable with a plug-in module, containing either 8 or 16 input channels, at the rear panel. The MSO function supports the I<sup>2</sup>C / SPI / UART serial bus trigger and decoding.

The GDS-2000A Series is equipped with all the features that a high-tech DSO should have today. The RS-232C interface, USB ports, and Go-NoGo output are provided as standard, and the Ethernet port, SVGA Video output and GPIB port are available as options for user's free selection. At a moderate cost, GDS-2000A Series is a DSO to provide high customer-value with innovative design.



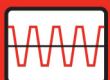
Front



Rear Panel

### APPLICATIONS

- Industrial and Educational R&D Labs
- Product Testing and Quality Assurance
- Embedded System and Mix Signal Design
- System Integration & Debugging
- Maintenance & Repair Service



## SPECIFICATIONS

|                         |   | GDS-2072A   | GDS-2074A | GDS-2102A                         | GDS-2104A | GDS-2202A                               | GDS-2204A | GDS-2302A                                    | GDS-2304A |
|-------------------------|---|---|-----------|-----------------------------------|-----------|---|-----------|--|-----------|
| VERTICAL SENSITIVITY    | Channels  | 2Ch+EXT   | 4Ch+EXT   | 2Ch+EXT                           | 4Ch+EXT   | 2Ch+EXT                                 | 4Ch+EXT   | 2Ch+EXT                                      | 4Ch+EXT   |
|                         | Bandwidth<br>Rise Time<br>Bandwidth Limit   | DC~70MHz(-3dB)<br>5ns<br>20MHz  |           | DC~100MHz(-3dB)<br>3.5ns<br>20MHz |           | DC~200MHz(-3dB)<br>1.75ns<br>20M/100MHz |           | DC~300MHz(-3dB)<br>1.17ns<br>20M/100M/200MHz |           |
|                         | Vertical Resolution<br>Input Coupling<br>Input Impedance<br>Offset Position Range<br>DC Gain Accuracy (**)  | 8 bits@1M : 1mV*~10V (* : When the vertical scale is set to 1mV/div, the bandwidth limit will be set to 20MHz automatically)<br>AC, DC, GND<br>1MΩ // 16pF approx.<br>(3% X  Readout  + 0.1div + 1mV) when 2mV/div or greater is selected ; (5% X  Readout  + 0.1 div + 1mV) when 1mV/div is selected<br>(** : The measurement type is average of ≥16 waveforms with vertical position at zero)   |           |                                   |           |   |           |  |           |
|                         | Polarity<br>Maximum Input Voltage<br>Offset Position Range<br>Waveform Signal Process   | Normal , Invert<br>300Vrms , CAT I (300Vrms CAT II with GTP-150A-2/250A-2/350A-2 10:1 probe)<br>1mV/div ~ 20mV/div : 0.5V ; 50mV/div ~ 200mV/div : 5V ; 500mV/div ~ 2V/div : 25V ; 5V/div~10V/div : 250V<br>+, -, x, ÷, FFT, FFTms, d/dt(Differentiation*), ∫ dt(Integration*), √<br>FFT : Spectral magnitude. Set FFT Vertical Scale to Linear RMS or dBV RMS, and FFT Window to Rectangular, Hamming, Hanning, or Blackman-Harris.  |           |                                   |           |   |           |  |           |
| TRIGGER                 | Source<br>Trigger Mode<br>Trigger Type<br>Trigger Holdoff Range<br>Coupling<br>Sensitivity  | Ch1 ,CH2, CH3*, CH4*, Line, EXT, D0-D7 or D0-D15** ; *four channel models only. **Logic analyzer option only.<br>Auto (Supports Roll Mode for 100 ms/div and slower), Normal, Single Sequence<br>Edge, Pulse Width (Glitch), Video, Pulse Runt, Rise & Fall (Slope), Alternate, Glitch Trigger, Duration Trigger, Slope Trigger,<br>Time out, Event-Delay(1~65,535 events), Time-Delay(Duration;10ns~10s), Logic*, Bus* , *with DS2-08LA or DS2-16LA option<br>10ns ~ 10s<br>AC, DC, LF rej., HF rej., Noise rej.<br>DC ~ 100MHz Approx. 1div or 1.0mV ; 100MHz ~ 200MHz Approx. 1.5div or 15mV ;<br>200MHz ~ 300MHz Approx. 2div or 20mV |           |                                   |           |   |           |  |           |
| EXT TRIGGER             | Range<br>Sensitivity<br>Input Impedance   | 15V<br>DC ~ 100MHz Approx. 100mV<br>100MHz ~ 200MHz Approx. 150mV ; 200MHz ~ 300MHz Approx. 150mV<br>1MΩ 3%, ~16pF  |           |                                   |           |   |           |  |           |
| HORIZONTAL              | Time Base Range<br>Pre-trigger<br>Post-trigger<br>Time Base Accuracy<br>Real Time Sample Rate<br>ET Sample Rate<br>Record Length<br>Acquisition Mode<br>Peak Detection<br>Average   | 1ns/div ~ 100s/div (1-2-5 increments); ROLL : 100ms/div ~ 100s/div<br>10 div maximum<br>1,000 div max ( depend on time base )<br>20 ppm over any ≥ 1 ms time interval<br>Max. : 2GSa/s<br>100GSa/s maximum for all models<br>Max. : 2Mpts<br>Normal, Average, Peak Detect, Single Sequence<br>2ns (typical)<br>Selectable from 2 to 256   |           |                                   |           |   |           |  |           |
| X-Y MODE                | X-Axis Input<br>Y-Axis Input<br>Phase Shift   | Channel 1 ; Channel 3* (* : four channel models only )<br>Channel 2 ; Channel 4* (* : four channel models only )<br>3° at 100kHz  |           |                                   |           |   |           |  |           |
| CURSORS AND MEASUREMENT | Cursors<br>Automatic Measurement<br>Control Panel Function<br>Auto Counter<br>Autoset<br>Save Setup<br>Save Waveform  | Amplitude, Time, Gating Available; Unit : Seconds(S), Hz(1/S), Phase (Degrees), Ratio(%)<br>36 sets: Pk-Pk, Max, Min, Amplitude, High, Low, Mean, Cycle Mean, RMS, Cycle RMS, Area, Cycle Area, ROVShoot, RPREShoot, FPREShoot,<br>Frequency, Period, RiseTime, FallTime, +Width, -Width, Duty Cycle, +Pulses, -Pulses, +Edges, -Edges, FRR, FRF, FFR, LRR, LRF, LFR, LFF, Phase<br>Cursors measurement<br>6 digits, range from 2Hz minimum to the rated bandwidth<br>Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with undo Autoset<br>20set<br>24set                                    |           |                                   |           |   |           |  |           |
| DISPLAY SYSTEM          | TFT LCD Type<br>Display Resolution<br>Interpolation<br>Waveform Display<br>Waveform Update Rate<br>Display<br>Display Graticule   | 8" TFT LCD SVGA color display(LED Back-light)<br>800 horizontal x 600 vertical pixels (SVGA)<br>Sin(x)/x & Equivalent time sampling<br>Dots, Vectors, Variable persistence(16ms~10s), Infinite persistence<br>80,000 waveforms per second, maximum<br>Display mode : YT ; XY<br>8 x 10 divisions  |           |                                   |           |   |           |  |           |
| INTERFACE               | RS-232C<br>USB Port<br>Ethernet Port (LAN)<br>SVGA Video Port<br>GPiB<br>Go/NoGo BNC<br>Kensington Style Lock   | DB-9 male connector<br>USB 2.0 Full-speed host port, USB 2.0 Full-speed device port<br>RJ-45 connector, 10/100Mbps with HP Auto-MDIX (option)<br>SVGA output (option)<br>GPiB module (option)<br>5V Max/10mA TTL open collector output<br>Rear-panel security slot connects to standard Kensington-style lock   |           |                                   |           |   |           |  |           |
| LOGIC ANALYZER (OPTION) | Sample Rate<br>Bandwidth<br>Record Length<br>Input Channels<br>Trigger Type<br>Thresholds<br>Threshold Selections<br>Threshold Accuracy<br>User-defined Threshold Range<br>Maximum Input Voltage<br>Minimum Voltage Swing<br>Input Impedance<br>Vertical Resolution | 500MSa/s<br>200MHz<br>2M max<br>16 Digital (D15 - D0) or 8 Digital (D7~D0)<br>Edge, Pattern, Pulse Width, Serial bus (I <sup>2</sup> C, SPI, UART), Parallel<br>Quad-D0 ~ D3, D4 ~ D7 . . . Thresholds D8~D11*, D12~D15* (*: DS2-16LA only)<br>TTL, CMOS, ECL, PECL, User Defined<br>100mV<br>10V<br>40V<br>500mV<br>101KΩ probe loading 8 pF<br>1 bit  |           |                                   |           |   |           |  |           |
| OPERATING ENVIRONMENT   | Temperature   | 0°C ~ 50°C, Relative Humidity ≤ 80% at 40°C or below ; ≤ 45% at 41°C~50°C   |           |                                   |           |   |           |  |           |
| POWER SOURCE            | Line Voltage Range<br>Multi-Language Menu<br>On-Line Help<br>Time clock   | AC 100V ~ 240V, 48Hz ~ 63Hz, auto selection<br>Available<br>Available<br>Time and date, provide the date/time for saved data  |           |                                   |           |   |           |  |           |
| MISCELLANEOUS           |   |   |           |                                   |           |   |           |  |           |
| DIMENSIONS & WEIGHT     |   | 380(W) X 220(H) X 145(D)mm, Approx. 4.2 kg  |           |                                   |           |   |           |  |           |

Note : Three-year warranty, excluding probes & LCD display panel.

Specifications subject to change without notice. BH-2000AGD4BH

## ORDERING INFORMATION

|           |   |
|-----------|---|
| GDS-2304A | 300MHz, 4-Channel, Digital Storage Oscilloscope |
| GDS-2302A | 300MHz, 2-Channel, Digital Storage Oscilloscope |
| GDS-2204A | 200MHz, 4-Channel, Digital Storage Oscilloscope |
| GDS-2202A | 200MHz, 2-Channel, Digital Storage Oscilloscope |
| GDS-2104A | 100MHz, 4-Channel, Digital Storage Oscilloscope |
| GDS-2102A | 100MHz, 2-Channel, Digital Storage Oscilloscope |
| GDS-2074A | 70MHz, 4-Channel, Digital Storage Oscilloscope  |
| GDS-2072A | 70MHz, 2-Channel, Digital Storage Oscilloscope  |

## ACCESSORIES

|   |
|---|
| Quick start guide , User manual CD x 1, Power cord x 1                                      |
| GTP-070B-4 :70MHz (10:1/1:1) Switchable passive probe for GDS-2072A/2074A(one per channel)  |
| GTP-150A-2 :150MHz (10:1/1:1) Switchable passive probe for GDS-2102A/2104A(one per channel) |
| GTP-250A-2 :250MHz (10:1/1:1) Switchable passive probe for GDS-2202A/2204A(one per channel) |
| GTP-350A-2 :350MHz (10:1/1:1) Switchable passive probe for GDS-2302A/2304A(one per channel) |

## OPTION

|          |   |          |  |
|----------|---|----------|--|
| DS2-LAN  | Ethernet & SVGA output  | DS2-16LA | 16-Channel Logic Analyzer includes 16 Channel Logic Analyzer Card (GLA-16) |
| DS2-GPIB | GPIB Interface  | DS2-08LA | 8-Channel Logic Analyzer includes 8-Channel Logic Analyzer Card (GLA-08)   |
| DS2-FGN  | DDS Function Generator  |          |  |
| AFG-125  | 25MHz Single channel USB Modular Arbitrary Function Generator |          |  |
| AFG-225  | 25MHz Dual channel USB Modular Arbitrary Function Generator   |          |  |

## OPTION ACCESSORIES

|          |   |          |   |
|----------|---|----------|---|
| CTL-08LA | 8-Channel Logic Analyzer Probe  | GDB-03   | Oscilloscope Education & Training Kit                                 |
| CTL-16LA | 16-Channel Logic Analyzer Probe   | GCP-005  | Current Probe, 40Hz ~ 4kHz, 5A, Current Probe                         |
| CLA-08   | 8-Channel Logic Analyzer Card   | GCP-020  | Current Probe, DC ~ 100kHz, 10A, Current Probe                        |
| CLA-16   | 16-Channel Logic Analyzer Card  | GCP-100  | Current Probe, 40Hz ~ 10kHz, 20A, Current Probe                       |
| GRA-400  | Rack Adapter Panel  | GCP-1030 | Current Probe, DC ~ 100MHz, 30Arms, Current Probe                     |
| GAK-003  | 50Ω Impedance Adapter   | GCP-206P | Current Probe - Power Supply, 2 Channel Power Supply for GCP-530/1030 |
| CS2-008  | Soft Carrying Case  | GCP-245P | Current Probe - Power Supply, 4 Channel Power Supply for GCP-530/1030 |
| DS2-FH1  | Module extension bay & USB Type A to Type A/B cable                     | GCP-530  | Current Probe, DC ~ 50MHz, 30Arms, Current Probe                      |
| GTL-232  | RS-232C Cable, 9-pin, F-F Type, null modem, 2000mm                      | GDP-025  | Differential Probe, 25M High Voltage Differential Probe               |
| GTL-246  | USB Cable, USB 2.0, A-B Type, 1200mm                                    | GDP-050  | Differential Probe, 50M High Voltage Differential Probe               |
| GTL-248  | GPiB Cable, Double Shielded, 2000mm                                     | GDP-100  | Differential Probe, 100M High Voltage Differential Probe              |
| GTL-251  | USB-GPIB Adapter, GPiB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm | GTP-033A | Oscilloscope Probe, 35MHz 1:1 Passive Probe, BNC(P/M)                 |

## FREE DOWNLOAD

|             |                   |        |                             |
|-------------|-------------------|--------|-----------------------------|
| PC Software | FreeWave software | Driver | USB driver ; LabView driver |
|-------------|-------------------|--------|-----------------------------|

## GOOD WILL INSTRUMENT CO., LTD.

No.7-1, Jhongsing Road, Tucheng Dist., New Taipei City 236, Taiwan  
T +886-2-2268-0389 F +886-2-2268-0639

www.gwinstek.com

**GW INSTEK**

Simply Reliable