



**VPO**  
Visual Persistence Oscilloscope

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.

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.

## GDS-2000A Series

### FEATURES

- 300/200/100/70MHz Bandwidth, 2 or 4 Input Channels
- 2GSa/s Real-Time Sampling Rate and 100GSa/s Equivalent Time Sampling Rate
- 2Mega Points Memory Depth
- VPO Technology to Display Less-Frequently-Occurred Signals
- Fastest Update Rate of 80,000 Waveform Per Second
- Segmented Memory Acquisition and Waveform Search Function
- Optional 8 or 16 Additional Digital Channels with Logic Analyzer (MSO) & Serial Bus I<sup>2</sup>C/SPI/UART Trigger and Decode Software
- Optional Function Generator
- Flexible Remote Control Connectivity (Standard : USB ; Optional : LAN/ GPIB)



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                | Channels                     | 2Ch+EXT                                                                                                                                                                                                                                                                                          | 4Ch+EXT   | 2Ch+EXT         | 4Ch+EXT   | 2Ch+EXT         | 4Ch+EXT   | 2Ch+EXT         | 4Ch+EXT   |
|                         | Bandwidth                    | DC~70MHz(-3dB)                                                                                                                                                                                                                                                                                   |           | DC~100MHz(-3dB) |           | DC~200MHz(-3dB) |           | DC~300MHz(-3dB) |           |
|                         | Rise Time                    | 5ns                                                                                                                                                                                                                                                                                              |           | 3.5ns           |           | 1.75ns          |           | 1.17ns          |           |
|                         | Bandwidth Limit              | 20MHz                                                                                                                                                                                                                                                                                            |           | 20MHz           |           | 20M/100MHz      |           | 20M/100M/200MHz |           |
|                         | Vertical Resolution          | 8 bits @1M : 1mV~-10V ( * : When the vertical scale is set to 1mV/div, the bandwidth limit will be set to 20MHz automatically)                                                                                                                                                                   |           |                 |           |                 |           |                 |           |
|                         | Input Coupling               | AC, DC, GND                                                                                                                                                                                                                                                                                      |           |                 |           |                 |           |                 |           |
| TRIGGER                 | Input Impedance              | 1MΩ// 16pF approx.                                                                                                                                                                                                                                                                               |           |                 |           |                 |           |                 |           |
|                         | DC Gain Accuracy(**)         | ±(5% X  Readout  + 0.1div + 1mV) when 1mV/div is selected ; ±(3% X  Readout  + 0.1div + 1mV) when 2mV/div or greater is selected ( ** : The measurement type is average of ≥16 waveforms with vertical position at zero)                                                                         |           |                 |           |                 |           |                 |           |
|                         | Polarity                     | Normal , Invert                                                                                                                                                                                                                                                                                  |           |                 |           |                 |           |                 |           |
|                         | Maximum Input Voltage        | 300V (DC+AC Peak), CAT I                                                                                                                                                                                                                                                                         |           |                 |           |                 |           |                 |           |
|                         | Offset Position Range        | 1mV/div ~ 20mV/div : ±0.5V ; 50mV/div ~ 200mV/div : ±5V ; 500mV/div ~ 2V/div : ±25V ; 5V/div~10V/div : ±250V                                                                                                                                                                                     |           |                 |           |                 |           |                 |           |
|                         | Waveform Signal Process      | + , -, X , π , FFT, FFTms<br>FFT: Spectral magnitude. Set FFT Vertical Scale to Linear RMS or dBV RMS, and FFT Window to Rectangular, Hamming, Hanning, or Blackman-Harris                                                                                                                       |           |                 |           |                 |           |                 |           |
| EXT TRIGGER             | Source                       | Ch1, CH2, CH3*, CH4*, Line, EXT, D0-D15** ; *four channel models only. **Logic analyzer option only.                                                                                                                                                                                             |           |                 |           |                 |           |                 |           |
|                         | Trigger Mode                 | Auto (Supports Roll Mode for 100 ms/div and slower), Normal, Single                                                                                                                                                                                                                              |           |                 |           |                 |           |                 |           |
|                         | Trigger Type                 | Edge, Pulse Width, Video, Pulse Runt, Rise & Fall, Alternate, Time out, Event-Delay(1~65,535 events), Time-Delay(10ns~10s), Logic*, Bus*, *with DS2-08LA option                                                                                                                                  |           |                 |           |                 |           |                 |           |
|                         | Trigger Holdoff Range        | 10ns ~ 10s                                                                                                                                                                                                                                                                                       |           |                 |           |                 |           |                 |           |
|                         | Coupling                     | AC, DC, LF rej. , Hf rej. , Noise rej.                                                                                                                                                                                                                                                           |           |                 |           |                 |           |                 |           |
|                         | Coupling                     | AC,DC,LF rej. ,Hf rej. ,Noise rej.                                                                                                                                                                                                                                                               |           |                 |           |                 |           |                 |           |
| HORIZONTAL              | Sensitivity                  | DC ~ 100MHz Approx. 1div or 1.0mV ; 100MHz ~ 200MHz Approx. 1.5div or 15mV ; 200MHz ~ 300MHz Approx. 2div or 20mV                                                                                                                                                                                |           |                 |           |                 |           |                 |           |
|                         | Range                        | ±15V                                                                                                                                                                                                                                                                                             |           |                 |           |                 |           |                 |           |
|                         | Sensitivity                  | DC ~ 100MHz Approx. 100mV<br>100MHz ~ 200MHz Approx. 150mV ; 200MHz ~ 300MHz Approx. 150mV                                                                                                                                                                                                       |           |                 |           |                 |           |                 |           |
|                         | Input Impedance              | 1MΩ ±3%, -16pF                                                                                                                                                                                                                                                                                   |           |                 |           |                 |           |                 |           |
|                         | Time Base Range              | 1ns/div ~ 100s/div (1-2.5 increments); ROLL : 100ms/div ~ 100s/div                                                                                                                                                                                                                               |           |                 |           |                 |           |                 |           |
|                         | Pre-trigger                  | 10 div maximum                                                                                                                                                                                                                                                                                   |           |                 |           |                 |           |                 |           |
| X-Y MODE                | Post-trigger                 | 1,000 div max ( depend on time base )                                                                                                                                                                                                                                                            |           |                 |           |                 |           |                 |           |
|                         | Accuracy                     | ±20 ppm over any ≥ 1 ms time interval                                                                                                                                                                                                                                                            |           |                 |           |                 |           |                 |           |
|                         | Real Time Sample Rate        | Max. : 2GSa/s                                                                                                                                                                                                                                                                                    |           |                 |           |                 |           |                 |           |
|                         | ET Sample Rate               | 100GSa/s maximum for all models                                                                                                                                                                                                                                                                  |           |                 |           |                 |           |                 |           |
|                         | Record Length                | Max. : 2Mpts                                                                                                                                                                                                                                                                                     |           |                 |           |                 |           |                 |           |
|                         | Acquisition Mode             | Normal, Average, Peak Detect, Single                                                                                                                                                                                                                                                             |           |                 |           |                 |           |                 |           |
| CURSORS AND MEASUREMENT | Peak Detection               | 2ns (typical)                                                                                                                                                                                                                                                                                    |           |                 |           |                 |           |                 |           |
|                         | Average                      | Selectable from 2 to 256                                                                                                                                                                                                                                                                         |           |                 |           |                 |           |                 |           |
|                         | X-Axis Input                 | Channel 1 ; Channel 3* ( * : four channel models only )                                                                                                                                                                                                                                          |           |                 |           |                 |           |                 |           |
|                         | Y-Axis Input                 | Channel 2 ; Channel 4* ( * : four channel models only )                                                                                                                                                                                                                                          |           |                 |           |                 |           |                 |           |
|                         | Phase Shift                  | ±3° at 100kHz                                                                                                                                                                                                                                                                                    |           |                 |           |                 |           |                 |           |
|                         | Cursors                      | Amplitude, Time, Gating Available; Unit : Seconds(S), Hz(1/S), Phase (Degrees), Ratio(%)                                                                                                                                                                                                         |           |                 |           |                 |           |                 |           |
| DISPLAY SYSTEM          | Automatic Measurement        | 36 sets: Pk-Pk, Max, Min, Amplitude, High, Low, Mean, Cycle Mean, RMS, Cycle RMS, Area, Cycle Area, ROVShoot, FOVShoot, RPREShoot, FPREShoot, Frequency, Period, RiseTime, FallTime, +Width, -Width, Duty Cycle, +Pulses, -Pulses, +Edges, -Edges, FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF, Phase |           |                 |           |                 |           |                 |           |
|                         | Control Panel Function       | Cursors measurement                                                                                                                                                                                                                                                                              |           |                 |           |                 |           |                 |           |
|                         | Auto Counter                 | 6 digits, range from 2Hz minimum to the rated bandwidth                                                                                                                                                                                                                                          |           |                 |           |                 |           |                 |           |
|                         | Autoset                      | Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with Undo Autoset                                                                                                                                                                                   |           |                 |           |                 |           |                 |           |
|                         | Save Setup                   | 20set                                                                                                                                                                                                                                                                                            |           |                 |           |                 |           |                 |           |
|                         | Save Waveform                | 24set                                                                                                                                                                                                                                                                                            |           |                 |           |                 |           |                 |           |
| INTERFACE               | TFT LCD Type                 | 8" TFT LCD SVGA color display(LED Back-light)                                                                                                                                                                                                                                                    |           |                 |           |                 |           |                 |           |
|                         | Display Resolution           | 800 horizontal x 600 vertical pixels (SVGA)                                                                                                                                                                                                                                                      |           |                 |           |                 |           |                 |           |
|                         | Interpolation                | Sin(x)/x & Equivalent time sampling                                                                                                                                                                                                                                                              |           |                 |           |                 |           |                 |           |
|                         | Waveform Display             | Dots, Vectors, Variable persistence(16ms~10s), Infinite persistence                                                                                                                                                                                                                              |           |                 |           |                 |           |                 |           |
|                         | Waveform Update Rate         | 80,000 waveforms per second, maximum                                                                                                                                                                                                                                                             |           |                 |           |                 |           |                 |           |
|                         | Display Graticule            | 8 x 10 divisions                                                                                                                                                                                                                                                                                 |           |                 |           |                 |           |                 |           |
| LOGIC ANALYZER (OPTION) | RS-232C                      | DB-9 male connector                                                                                                                                                                                                                                                                              |           |                 |           |                 |           |                 |           |
|                         | USB Port                     | 2 sets USB 2.0 high-speed host port ; 1 set USB high-speed 2.0 device port                                                                                                                                                                                                                       |           |                 |           |                 |           |                 |           |
|                         | Ethernet Port                | RJ-45 connector, 10/100Mbps with HP Auto-MDIX (option)                                                                                                                                                                                                                                           |           |                 |           |                 |           |                 |           |
|                         | SVGA Video Port              | SVGA output (option)                                                                                                                                                                                                                                                                             |           |                 |           |                 |           |                 |           |
|                         | GPIO                         | GPIO module (Optional)                                                                                                                                                                                                                                                                           |           |                 |           |                 |           |                 |           |
|                         | Co/NoGo BNC                  | 5V Max/10mA TTL open collector output                                                                                                                                                                                                                                                            |           |                 |           |                 |           |                 |           |
| POWER SOURCE            | Kensington Style Lock        | Rear-panel security slot connects to standard Kensington-style lock                                                                                                                                                                                                                              |           |                 |           |                 |           |                 |           |
|                         | Sample Rate                  | 500MSa/s                                                                                                                                                                                                                                                                                         |           |                 |           |                 |           |                 |           |
|                         | Bandwidth                    | 200MHz                                                                                                                                                                                                                                                                                           |           |                 |           |                 |           |                 |           |
|                         | Record Length                | 2M max                                                                                                                                                                                                                                                                                           |           |                 |           |                 |           |                 |           |
|                         | Input Channels               | 16 Digital (D15 ~ D0) or 8 Digital (D7~D0)                                                                                                                                                                                                                                                       |           |                 |           |                 |           |                 |           |
|                         | Trigger Type                 | Edge, Pattern, Pulse Width, Serial bus (I <sup>2</sup> C, SPI, UART), Parallel                                                                                                                                                                                                                   |           |                 |           |                 |           |                 |           |
| MISCELLANEOUS           | Thresholds                   | Quad-D0 ~ D3, D4 ~ D7, ... , Thresholds D8~D11*, D12~D15* (*: DS2-16LA only)                                                                                                                                                                                                                     |           |                 |           |                 |           |                 |           |
|                         | Threshold Selections         | TTL, CMOS, ECL, PECL, User Defined                                                                                                                                                                                                                                                               |           |                 |           |                 |           |                 |           |
|                         | User-defined Threshold Range | ±10V                                                                                                                                                                                                                                                                                             |           |                 |           |                 |           |                 |           |
|                         | Maximum Input Voltage        | ±40V                                                                                                                                                                                                                                                                                             |           |                 |           |                 |           |                 |           |
|                         | Minimum Voltage Swing        | ±500mV                                                                                                                                                                                                                                                                                           |           |                 |           |                 |           |                 |           |
|                         | Vertical Resolution          | 1 bit                                                                                                                                                                                                                                                                                            |           |                 |           |                 |           |                 |           |
| DIMENSIONS & WEIGHT     | Line Voltage Range           | AC 100V ~ 240V, 48Hz ~ 63Hz, auto selection                                                                                                                                                                                                                                                      |           |                 |           |                 |           |                 |           |
|                         | Multi-Language Menu          | Available                                                                                                                                                                                                                                                                                        |           |                 |           |                 |           |                 |           |
|                         | On-Line Help                 | Available                                                                                                                                                                                                                                                                                        |           |                 |           |                 |           |                 |           |
|                         | Time clock                   | Time and date, provide the date/time for saved data                                                                                                                                                                                                                                              |           |                 |           |                 |           |                 |           |
|                         |                              | 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.

DS-2000AGD1DH

## 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-070A-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-GPIB | GPIB Interface                                                                                                           |
| DS2-FGN  | DDS Function Generator                                                                                                   |
| DS2-8LA  | 8-Channel Logic Analyzer : includes 8-Channel Logic Analyzer Card(GLA-08) and 8-Channel Logic Analyzer Probe (GTL-08LA)  |
| DS2-16LA | 16-Channel Logic Analyzer includes 16 Channel Logic Analyzer Card(GLA-16) and 16-Channel Logic Analyzer Probe (GTL-16LA) |

## OPTION ACCESSORIES

|          |                                         |
|----------|-----------------------------------------|
| GTL-08LA | 8-Channel Logic Analyzer Testing Probe  |
| GTL-16LA | 16-Channel Logic Analyzer Testing Probe |
| GLA-08   | 8-Channel Logic Analyzer Card           |
| GLA-16   | 16-Channel Logic Analyzer Card          |

## FREE DOWNLOAD

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

Global Headquarters

GOOD WILL INSTRUMENT CO., LTD.

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

China Subsidiary

GOOD WILL INSTRUMENT (SUZHOU) CO., LTD.

NO. 69, Lushan Road, Snd, Suzhou Jiangsu 215011 China  
 T +86-512-6661-7177 F +86-512-6661-7277

Malaysia Subsidiary

GOOD WILL INSTRUMENT (M) SDN. BHD.

27, Persiaran Mahsuri 1/1, Sunway Tunas,  
 11900 Bayan Lepas, Penang, Malaysia  
 T +604-6309988 F +604-6309989

U.S.A. Subsidiary

INSTEK AMERICA CORP.

3661 Walnut Avenue Chino, CA 91710, U.S.A.  
 T +1-909-5918358 F +1-909-5912280

Japan Subsidiary

INSTEK JAPAN CORPORATION

4F, Prosper Bldg, 1-3-3 Iwamoto-Cho Chiyoda-Ku,  
 Tokyo 101-0032 Japan  
 T +81-3-5823-5656 F +81-3-5823-5655

Korea Subsidiary

GOOD WILL INSTRUMENT KOREA CO., LTD.

Room No.805, Ace Hightech-City B/D 1Dong,  
 Mullaee-Dong 3Ga 55-20, Yeongduengpo-Gu, Seoul, Korea  
 T +82-2-3439-2205 F +82-2-3439-2207

**GW INSTEK**

Simply Reliable

[www.gwinstek.com](http://www.gwinstek.com)