

Digital Storage Oscilloscope

GDS-1000A-U Series

QUICK START GUIDE

CW INSTEK PART NO. 82DS-112A1M01



SAFETY INSTRUCTIONS

This section contains the basic safety symbols that may appear on the accompanying user manual CD or on the instrument. For detailed safety instructions and precautions, please see the Safety Instructions chapter in the user manual CD.

Safety Symbols

These safety symbols may appear in the user manual or on the instrument.

- Warning: Identifies conditions or practices that could result in injury or loss of life.
- Caution: Identifies conditions or practices that could result in damage to the instrument or to other properties.
- DANGER High Voltage
- Attention Refer to the Manual
- Protective Conductor Terminal
- Earth (ground) Terminal
- Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Power Cord for the United Kingdom

When using the instrument in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons.

WARNING: THIS APPLIANCE MUST BE EARTHED
IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/ Yellow: Earth
Blue: Neutral
Brown: Live (Phase)



As the colours of the wires in main leads may not correspond with the coloured marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with either the letter E, the earth symbol or coloured Green/Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black. The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, a cable of 0.75mm² should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any exposed wiring from a cable, plug or connection that is engaged in a live socket is extremely hazardous. If a cable or plug is deemed hazardous, turn off the mains power and remove the cable, any fuses and fuse assemblies. All hazardous wiring must be immediately destroyed and replaced in accordance to the above standard.

GETTING STARTED

The Getting started chapter introduces the oscilloscope's main features, appearance, and set up procedure.

Main Features

| Model name | Frequency bandwidth | Input channels |
|-------------|---------------------|----------------|
| GDS-1072A-U | DC~70MHz (-3dB) | 2 |
| GDS-1102A-U | DC~100MHz (-3dB) | 2 |
| GDS-1152A-U | DC~150MHz (-3dB) | 2 |

- Performance
- 1 GS/s real-time sampling rate
 - 25GS/s equivalent-time sampling rate
 - 2M points record length
 - Up to 10ns peak detection
 - 2mV~10V vertical scale
 - 1ns ~ 50s time scale

- Features
- 5.6 inch color TFT display
 - Saving and recalling setups and waveforms
 - 27 automatic measurements
 - Multi-language menu (12 languages)
 - Math operation: Addition, Subtraction, Multiplication, FFT, FFT RMS
 - Data logging
 - Go-NoGo testing
 - Autoset with Auto range

- Edge, Video, Pulse Width triggers
- Compact size: (W) 310 x (D) 140 x (H) 142 mm
- Probe factor from 0.1X~2000X voltage/current

- Interface
- USB 2.0 full-speed interface for saving and recalling data
 - Calibration output
 - External trigger input
 - USB B (slave) interface for remote control

Package Contents and Accessories

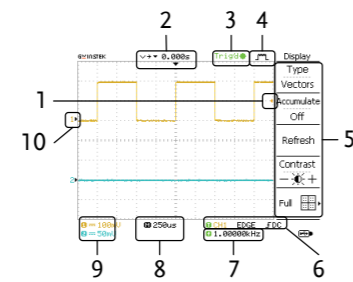
| Standard Accessories | |
|-------------------------|---------------------------------------|
| Part Number | Description |
| 82DS-112A1E01 | User Manual CD |
| 82DS-112A1M01 | Quick Start Guide (this document) |
| GTP-070A-4 for GDS-1072 | Passive probe, 70MHz, 10x readout x2 |
| GTP-100A-4 for GDS-1102 | Passive probe, 100MHz, 10x readout x2 |
| GTP-150A-2 for GDS-1152 | Passive probe, 150MHz, 10x readout x2 |
| Region Dependent | Power cord x1 |

Optional Accessories

| Part Number | Description |
|-------------|-------------------------|
| GTL-242 | USB 2.0 Cable, type A-B |
| GTL-110 | Test Lead (BNC-BNC) |
| GSC-006 | Soft carry case |

Display and Panel Overview

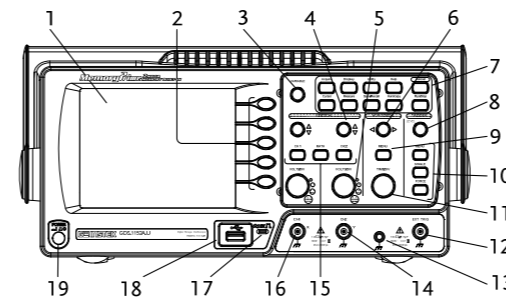
Display Overview



Description

- | | |
|---------------------|----------------------|
| 1. Trigger position | 2. Waveform position |
| 3. Trigger status | 4. Acquisition |
| 5. Menu | 6. Trigger condition |
| 7. Frequency | 8. Horizontal status |
| 9. Vertical status | 10. Waveform marker |

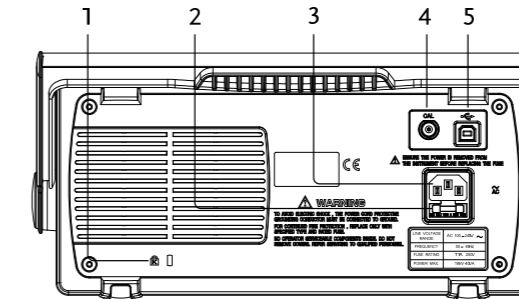
Front Panel



Description

- | | |
|-------------------------------|-----------------------------|
| 1. LCD display | 2. Function keys |
| 3. Variable knob | 4. Vertical position knob |
| 5. VOLT/DIV knob | 6. Horizontal position knob |
| 7. Menu keys | 8. Trigger level knob |
| 9. Horizontal menu key | 10. Trigger keys |
| 11. TIME/DIV knob | 12. EXT TRIG |
| 13. Ground Terminal | 14. CH2 Terminal |
| 15. CH1/CH2 Math keys | 16. CH1 Terminal |
| 17. Probe Compensation output | 18. USB A port |
| 19. Power Switch | |

Rear Panel



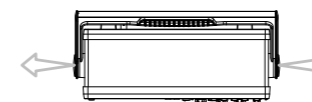
Description

- | | |
|-----------------------|----------------|
| 1. Security lock slot | 2. Fuse socket |
| 3. Power cord socket | 4. CAL output |
| 5. USB B port | |

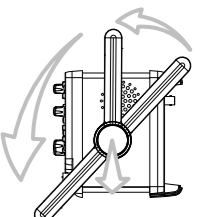
Setting up the Oscilloscope

This section describes how to set up the oscilloscope properly including adjusting the handle, connecting a signal, adjusting the scale, and compensating the probe. Before operating the oscilloscope in a new environment, run these steps to make sure the oscilloscope is functionally stable.

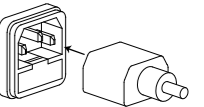
1. Pull both bases of the handle out slightly.



2. Turn to one of the three preset positions.



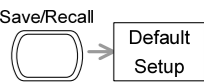
3. Connect the power cord.



4. Press the power switch. The display will become active in approximately 10 seconds.

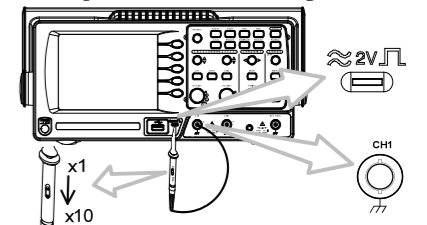


5. Reset the system by recalling the factory settings. Press the Save/Recall key, then Default Setup.



6. Connect the probe between the Channel1 input terminal and probe compensation signal output (2Vp-p, 1kHz square wave).

7. Set the probe attenuation voltage to x10.



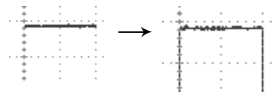
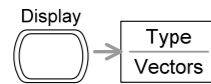
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The information in this manual was correct at the time of printing. However, Good Will continues to improve its products and therefore reserves the right to change the specifications, equipment, and maintenance procedures at any time without notice.

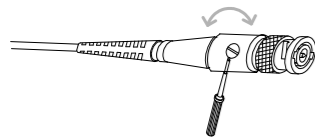
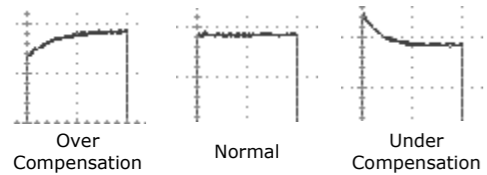
8. Press the Autoset key. A square waveform will appear in the center of the display.



9. Press the Display key, then Type and select the vector waveform type.



10. Turn the adjustment point on the probe to flatten the square waveform edge.



11. Setting up the oscilloscope is complete. You may start to use the oscilloscope.

SPECIFICATIONS

The specifications apply when the oscilloscope is powered on for at least 30 minutes under +20°C~+30°C.

Model Specific Specifications

| GDS-1072A-U | |
|---------------------|--|
| Bandwidth (-3dB) | DC coupling: DC ~ 70MHz AC coupling: 10Hz ~ 70MHz |
| Bandwidth Limit | 20MHz (-3dB) |
| Trigger Sensitivity | 0.5div or 5mV (DC ~ 25MHz) 1.5div or 15mV (25MHz~70MHz) |
| External Trigger | ~ 50mV (DC~25MHz) |
| Sensitivity | ~ 100mV (25MHz~70MHz) |
| Rise Time | < 5.8ns approx. |

| GDS-1102A-U | |
|---------------------|---|
| Bandwidth (-3dB) | DC coupling: DC ~ 100MHz AC coupling: 10Hz ~ 100MHz |
| Bandwidth Limit | 20MHz (-3dB) |
| Trigger Sensitivity | 0.5div or 5mV (DC ~ 25MHz) 1.5div or 15mV (25MHz~100MHz) |
| External Trigger | ~ 50mV (DC~25MHz) |
| Sensitivity | ~ 100mV (25MHz~100MHz) |
| Rise Time | < 3.5ns approx. |

| GDS-1152A-U | |
|------------------|--|
| Bandwidth (-3dB) | DC coupling: DC ~ 150MHz AC coupling: 10Hz ~ 150MHz |
| Bandwidth Limit | 20MHz (-3dB) |

| | |
|------------------------------|---|
| Trigger Sensitivity | 0.5div or 5mV (DC ~ 25MHz) 1.5div or 15mV (25MHz~150MHz) |
| External Trigger Sensitivity | ~ 50mV (DC~25MHz) ~ 100mV (25MHz~100MHz) |
| Rise Time | < 2.3ns approx. |

Common Specifications

| Vertical | |
|-----------------|--|
| Sensitivity | 2mV/div~10V/Div (1-2-5 increments) |
| Accuracy | ± (3% x Readout + 0.1div + 1mV) |
| Bandwidth | See model-specific specifications |
| Rise Time | See model-specific specifications |
| Input Coupling | |
| Input Impedance | 1MΩ±2%, ~15pF |
| Polarity | Normal, Invert |
| Maximum Input | 300V (DC+AC peak), CAT II |
| Math Operation | +, -, ×, FFT, FFT rms |
| Offset Range | 2mV/div~50mV/div: ±0.4V 100mV/div~500mV/div: ±4V 1V/div~5V/div: ±40V 10V/div: ±300V |

| Trigger | |
|-------------|---------------------------------------|
| Sources | CH1, CH2, Line, EXT |
| Modes | Auto, Normal, Single, TV, Edge, Pulse |
| Coupling | AC, DC, LF rej, HF rej, Noise rej |
| Sensitivity | See model-specific specifications |
| Holdoff | 40ns ~ 2.5s |

| External Trigger | |
|------------------|-----------------------------------|
| Range | DC: ±15V, AC: ±2V |
| Sensitivity | See model-specific specifications |
| Input Impedance | 1MΩ±2%, ~15pF |
| Maximum Input | 300V (DC+AC peak), CATII |

| Horizontal | |
|--------------|--|
| Range | 1ns/div~50s/div, 1-2.5-5 increment Roll: 50ms/div - 50s/div |
| Modes | Main, Window, Window Zoom, Roll, X-Y |
| Accuracy | ±0.01% |
| Pre-Trigger | 10 div maximum |
| Post-Trigger | 1000 div |

| X-Y Mode | |
|--------------|---------------|
| X-Axis Input | Channel 1 |
| Y-Axis Input | Channel 2 |
| Phase Shift | ±3° at 100kHz |

| Signal Acquisition | |
|---------------------|--|
| Real-Time | 1G Sa/s maximum |
| Equivalent | 25G Sa/s maximum |
| Vertical Resolution | 8 bits |
| Record Length | Maximum; 2M points (1 channel), 1M points (2 channels) |
| Acquisition | Normal, Peak Detect, Average |
| Peak Detection | 10ns (500ns/div ~ 50s/div) |
| Average | 2, 4, 8, 16, 32, 64, 128, 256 |

| Cursors and Measurement | |
|-------------------------|---|
| Voltage | Vpp, Vamp, Vavg, Vrms, Vhi, Vlo, Vmax, Vmin, Rise Preshoot/ Overshoot, Fall Preshoot/ Overshoot |
| Time | Freq, Period, Rise Time, Fall Time, + Width, - Width, Duty Cycle |
| Delay | FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF |
| Cursors | Voltage difference (ΔV) and Time difference (ΔT) between cursors |
| Auto Counter | Resolution: 6 digits, Accuracy: ±2% Signal source: All available trigger source except the Video trigger |

| Control Panel Function | |
|------------------------|--|
| Autoset | Automatically adjust Vertical Volt/div, Horizontal Time/div, and Trigger level |
| Save/Recall | Up to 15 sets of measurement conditions and waveforms |

| Display | |
|-------------------|--------------------------------------|
| LCD | 5.6 inch, TFT, brightness adjustable |
| Resolution (dots) | 234 (Vertical) x 320 (Horizontal) |
| Graticule | 8 x 10 divisions |
| Display Contrast | Adjustable |

| Interface | |
|---------------------|-------------------------------------|
| USB Slave Connector | USB 2.0 full speed (CDC-ACM) |
| USB Host connector | Image (BMP) and waveform data (CSV) |

| Probe Compensation Signal | |
|---------------------------|-------------------------------------|
| Frequency range | 1kHz ~ 100kHz adjustable, 1kHz step |
| Duty cycle | 5% ~ 95% adjustable, 5% step |
| Amplitude | 2Vpp±3% |

| Power Source | |
|-------------------|-------------------------|
| Line Voltage | 100V~240V AC, 47Hz~63Hz |
| Power Consumption | 18W, 40VA maximum |
| Fuse Rating | 1A slow, 250V |

| Operation Environment | |
|-----------------------|-------------------------------|
| Storage Temperature | -10°C~60°C, no condensation |
| Relative humidity | 93% @ 40°C 65% @ 41°C~60°C |

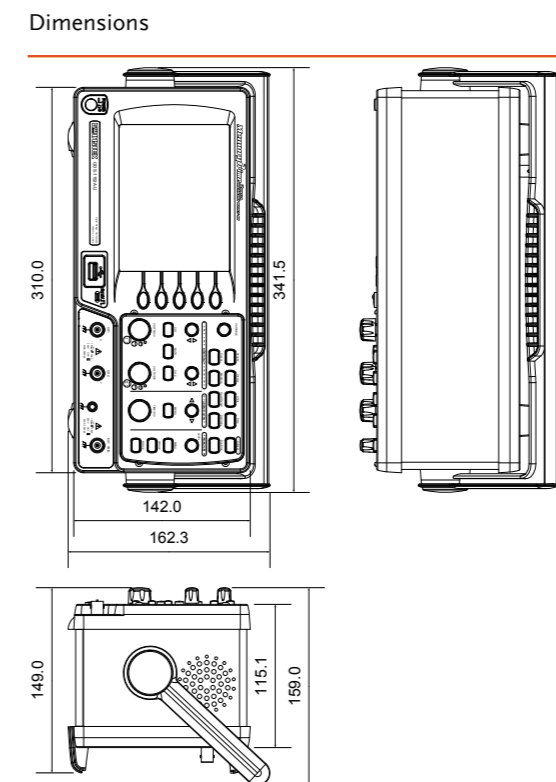
| Dimensions and Weight | |
|-----------------------|-----------------------------|
| Dimensions | 310(W) x 142(H) x 140(D) mm |
| Weight | Approx. 2.5kg |

| Probe Specifications | | |
|--------------------------|--|--|
| GTP-150A-2 (GDS-1152A-U) | | |
| Probe Position | Position x10 | Position x1 |
| Attenuation Ratio | 10:1 | 1:1 |
| Bandwidth | DC ~ 150MHz | DC~6MHz |
| Input Resistance | 10MΩ when used with 1MΩ input | 1MΩ when used with 1MΩ input |
| Input Capacitance | 17pF approx. | 47pF approx. |
| Maximum Input Voltage | 500V CAT I, 300V CAT II (DC+Peak AC) Derating with frequency | 300V CAT I, 150V CAT II (DC+Peak AC) Derating with frequency |
| Temperature | -10°C ~ 55°C | |
| Relative Humidity | ≤85% @35°C | |
| Safety Standard | EN 61010-031 CAT II | |

| GTP-100A-4 (GDS-1102A-U) | | |
|--------------------------|---|---|
| Probe Position | Position x10 | Position x1 |
| Attenuation Ratio | 10:1 | 1:1 |
| Bandwidth | DC ~ 100MHz | DC~6MHz |
| Input Resistance | 10MΩ when used with 1MΩ input | 1MΩ when used with 1MΩ input |
| Input Capacitance | 17pF approx. | 47pF approx. |
| Maximum Input Voltage | 500V CAT I, 300V CAT II (DC+Peak AC)Derating with frequency | 300V CAT I, 150V CAT II (DC+Peak AC)Derating with frequency |
| Temperature | -10°C ~ 55°C | |
| Relative Humidity | ≤85% @35°C | |

| | |
|-----------------|---------------------|
| Safety Standard | EN 61010-031 CAT II |
|-----------------|---------------------|

| GTP-070A-4 (GDS-1072A-U) | | |
|--------------------------|-------------------------------|------------------------------|
| Probe Position | Position x10 | Position x1 |
| Attenuation Ratio | 10:1 | 1:1 |
| Bandwidth | DC ~ 70MHz | DC~6MHz |
| Input Resistance | 10MΩ when used with 1MΩ input | 1MΩ when used with 1MΩ input |
| Input Capacitance | 28pF~32pF | 120pF~220pF |
| Maximum Input Voltage | <600V pk | <200V pk |
| Temperature | -10°C ~ 50°C | |
| Relative Humidity | ≤85% | |



EC Declaration of Conformity

We
GOOD WILL INSTRUMENT CO., LTD.
 No.7-1, Jhongsing Rd., Tucheng Dist., New Taipei City 236, Taiwan
GOOD WILL INSTRUMENT (SUZHOU) CO., LTD.
 No. 69, Lushan Road, Suzhou New District Jiangsu, China
 declares that the below mentioned product
GDS-1072A-U, GDS-1102A-U, GDS-1152A-U
 Are herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Law of Member States relating to Electromagnetic Compatibility (2004/108/EC) and Low Voltage Equipment Directive (2006/95/EC). For the evaluation regarding the Electromagnetic Compatibility and Low Voltage Equipment Directive, the following standards were applied:

| EMC | |
|------------------------------------|--|
| EN 61326-1 : | Electrical equipment for measurement, control and laboratory use — EMC requirements (2006) |
| EN 61326-2-1: | laboratory use — EMC requirements (2006) |
| Conducted and Radiated Emissions | Electrostatic Discharge EN 61000-4-2: 2009 |
| EN 55011: 2009+A1:2010 | |
| Current Harmonic | Radiated Immunity EN 61000-4-3: 2006+A1:2008+A2:2010 |
| EN 61000-3-2: 2006+A1:2009+A2:2009 | |
| Voltage Fluctuation | Electrical Fast Transients EN 61000-4-4: 2004+A1:2010 |
| EN 61000-3-2: 2008 | |
| | Surge Immunity EN 61000-4-5: 2006 |
| | Conducted Susceptibility EN 61000-4-6: 2009 |
| | Power Frequency Magnetic Field EN 61000-4-8: 2010 |
| | Voltage Dips/ Interrupts EN 61000-4-11: 2004 |

| Safety | |
|--|--|
| Low Voltage Equipment Directive 2006/95/EC | |
| Safety Requirements | |
| EN 61010-1: 2010 | |
| EN 61010-2-030 : 2010 | |