Digital Storage Oscilloscope

GDS-1000-U Series

QUICK START GUIDE

GW INSTEK PART NO. 82DS-11102UMA1

Good Will Instrument Co., Ltd. No. 7-1, Jhongsing Rd., Tucheng Dist., New Taipei City 236, Taiwan.

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	Warning: Identifies conditions or practices that could result in injury or loss of life.
Caution	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-1052-U	DC–50MHz (–3dB)	2
GDS-1072-U	DC–70MHz (–3dB)	2
GDS-1102-U	DC–100MHz (–3dB)	2

Performance	• 250MSa/s real-time sampling rate • 25GS/s equivalent-time sampling rate • 4k points record length • Up to 10ns peak detection • 2mV~10V vertical scale • 1ns~50s time scale
Features	• 5.7 inch color TFT display • Saving and recalling setups and waveforms • 19 automatic measurements • Multi-language menu (12 languages) • Math operation: Addition, Subtraction, FFT • Data logging • Go-NoGo testing • Edge, Video, Pulse width triggers
Interface	• USB 2.0 full-speed interface for saving and recalling data • Calibration output • External trigger input • USB B type (slave) interface for remote control

Package Contents and Accessories

Standard Accessories

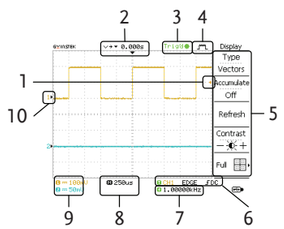
Part Number	Description
82DS-112AUEA1	User Manual CD
82DS-1102UMA1	Quick Start Guide (this document)
GTP-070A-4 for GDS-1052-U, GDS-1072-U	Passive probe, 70MHz, 10x, 1x
GTP-100A-4 for GDS-1102-U	Passive probe, 100MHz, 10x, 1x
Region Dependent	Power cord x1

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

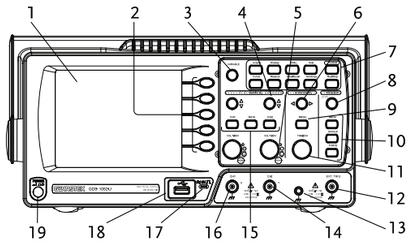
Display and Panel Overview

Display Overview



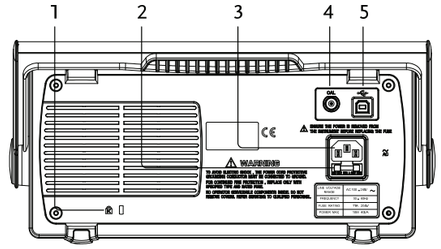
1.	Trigger position	2.	Waveform position
3.	Trigger status	4.	Acquisition
5.	Menu	6.	Trigger condition
7.	Frequency	8.	Horizontal status
9.	Vertical status	10.	Waveform marker

Front Panel



1.	LCD display	2.	Function keys
3.	Variable knob	4.	Vertical position knob
5.	VOLTS/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 type port
19.	Power Switch		

Rear Panel

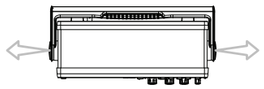


1.	Security lock slot	2.	Fuse socket
3.	Power cord socket	4.	CAL output
5.	USB B type port		

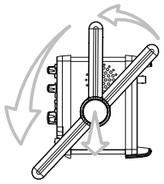
Setting up the Oscilloscope

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.

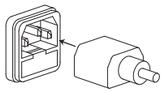
1. Pull both bases of the handle out slightly.



2. Turn to one of the three preset positions.

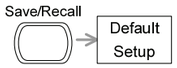


3. Connect the power cord.

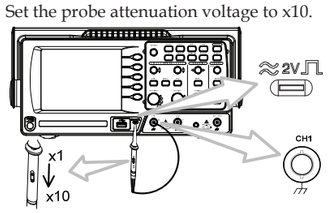


4. Press the power switch. The display will become active in approximately 10 seconds.

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

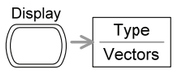


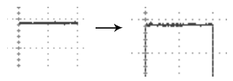
6. Connect the probe between the Channel1 input terminal and probe compensation signal output (2Vp-p, 1kHz square wave).
7. Set the probe attenuation voltage to x10.



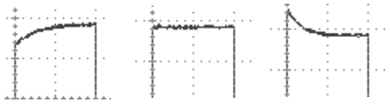
8. Press the Autoset key. A square waveform will appear in the center of the display.

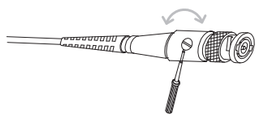
9. Press the Display key, then Type and select the vector waveform type.





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.

Resolution (dots)	234 (Vertical) x 320 (Horizontal)
Graticule	8 x 10 divisions
Display Contrast	Adjustable

Interface

USB Slave Connector	USB1.1 & 2.0 full speed compatible (flash disk not supported)
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	-20°C~70°C, no condensation
Relative humidity	80% @ 70°C

Dimensions and Weight

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

SPECIFICATIONS

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

Model Specific Specifications

GDS-1052-U

Bandwidth (–3dB)	DC coupling: DC ~ 50MHz AC coupling: 10Hz ~ 50MHz
Bandwidth Limit	20MHz (–3dB)
Trigger Sensitivity	0.5div or 5mV (DC ~ 25MHz) 1.5div or 15mV (25MHz~50MHz)
External Trigger Sensitivity	~ 50mV (DC~25MHz) ~ 100mV (25MHz~50MHz)
Rise Time	< 14ns approx.

GDS-1072-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 Sensitivity	~ 50mV (DC~25MHz) ~ 100mV (25MHz~70MHz)
Rise Time	< 5.8ns approx.

GDS-1102-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 Sensitivity	~ 50mV (DC~25MHz) ~ 100mV (25MHz~100MHz)
Rise Time	< 3.5ns 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	AC, DC, Ground
Input Impedance	1MΩ±2%, ~15pF
Polarity	Normal, Invert
Maximum Input	300V (DC+AC peak), CAT II
Math Operation	+, –, FFT
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

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	250M Sa/s maximum
Equivalent	25G Sa/s maximum
Vertical Resolution	8 bits
Record Length	4k points Maximum
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
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	5.7 inch, TFT, brightness adjustable

Probe Specifications

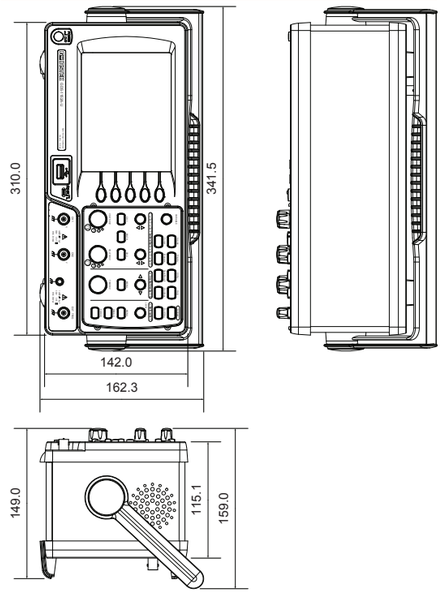
GTP-070A-4 (GDS-1052-U, GDS-1072-U)

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	≤600Vpk, Derating with frequency	≤200Vpk, Derating with frequency
Temperature	–10°C ~ 50°C	
Relative Humidity	≤85% @35°C	
Safety Standard	EN 61010-031 CAT II	

GTP-100A-4 (GDS-1102-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	14.5~17.5pF approx.	85~115pF approx.
Maximum Input Voltage	≤600Vpk, Derating with frequency	≤200Vpk, Derating with frequency
Temperature	–10°C ~ 50°C	
Relative Humidity	≤85% @35°C	
Safety Standard	EN 61010-031 CAT II	

Dimensions



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-1052-U, GDS-1072-U, GDS-1102-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 : EN 61326-2-1:	Electrical equipment for measurement, control and laboratory use — EMC requirements (2006)
Conducted and Radiated Emissions EN 55011: 2009+A1:2010	Electrostatic Discharge EN 61000-4-2: 2009
Current Harmonic EN 61000-3-2: 2006+A1:2009+A2:2009	Radiated Immunity EN 61000-4-3: 2006+A1:2008+A2:2010
Voltage Fluctuation EN 61000-3-2: 2008	Electrical Fast Transients EN 61000-4-4: 2004+A1:2010
----------	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/ InterruptsIEC EN 61000-4-11: 2004

◎ Safety

Low Voltage Equipment Directive 2006/95/EC
Safety Requirements IEC/EN 61010-1: 2001