Digital Storage Oscilloscope

GDS-1000B Series

QUICK START GUIDE

GW INSTEK PART NO. 82DS-1KB00MA1

ISO-9001 CERTIFIED MANUFACTURER

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-1072B	70MHz	2
GDS-1102B	100MHz	2
GDS-1054B	50MHz	4
GDS-1074B	70MHz	4
GDS-1104B	100MHz	4

Features

- 7 inch, 800 X 480 TFT WVGA display.
- Models available from 50MHz to 100MHz.
- Real-time sampling rate of 1GSa/s, max.
- Record length: 10M points record length.
- Waveform capture rate of 50,000 waveforms per second.
- Vertical sensitivity: 1mV/div~10V/div.
- On-screen Help.
- 32 MB internal flash disk.
- Go-NoGo app.
- Remote Disk app (4 ch. only).

Interface

- USB host port: front panel, for storage devices.
- USB device port: rear panel, for remote control or printing (to PictBridge compatible printers).
- Probe compensation output with selectable output frequency (1kHz ~ 200kHz).
- Ethernet port (GDS-1054B, GDS-1074B, GDS-1104B only).
- Calibration output.

Package Contents and Accessories

Standard Accessories

Item	Part Number
User manual CD	82DS-1KB00E*1
Quick Start Guide (this document)	82DS-1KB00M*1
Passive Probe; 70 MHz for GDS-1054B, GDS-1072B, GDS-1074B	GTP-070B-4
Passive Probe; 100 MHz for GDS-1102B, GDS-1104B	GTP-100B-4
Power Cord x1	Region Dependent

Optional Accessories

Item	Part Number
Instrument cart, 470(W) x 430(D)mm (U.S. type input socket)	GTC-001
Instrument cart, 330(W) x 430(D)mm (U.S. type input socket)	GTC-002
Test lead, BNC to BNC heads	GTL-110
USB cable, USB2.0A-B type cable 4P	GTL-242
Passive Probe; 70 MHz	GTP-070B-4
Passive Probe; 100 MHz	GTP-100B-4

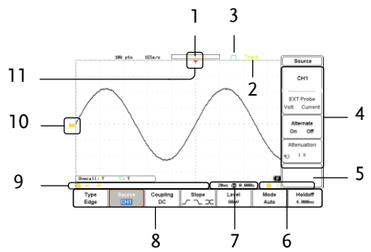
Standard Apps*

Name	Description
Go-NoGo	Go-NoGo testing app.
Remote Disk	Allows the scope to mount a network share drive (4 channel models only).

*Optional apps are available as a free download from the GW Instek website at www.gwinstek.com.

Display and Panel Overview

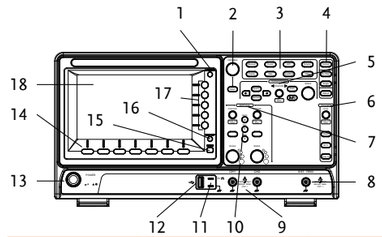
Display Overview



Description

1.	Memory Bar	2.	Trigger Status
3.	Acquisition Status	4.	Side Menu
5.	Waveform Frequency	6.	Trigger Configuration
7.	Horizontal status	8.	Bottom Menu
9.	Channel Status	10.	Channel/Reference/ Math Indicators
11.	Horizontal Position		

Front Panel

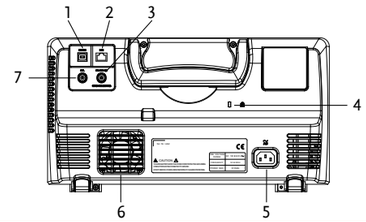


Description

1.	Hardcopy key	2.	Variable knob and Select key
3.	Function keys	4.	Autoset, Run/Stop, Single & Default keys
5.	Horizontal and Search* controls	6.	Trigger controls
7.	Vertical controls	8.	EXT trigger input (2CH only)
9.	Analog channel inputs	10.	Math, Reference & Bus* keys
11.	Probe calibration output	12.	USB Host port
13.	Power button	14.	Bottom menu keys
15.	Option* key	16.	Menu off key
17.	Side menu keys	18.	LCD

*The Bus, Search and Option keys are not available on the GDS-1000B.

Rear Panel



Description

1.	USB device port	2.	LAN port (GDS-1054B, GDS-1074B, GDS-1104B only)
3.	Go-NoGo output	4.	Key lock slot
5.	Power input socket	6.	Fan
7.	Calibration output		

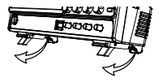
Setting up the Oscilloscope

This section describes how to set up the oscilloscope properly including setting the stand, installing the optional modules and compensating the probe.

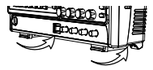
Tilting the Stand

The GDS-1000B has two adjustable tabs at the front that can be used to position the instrument into two preset orientations.

1. Pull the tabs out to lean the scope back.



2. Push the tabs under the casing to stand upright.

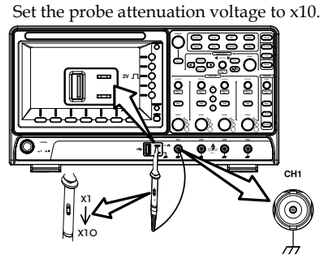


Probe Compensation

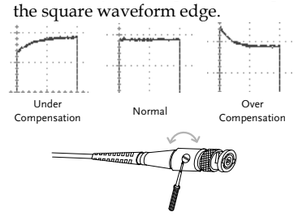
This section describes how to connect a signal, adjust the scale, and compensate the probe. Before operating the GDS-1000B in a new environment, run these steps to make sure the instrument performs at its full potential.

1. Press the Default key to reset the system to the factory settings.
2. Connect the probe to the Channel 1 input and to the probe calibration output. This output provides a 2Vp-p, 1kHz square wave for signal compensation by default.

3. Set the probe attenuation voltage to x10.



4. Press the Autoset key.
5. A square waveform will appear in the center of the display.
6. Press the Display key and select the Vector waveform type from the bottom menu.
7. Turn the adjustment point on the probe to flatten the square waveform edge.



8. 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-1054B

Bandwidth (–3dB)	DC coupling: DC ~ 50MHz
Channels	4
Rise Time	7ns
Bandwidth Limit	20MHz

GDS-1072B & GDS-1074B

Bandwidth (–3dB)	DC coupling: DC ~ 70MHz
Channels	2 + EXT (GDS-1072B) 4 (GDS-1074B)
Rise Time	5ns
Bandwidth Limit	20MHz

GDS-1102B & GDS-1104B

Bandwidth (–3dB)	DC coupling: DC ~ 100MHz
Channels	2 + EXT (GDS-1102B) 4 (GDS-1104B)
Rise Time	3.5ns
Bandwidth Limit	20MHz

Common Specifications

Vertical

Resolution	8 bit :1mV~10V/div
Input Coupling	AC, DC, GND
Input Impedance	1MΩ// 16pF approx
DC Gain Accuracy	1mV: ±4% full scale >2mV: ±3% full scale
Polarity	Normal & Invert
Maximum Input Voltage	300Vrms, CAT I
Offset Position Range	1mV/div: ±1.25V 2mV/div ~ 100mV/div: ±2.5V 200mV/div ~ 10V/div: ±125V
Waveform Signal Process	+, -, ×, ÷, FFT, FFTrms, User defined expression FFT: Spectral magnitude. Set FFT Vertical Scale to Linear RMS or dBV RMS, and FFT Window to Rectangular, Hamming, Hanning, or Blackman-Harris

External Trigger

Range	±15V
Sensitivity	DC ~ 100MHz Approx. 100mV
Input Impedance	1MΩ±3% ~ 16pF

Trigger

Source	CH1, CH2, CH3*, CH4*, Line, EXT** *4 channel models only. **2 channel models only.
Trigger Mode	Auto (supports Roll Mode for 100 ms/div and slower), Normal, Single
Trigger Type	Edge, Pulse Width(Glitch), Video, Pulse Runt, Rise & Fall, Timeout, Alternate, Event-Delay (1~65535 events), Time-Delay (Duration: 4ns~10s)
Holdoff range	4ns to 10s
Coupling	AC, DC, LF rej., Hf rej., Noise rej.
Sensitivity	1 div

Horizontal

Timebase Range	5ns/div ~ 100s/div (1-2-5 increments) ROLL: 100ms/div ~ 100s/div
Pre-trigger	10 div maximum
Post-trigger	2,000,000 div maximum
Timebase Accuracy	±50 ppm over any ≥ 1ms time interval
Real Time Sample Rate	1GSa/s, max.
Record Length	Maximum 10Mpts
Acquisition Mode	Normal, Average, Peak Detect, Single
Peak Detection	2ns (typical)
Average	Selectable from 2 to 256

X-Y Mode

X-Axis Input	Channel 1; Channel 3* *4 channel models only.
Y-Axis Input	Channel 2; Channel 4* *4 channel models only.
Phase Shift	±3° at 100kHz

Cursors and Measurement

Cursors	Amplitude, Time, Gating available; Unit: seconds(s), Hz(1/s), Phase(degree), Ration(%)
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
Cursors measurement	Voltage difference between cursors (ΔV) Time difference between cursors (ΔT)
Auto counter	6 digits, range from 2Hz minimum to the rated bandwidth

Control Panel Function

Autoset	Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with undo Autoset
Save Setup	20set
Save Waveform	24set

Display

TFT LCD Type	7" TFT WVGA color display
Display Resolution	800 horizontal × 480 vertical pixels (WVGA)
Interpolation	Sin(x)/x
Waveform Display	Dots, vectors, variable persistence (16ms~4s), infinite persistence
Waveform Update Rate	50,000 waveforms per second, maximum
Display Graticule	8 x 10 divisions
Display Mode	YT, XT

Interface

USB Port	USB 2.0 High-speed host port X1, USB High-speed 2.0 device port X1
Ethernet Port	RJ-45 connector, 10/100Mbps with HP Auto-MDIX. (Only for the GDS-1054B, GDS-1074B, GDS-1104B)
Go-NoGo BNC	5V Max/10mA TTL open collector output
Kensington Style Lock	Rear-panel security slot connects to standard Kensington-style lock

Miscellaneous

Multi-language menu	Available
Operation Environment	Temperature: 0°C to 50°C Relative Humidity: ≤ 80% at 40°C or below; ≤ 45% at 41°C ~ 50°C
On-line help	Available
Dimensions	384mm x 208mm x 127.3mm
Weight	2.8kg

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-1054B, GDS-1072B, GDS-1074B, GDS-1102B, GDS-1104B
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 & 2014/30/EU) and Low Voltage Equipment Directive (2006/95/EC & 2014/35/EU). 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 (2013)
Conducted & Radiated Emission EN 55011: 2009+A1: 2010	Electrostatic Discharge EN 61000-4-2: 2009
Current Harmonics EN 61000-3-2: 2006+A1: 2009+A2: 2009	Radiated Immunity EN 61000-4-3: 2006+A1: 2008 +A2 : 2010
Voltage Fluctuations EN 61000-3-3:2013	Electrical Fast Transients EN 61000-4-4: 2012
----------	Surge Immunity EN 61000-4-5: 2006
----------	Conducted Susceptibility EN 61000-4-6: 2014
----------	Power Frequency Magnetic Field EN 61000-4-8: 2010
----------	Voltage Dip/ Interruption EN 61000-4-11: 2004

◎ Safety

Low Voltage Equipment Directive 2006/95/EC
Safety Requirements EN 61010-1: 2010 (Third Edition); EN 61010-2-030: 2010 (First Edition)