SIGLENT®

TELONIC
TEST INSTRUMENTS & POWER SUPPLIES
01189 786911 TELONIC.CO.UK
ESTABLISHED OVER 50 YEARS SINCE 1966

nqa ISO 9001 QUALITY MANAGEMENT
UKAS MANAGEMENT SYSTEMS 0015

SDG1000X Series
Function/Arbitrary
Waveform Generator

Quick Start

QS0201X-E01B

Copyright

- ©SIGLENT TECHNOLOGIES CO., LTD. All rights reserved.
- Information in this publication replaces all previous corresponding material.
- SIGLENT reserves the rights to change the specifications and the price.
- Contents of this manual are not allowed to be copied, extracted, or translated without the permission of Siglent Technologies.

General Safety Summary

Carefully read the following safety precautions to avoid any personal injuries or damages to the instrument and any product connected to it. To avoid potential hazards, please use the instrument as specified.

Any service on this instrument should be performed by qualified repair personnel only.

Avoid exposing this instrument to fire.

Always use a proper power line voltage.

Power this instrument only with the specified power line voltage approved by local regulations.

Ground the Instrument.

The instrument is grounded through the protective ground conductor of the power line. To avoid electric shock, the ground conductor must be connected to the ground. Make certain the instrument is grounded correctly before connecting its input or output terminals.

Connect the signal wire correctly.

The potential of the signal wire ground is equal to the earth potential, Remove do not connect the signal wire to a high voltage. Do not touch the exposed contacts or components.

Observe all terminal ratings.

To avoid fire or electric shock, please observe all ratings and labels on the instrument. Before connecting the instrument, please read the manual carefully to gain more information about the ratings.

Do not operate any instrument that is suspected of being defective.

If you suspect that the product is damaged, please have it checked by qualified technical personnel.

Avoid contact with exposed circuits or wires.

Do not touch exposed contacts or components when thethe instrument is powered on.

Do not operate in wet/damp conditions.

Do not operate in an explosive atmosphere.

Keep the surface of the instrument clean and dry.

Safety Terms and Symbols

Terms used on the instrument. Terms may appear on the instrument:

DANGER: Indicates an injury or hazard that may immediately happen.

WARNING: Indicates an injury or hazard that may not immediately happen.

CAUTION: Indicates that a potential damage to the instrument or other property might occur.

Symbols used on the instrument. Symbols may appear on the instrument:

Hazardous Voltage	Warning	Protective Earth Ground	Chassis Ground	Power Switch

Content

Adjust the Handle

When using the instrument, users can adjust the handle to a desired position for optimum use.
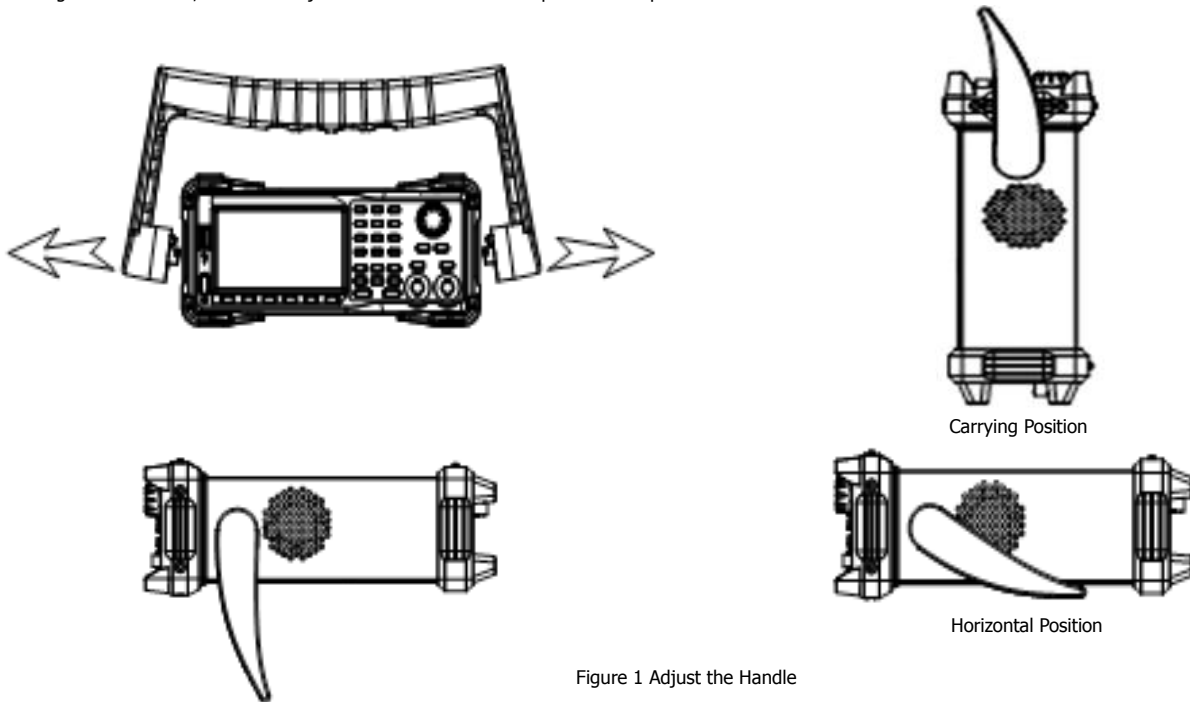

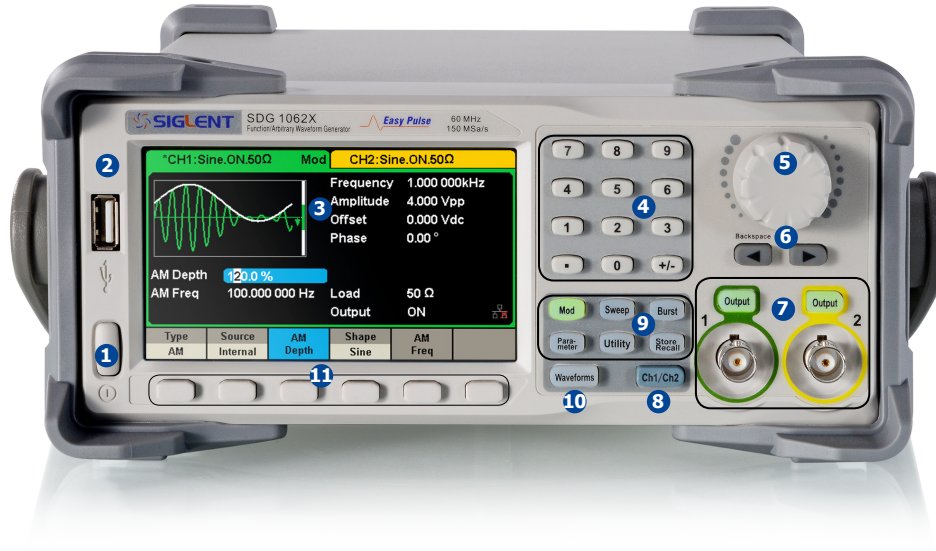
Carrying Position

Horizontal Position

Figure 1 Adjust the Handle

The Front Panel

The figure below shows the SDG1000X's front panel layout:

1. Power Switch
2. USB Host
3. User Interface
4. Numeric Keyboard
5. Knob
6. Arrow Keys
7. CH1/CH2 Control/ Output Port
8. Channel Select Key
9. Function Keys
10. Waveform Option Key
11. Menu Softkeys

Figure 2 SDG1000X Front Panel

1.Power Switch

This switch is used to turn on/off the SDG1000X. When the power switch is off, SDG1000X is in the power off state.

2.USB Host

SDG1000X supports U-Disk using FAT format. It is used to read waveforms or state files from a U-Disk or store the current state of the instrument to the U-Disk. Users can update the firmware through a U-Disk.

3.User Interface

SDG1000X has a 4.3 inch TFT-LCD screen, which displays current function menu, parameter settings, system state, prompts, etc. For detailed information, please refer to "User Interface".

4.Numeric Keyboard

Consists of numbers from 0 to 9, radix points "." and symbol keys "+/-", which are used to input parameters.
Note: To enter a negative number, please enter a symbol "-" .

5.Knob

Used to increase (clockwise) or decrease (counterclockwise) the current numerical value when setting parameter values.

The knob is also used to switch characters in the soft keyboard when inputting a file name.

When saving or reading files, rotate the knob to choose a position to save a file or choose a file to be read; press the knob to open a selected folder or file.

When choosing Waveforms → Page 1/2 → Arb → Arb Type rotate the knob to select a desired built-in or stored waveform.

6.Arrow Keys

When using knob to set parameters, the arrow keys are used to select the digit to be modified.

When using the numeric keyboard to set parameters, the left arrow key is used as a Backspace function.

When inputting a file name, the arrow keys are used to move the position of the cursor

7.Channel Control Area

CH1 Control/Output Key

The **Output** key on the left is used to turn on/off CH1 output.

The nominal output impedance of the BNC connector is 50 Ω.

When pressing **Output** (the key backlight turns on), the connector outputs the waveform according to the current configuration of CH1.

CH2 Control/Output Key

The **Output** key on the right is used to turn on/off CH2 output.

The nominal output impedance of the BNC connector is 50 Ω.

When pressing **Output** (the key backlight turns on), the connector outputs the waveform according to the current configuration of CH2.

> **CAUTION:**
>
> Overvolltage protection of CH1 and CH2 will take effect once any of the following conditions is met. When overvoltage protection occurs, a warning message will be displayed and the output is disabled.
>
> • The absolute value of the input voltage is higher than 11 V ± 0.5 V when the amplitude of the generator is higher than or equal to 2 Vpp or the DC offset is higher than or equal to $|3 V_{DC}|$ (under HighZ load).
>
> • The absolute value of input voltage is higher than 4 V ± 0.5 V when the amplitude of the generator is lower than 2 Vpp and the DC offset is lower than $|3 V_{DC}|$ (under HighZ load).
>
> Choose **Utility** → **Page 1/2** → **OverVoltage Protection** to turn on/off the function.

8.Channel Select Key

This key is used to toggle the currently selected channel between CH1 and CH2.

9.Function Keys

Mod ----**Modulation**

This key is used to enable the modulation screen and allow for several types of modulation. Types include AM, DSB-AM, FM, PM, ASK, FSK, PSK and PWM modulated signals.

• Both "Internal" and "External" modulation sources are supported.

• The corresponding key backlight will turn on when this function is selected.

Sweep ----**Sweep**

This key is used to generate sweeping frequency signals of Sine, Square, Ramp and Arbitrary functions.

• The Sweep mode supports "Linear" and "Log" sweep profiles.

• Sweep supports "Internal", "External" and "Manual" trigger sources.

• The corresponding key backlight will turn on when this function is selected.

Burst ----**Burst**

This key is used to generate burst signals of Sine, Square, Ramp, Noise and Arbitrary functions.

• The Burst mode supports "NCycle", "Gated" and "Infinite" burst modes.

• Noise can only be used to generate gated burst.

• This mode supports "Internal", "External" and "Manual" trigger sources.

The corresponding key backlight will turn on when this

Parameter ----**Parameter Setting**

Users can switch directly to the parameter setting interface by pressing this key.

• The corresponding key backlight will turn on when this function is selected.

Utility ----Utility Functions and System Settings

This key is used to set system parameters and check version information.

•Press this key and then press the help softkey to obtain built-in help information about the product.

•The corresponding key backlight will turn on when this function is selected.

Store/Recall ----Store and Recall

Store/recall the instrument's state or arbitrary waveform data edited by users.

• Supporting the file management system, users can perform general file operations.

• In addition to the built-in nonvolatile memory (C disk), an external U-Disk (D disk) can also be used.

• The corresponding key backlight will turn on when this function is selected.

10.Waveform Option

The backlight of Waveforms will turn on when this function is selected. The user can choose Sine, Square, Ramp, Pulse, Noise, DC and Arb.

Waveforms ---- Sine

Provides sine waveform output which ranges from 1 µHz to 60 MHz.

• "Frequency/Period", "Amplitude/High level", "Offset/Low level" and "Phase" of the sine waveform can be modified.

• The Harmonics function can also be accessed.

Waveforms ---- Square

Provides square waveform output which ranges from 1 µHz to 60 MHz.

• "Frequency/Period", "Amplitude/High level", "Offset/Low level", "Phase" and "DutyCycle" of the square waveform can be modified.

Waveforms ---- **Ramp**

Provides ramp waveform output which ranges from 1 μHz to 500 kHz.

• "Frequency/Period", "Amplitude/High level", "Offset/Low level", "Phase" and "Symmetry" of the ramp waveform can be modified.

Waveforms ---- **Pulse**

Provides pulse waveform output which ranges from 1 μHz to 12.5 MHz.

• "Frequency/Period", "Amplitude/High level", "Offset/Low level", "Pulse Width/DutyCycle", "Rise/Fall" and "Delay" of the pulse waveform can be modified.

Waveforms ---- **Noise**

Provides White Gaussian Noise output with a bandwidth of 60 MHz.

• "Stdev" and "Mean" of the noise signal can be modified.

Waveforms ---- **DC**

Provides DC signal output with level up to ±10 V into HighZ load or ±5 V into 50Ω load

• "DC Offset" of the DC signal can be modified.

Waveforms ---- **Arb**

Provides arbitrary waveform output which ranges from 1 μHz to 6 MHz.

• Built-in waveforms include Cardiac, Gauspuls, ExpRise and ExpFall, etc. In addition, the waveform stored in the U-Disk can be output.

• Users can edit arbitrary waveforms through EasyWaveX and download them to the instrument.

"Frequency/Period", "Amplitude/High level", "Offset/Low level" and "Phase" of the arbitrary waveform can be modified.

11.Menu Softkeys

These keys correspond to the menu displayed above them on the screen. Press any key to activate the corresponding menu.

Figure 3 SDG1000X Rear Panel

1.Counter

BNC connector. The input impedance is 1 MΩ. This connector is used to accept the signal measured by the frequency counter.

2.Aux In/Out

BNC connector. The function of this connector is determined by the current operating mode of the instrument.

• Sweep/Burst trigger signal input port of external trigger.

• Sweep/Burst trigger signal output port of internal/manual trigger.

• Burst gating trigger input port.

• Synchronization output port. When synchronization is enabled, the port can output a CMOS signal with the same frequency as basic waveforms (except Noise and DC), arbitrary waveforms, and modulated waveforms (except external modulation).

• AM, DSB-AM, FM, PM, ASK, FSK, PSK and PWM external modulation signal input port.

3.10 MHz Clock Input/Output Port

BNC connector. The function of this connector is determined by the type of the clock source.

• If the instrument is using its internal clock source, the connector outputs the 10 MHz clock signal generated by the crystal oscillator inside the generator.

• If the instrument is using an external clock source, the connector accepts an external 10 MHz clock source.

4.Earth Terminal

The Earth Terminal is used to ground the instrument.

5.AC Power Supply Input

SDG1000X can accept two different types of AC input power.

AC power: 100-240V, 50/60Hz or 100-120V, 400Hz

Fuse: 1.25A, 250V

6.USB Device

Used when connecting the instrument to an external computer to allow waveform editing (i.e., EasyWaveX) and remote control.

7.LAN Interface

Through this interface, the generator can be connected to a computer or network for remote control. An integrated testing system may be built, as the generator conforms to the VXI-11 class standard of LAN-based instrument control.

SDG1000X can only display parameters and waveform of one channel at a time. The picture below shows the interface when CH1 is selected and AM modulation of a sine wave function is selected. The information displayed may vary depending on the function selected.
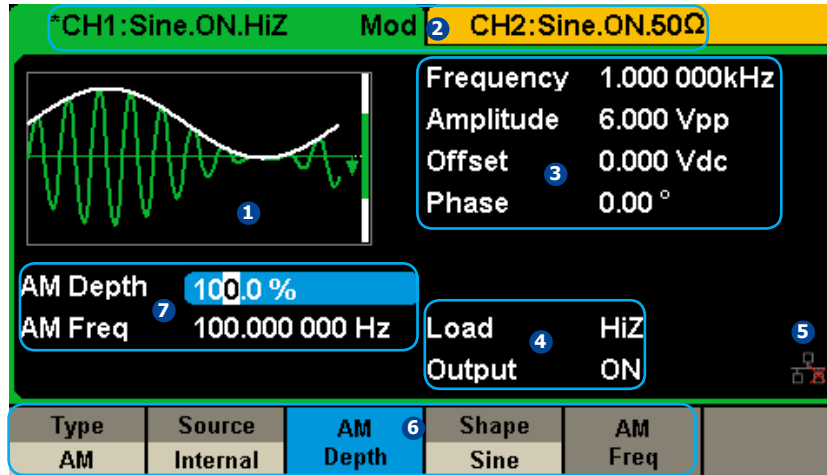

Figure 4 User Interface

1.Waveform Display Area

Displays the currently selected waveform of each channel.

2.Channel Status Bar

Indicates the selected status and output configuration of the channels.

3.Basic Waveform Parameters Area

Shows the current waveform's parameters of each channel. Press Parameter and select the corresponding softkey to highlight the parameter to configure. Then use number keys or knob to change the parameter value.

4.Channel Parameters Area

Displays the load and output settings of the currently selected channel.

Load ----Value of the output load, as selected by the user.

Press **Utility** → **Output** → **Load**, then use the softkeys, number keys or knob to change the parameter value; or continue pressing the corresponding output key for two second to switch between High Impedance and 50 Ω.

High Impedance: display HiZ.

Load: display impedance value (the default is 50 Ω and the range is 50 Ω to 100 kΩ).

Note: This setting does not actually change the instrument's output impedance of 50 Ω but rather is used to maintain amplitude accuracy into different load values.

Output ----Channel output state.

After pressing corresponding channel output control port, the current channel can be turned on/off.

5.LAN Status Icon

SDG1000X will show different prompt messages based on the current network status.

This mark indicates LAN connection is successful.

This mark indicates there is no LAN connection or LAN connection is unsuccessful.

6.Menu

Shows the menu corresponding to the displayed function. For example, Figure 4 shows the parameters of "AM modulation".

7.Modulation Parameters Area

Shows the parameters of the current modulation function. After selecting the corresponding menu, use number keys or knob to change the parameter value.

Using the Built-In Help System

To obtain built-in help information, press Utility key first, then press Page 1/2 and Help . Use the knob to choose the help item you want and then press Select to obtain help information.

The common help information is listed as the following:

1.System information.

2.Generating a standard waveform.

3.Generating an arbitrary waveform.

4.Generating a modulated waveform.

5.Sweep function.

6.Burst function.

7.Store/Recall.

8.Synchronizing multiple instruments.

9.Restoring factory settings.

10.Technical support.

Introduction to EasyWaveX

The SDG1000X series includes arbitrary waveform editing software called EasyWaveX. This software is a platform for easily creating, editing, and transferring waveforms to the generator. It provides 11 standard waveforms such as Sine, Square, Ramp, Pulse, Noise and DC, which meets most engineers' basic needs. In addition, it provides several ways of manual drawing, point-to-point line drawing and arbitrary point drawing. EasyWaveX allows for fast and easy creation of complex waveforms.

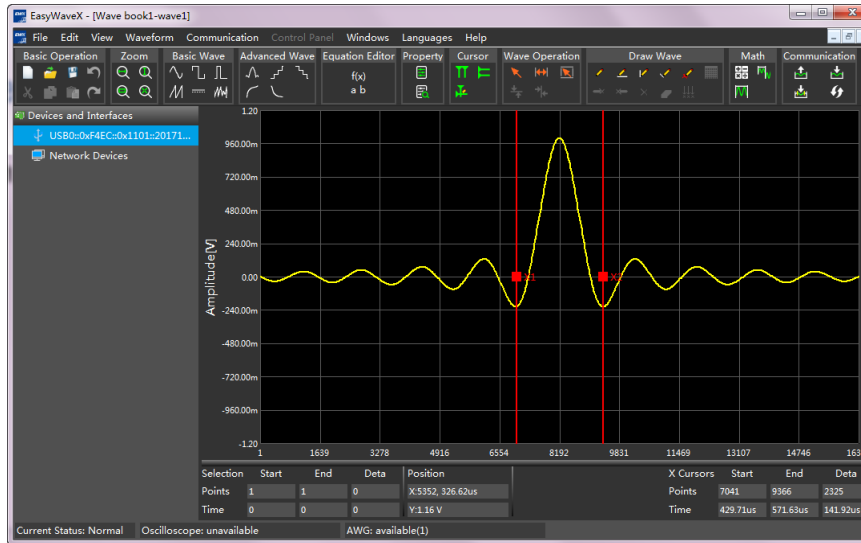The main interface of EasyWaveX is shown in the following figure.

Figure 5 EasyWaveX Interface

Contact SIGLENT

Headquarters:

SIGLENT Technologies Co., Ltd

Add: Bldg No.4 & No.5, Antongda Industrial Zone, 3rd Liuxian Road, Bao'an District, Shenzhen, 518101, China

Tel: + 86 755 3688 7876

Fax: + 86 755 3359 1582

Email: sales@siglent.com

Website: int.siglent.com

USA:

SIGLENT Technologies America, Inc

6557 Cochran Rd Solon, Ohio 44139

Tel: 440-398-5800

Toll Free: 877-515-5551

Fax: 440-399-1211

Email: info@siglent.com

Website: www.siglentna.com

Europe:

SIGLENT Technologies Germany GmbH

Add: Liebigstrasse 2-20, Gebaeude 14, 22113 Hamburg Germany

Tel: +49(0)-819-95946

Fax: +49(0)-819-95947

Email: info-eu@siglent.com

Website: www.siglenteu.com