SDG3000X Series Arbitrary Waveform Generator

Quick Start

EN01A

SIGLENT TECHNOLOGIES CO., LTD.

Copyright Information

Declaration

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Contents

General Safety Summary

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

To Avoid Fire or Personal Injure.

Use the Proper Power Cord

Only the power cord designed for the instrument and authorized by local government regulations should be used.

Ground the Instrument

The instrument is grounded through the protective earth conductor of the power cord. To avoid electric shock, please make certain the instrument is grounded correctly before connecting its input or output terminals.

Connect the Signal Cable Correctly

The potential of the signal cable ground is equal to the earth ground. Do not connect the signal wire to a high voltage.

Look Over All Terminal Ratings

To avoid fire or electric shock, please look over all ratings and sign instructions of the instrument. Before connecting the instrument, please read the manual carefully to gain more information about the ratings.
Equipment Maintenance and Service.
In the event of an equipment failure, please do not dismantle the machine for maintenance. The equipment contains capacitors, power supply, transformers and other energy storage devices which may cause high voltage damage. The internal devices of the equipment are sensitive to static electricity and direct contact can easily cause irreparable damage to the equipment. It is necessary to return to the factory or to the company's designated maintenance organization for maintenance. Be sure to pull out the power cord before repairing the equipment. Live line operation is strictly prohibited. The equipment can only be powered on when the maintenance is completed and the maintenance is confirmed to be successful.

Identification of Normal State of Equipment.

After the equipment is started, there will be no alarm information and error information at the interface under normal conditions. The curve of the interface will scan from left to right freely; if there is a button in the scanning process or there is alarm or error prompt, the device may be in an abnormal state. You need to view the specific prompt information. You can try to restart the setting. If the fault information is still in

place, do not use it for testing. Contact the manufacturer or the maintenance department designated by the manufacturer to carry out maintenance to avoid the wrong test data caused by the use of the fault or endanger the personal safety.

Do Not Operate with Suspected Failures.

If you suspect that there is damage to the instrument, please let only qualified service personnel check it.

Avoid Exposed Circuits, Wire, or Components.

Do not touch exposed contacts or components when the power is on.

Do not operate in wet/damp conditions.

Do not operate in an explosive atmosphere.

Keep the surface of the instrument clean and dry.

Only lithium batteries with the same specification could be used to replace the battery on the main board.

The responsible body or operator should refer to the instruction manual to preserve the protection afforded by the equipment. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Any parts of the device and its accessories are not allowed to be changed or replaced, other than authorized by the manufacturer or agent.

Safety Terms and Symbols

Terms used in this product. These terms may appear in the product:

DANGER	Indicates direct injury or hazards that may happen.
WARNING	Indicates potential injury or hazards that may happen.
CAUTION	Indicates potential damage to the instrument or other property that may happen.

Symbols used in this product. These symbols may appear on the product:


Hazardous Voltage


Warning


Protective Earth Ground


Earth Ground


Power Switch

Allgemeine Sicherheitsübersicht

Lesen Sie die folgenden Sicherheitshinweise sorgfältig durch, um Verletzungen oder Schäden am Gerät und an den daran angeschlossenen Produkten zu vermeiden. Um mögliche Gefahren zu vermeiden, verwenden Sie das Gerät bitte wie angegeben.

Verwenden Sie ein geeignetes Netzkabel

Verwenden Sie nur das für das Gerät vorgesehene und im jeweiligen Land zugelassene Netzkabel.

Erden Sie das Gerät

Das Gerät ist über den Schutzleiter der Netzleitung geerdet. Um einen elektrischen Schlag zu vermeiden, vergewissern Sie sich bitte, dass das Gerät korrekt geerdet ist, bevor Sie die Eingangs- oder Ausgangsklemmen des Geräts anschließen.

Schließen Sie das Messkabel richtig an

Die Kabelschirmung (Masse) des Messkabels ist gleich dem Potential der Erde, schließen Sie das Messkabel also nicht an eine hohe Spannung an.

Überprüfen Sie die Nennwerte aller Klemmen

Um Feuer oder einen elektrischen Schlag zu vermeiden, beachten Sie bitte alle Angaben und Hinweise auf dem Gerät. Bevor Sie das Gerät anschließen, lesen Sie bitte das Handbuch sorgfältig durch, um weitere Informationen über die Nennwerte zu erhalten.

Verwenden Sie einen ordnungsgemäßen Überspannungsschutz

Stellen Sie sicher, dass keine Überspannung (z. B. durch ein Gewitter) an das Gerät gelangen kann, da sonst die Gefahr eines elektrischen Schlages besteht.

Schutz vor Elektrostatik

Betreiben Sie das Gerät in einer Umgebung, die vor elektrostatischer Entladung geschützt ist, um Schäden durch statische Entladung zu vermeiden. Erden Sie vor dem Anschließen immer sowohl den Innen- als auch den Außenleiter des Kabels, um statische Aufladung abzubauen.

Für gute Belüftung sorgen

Eine unzureichende Belüftung kann zu einem Temperaturanstieg führen, der schließlich das Gerät beschädigt. Sorgen Sie daher für eine gute Belüftung und überprüfen Sie regelmäßig die Ansaugung und den Lüfter.

Vermeiden Sie freiliegende Schaltkreise oder Komponenten

Berühren Sie keine freiliegenden Kontakte oder Bauteile, wenn das Gerät eingeschaltet ist.

Richtige Sicherung verwenden

Verwenden Sie nur die angegebene Sicherung.

Betreiben Sie das Gerät nicht ohne Abdeckungen

Betreiben Sie das Gerät nicht, wenn Abdeckungen oder Verkleidungen entfernt sind.

Betreiben Sie das Gerät nicht bei vermuteten Defekten

Wenn Sie vermuten, dass das Gerät beschädigt ist, lassen Sie es vor dem weiteren Betrieb von qualifiziertem Servicepersonal überprüfen. Jegliche Wartung, Einstellung oder Austausch, insbesondere von Schaltkreisen oder Zubehör, muss von SIGLENT autorisiertem Personal durchgeführt werden.

Nicht in feuchter Umgebung betreiben

Um einen Kurzschluss im Geräteinneren oder einen elektrischen Schlag zu vermeiden, betreiben Sie das Gerät nicht in feuchter Umgebung.

Betreiben Sie das Gerät nicht in explosionsgefährdeten Umgebungen

Um Schäden am Gerät oder Personenschäden zu vermeiden, ist es wichtig, das Gerät nicht in explosionsgefährdeter Umgebung zu betreiben.

Halten Sie die Produktoberflächen sauber und trocken

Um den Einfluss von Staub und/oder Feuchtigkeit in der Luft zu vermeiden, halten Sie die Oberfläche des Geräts bitte sauber und trocken.

Sicherheit bei der Handhabung

Bitte behandeln Sie das Gerät während des Transports vorsichtig, um Schäden an Tasten, Drehknopfschnittstellen und anderen Teilen auf den Bedienfeldern zu vermeiden.

Es dürfen nur Tastköpfe verwendet werden, die den Spezifikationen des Herstellers entsprechen

Bei Verwendung von 2X/.../10000X-Sondenbaugruppen müssen die Sondenbaugruppen durch eine doppelte oder verstärkte Isolierung von den gemessenen Stromkreisen isoliert sein.

Alle Sondenbaugruppen sollten die Anforderungen von UL 61010-031 und CAN/CSA-C22.2 Nr. 61010-031-07 erfüllen.

Das Gerät darf nicht so positioniert werden, dass es schwierig ist, die Trennvorrichtung (abnehmbarer Stecker) zu bedienen.

Wenn das Gerät auf eine Weise verwendet wird, die nicht vom Hersteller angegeben ist, kann der Schutz, den das Gerät bietet, beeinträchtigt warden.

Sicherheitsbegriffe und Symbole

Begriffe in diesem Handbuch. Diese Begriffe können in diesem Handbuch vorkommen:

WARNUNG

Warnhinweise weisen auf Bedingungen oder Praktiken hin, die zu Verletzungen oder zum Verlust des Lebens führen können.

VORSICHT

Vorsichtshinweise weisen auf Bedingungen oder Praktiken hin, die zu Schäden an diesem Produkt oder anderen Gegenständen führen können.

Begriffe auf dem Produkt. Diese Begriffe können auf dem Produkt erscheinen:

GEFAHR	Weist auf direkte Verletzungen oder Gefahren hin, die auftreten können.
WARNUNG	Weist auf mögliche Verletzungen oder Gefährdungen hin, die auftreten können.
VORSICHT	Weist auf mögliche Schäden am Gerät oder an anderen Gegenständen hin, die eintreten können.

Symbole auf dem Produkt. Diese Symbole können auf dem Produkt erscheinen:

Hazardous Voltage

Protective Earth Ground

Warning

Terminal Ground

Power Switch

Wenn Sie solche Symbole auf dem Produkt finden, ziehen Sie das Handbuch zu Rate, um die Art der potenziellen Gefahr und die zu ergreifenden Maßnahmen zu erfahren

General Care and Cleaning

Care:

Do not store or leave the instrument in direct sunshine for extended periods.

To avoid damage to the instrument or probes, please do not expose them to fog, liquid, or solvents.

Cleaning:

Please perform the following steps to clean the instrument.

1. Disconnect the instrument from all power sources and then clean it with a soft damp cloth.
2. Clean the loose dust on the outside of the instrument with a soft cloth.

To avoid damage to the surface of the instrument, please do not use any corrosive liquid or chemical cleansers.

Make sure that the instrument is completely dry before restarting it to avoid potential short circuits or personal injury.

General Inspection

- **Inspect the shipping container**

Keep the original shipping container and cushioning material until the contents of the shipment have been completely checked and the instrument has passed both electrical and mechanical tests.

The consigner or carrier will be responsible for damages to the instrument resulting from shipment.

SIGLENT will not provide free maintenance or replacement if the instrument has been damaged in shipment.

- **Inspect the instrument**

If there are instruments found damaged, defective, or have failed any electrical and / or mechanical tests, please contact SIGLENT.

- **Check the accessories**

Please check the accessories according to the packing list. If the accessories are incomplete or damaged, please contact your SIGLENT sales representative.

First steps

Delivery Checklist

First, verify that all items listed on the packing list have been delivered. If you note any omissions or damage, please contact your nearest **SIGLENT** customer service center or distributor as soon as possible. If you fail to contact us immediately in case of omission or damage, we will not be responsible for replacement.

Quality Assurance

The instrument has a 3-year warranty (1-year warranty for attachments) from the date of shipment, during normal use and operation. **SIGLENT** can repair or replace any product that is returned to the authorized service center during the warranty period. We must first examine the product to make sure that the defect is caused by the process or material, not by abuse, negligence, accident, abnormal conditions or operation.

SIGLENT shall not be responsible for any defect, damage, or failure caused by any of the following:

a) Attempted repairs or installations by personnel other than **SIGLENT.**

b) Connection to incompatible devices/incorrect connection.

c) For any damage or malfunction caused by the use of non-**SIGLENT** supplies. Furthermore, **SIGLENT** shall not be obligated to service a product that has been modified. Spare, replacement parts, and repairs have a 90-day warranty.

The instrument's firmware has been thoroughly tested and is presumed to be functional. Nevertheless, it is supplied without warranty of any kind covering detailed performance. Products not made by **SIGLENT** are covered solely by the warranty of the original equipment manufacturer.

Maintenance Agreement

We provide various services on the basis of maintenance agreements. We offer extended warranties as well as installation, training, enhancement and on-site maintenance and other services through specialized supplementary support agreements. For details, please consult your local SIGLENT customer service center or distributor.

Preparation before Use

Adjust the Supporting Legs

Adjust the supporting legs properly to use them as stands to tilt the instrument upwards for stable placement as well as easier operation and observation of the instrument.

Connecting to Power Supply

The standard power supply for the instrument is 100~240 V, 50/60 Hz. Please use the power cord provided with the instrument to connect it to AC power.

Panel Introduction

The Front Panel

1. Power Switch

This key is used to turn on/off the AWG.

2. USB Host

SDG3000X supports U-Disk using FAT format. It's 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 U-Disk.

3. Trig/Sync Input and Output

Trig and Sync signals input and output port.

4. CH1/2 Output

Analog channel signal output port

5. Display area

Displays the current function menu and parameter settings, system status and prompt information, etc., and sets the signal source through touch operation

6. Front panel keypad

Waveform selection shortcut keys (Sine, Square, Pulse, etc.)	In AFG mode, it can quickly select different waveforms through the corresponding waveform buttons. The SEQ button quickly enters the sequence waveform (AWG) mode.
Number and unit keys	Used to input the value and unit of the selected parameter. Enter key is used to confirm parameter modification. ESC key is used to cancel modification. Back key deletes the last digit.
Knob	When setting parameters, the knob is used to increase (clockwise) or decrease the parameter value (counterclockwise). when storing or reading files, the knob is used to select files.
Arrow keys	Used to change the cursor position.
Output button	Analog channel output control. The Output button is used to turn on or off the channel output, and the signal is output from the BNC port.
CH1/CH2 button	Used to switch CH1 or CH2 as the currently selected channel.
Mod, Sweep, Burst	It can quickly enter the modulation/sweep/pulse train function menu by shortcut keys. When the function is turned on, the corresponding button light is on.
Trigger	Manual trigger input.
Utility	Quickly call the system settings menu.
Save/Recall	Quickly call the file manager.
Home	Quickly return to the main interface.
Touch	Turn the touch function on or off. When the touch function is turned on, the button light is on.

The Rear Panel

1. 10M REF IN

External 10 MHz reference clock input port.

2. 10M REF OUT

Internal 10 MHz reference clock output port.

3. MODULATION

External modulation signal input port.

4. COUNTER

Frequency Counter measured signal input port.

5. AC power input

Power supply input port.

6. LAN port

used to connect the generator to a computer or the network where the computer is located for remote control.

7. USB Device port

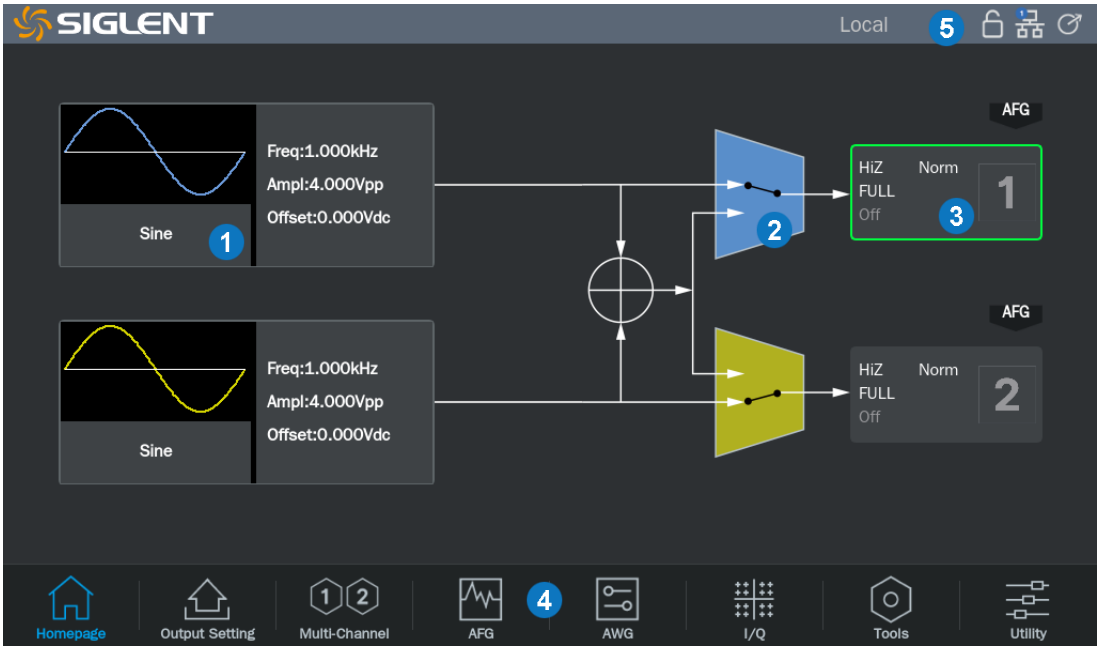
Through this interface, you can connect to a PC and control the generator through the host computer software EasyWaveX or user-defined programming.

8. USB Host port

The function is the same as the USB Host interface on the front panel.

User Interface

HOME PAGE

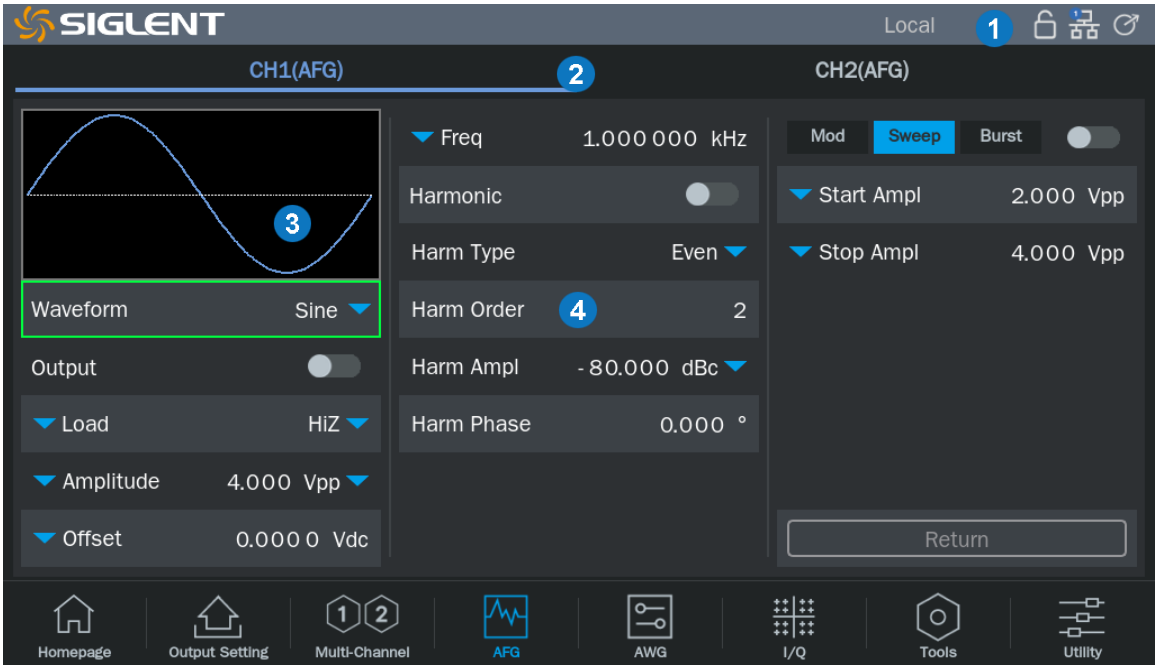


1. **Waveform and parameter display area,** showing the currently selected waveform of each channel and the corresponding waveform parameters.
2. **Dual-channel output configuration area,** dual-channel combine diagram and settings. Click the switch in the area to switch between channel output alone and output after merging channels.
3. **Channel output and setting area,** channel output parameter display and control. Click channel number to turn on/off the channel.
4. **Function selection area,** provide working mode selection, system configuration and other settings.
5. **Information display bar,** showing network connection status, clock status, etc.

Function selection button description

Homepage	Quickly return to the home page.
Output Setting	Enter the output setting page to set output polarity, noise superposition, output filter, amplitude limit, overvoltage protection, etc.
Multi-Channel	Enter the multi-channel setting page and set the channel combination, channel tracking, and coupling functions.
AFG	If the currently selected channel is in AFG mode, enter the waveform parameter setting interface of the channel, otherwise switch the channel to AFG mode.
AWG	If the currently selected channel is in AWG mode, enter the sequence wave setting interface, otherwise switch the channel to sequence wave mode.
IQ	If the current mode is IQ, then enter the IQ waveform setting interface, otherwise it will switch to IQ mode.
Tools	Select functions such as multi-pulse and frequency counter.
Utility	Enter the system information query, system settings, interface settings, file manager and other setting pages.

Parameter setting page (taking basic waveform as an example)



1. The information display bar and function selection area are the same as the home page.
2. Channel selection: You can select the corresponding channel for parameter configuration. The brackets after the channel number indicate the working mode of the current channel. For example, AFG indicates that the current channel is in AFG mode, and AWG indicates that the current channel is in AWG mode.
3. Waveform preview area: Display the currently selected waveform. Click to select the output waveform.
4. Parameter setting box: The left side is the parameter name. If there is an icon before the parameter name, it means that the parameter has other replaceable parameters, such as "frequency" can be switched to "period". Click to switch parameters. The right side is the parameter value. If there is a unit, the unit is displayed at the same time. Click the parameter value area to set the parameter value through the virtual keyboard or the front panel keypad. If the parameter value or unit is followed by an icon, it means that there are multiple options to choose from (such as the unit of the sine wave amplitude can be selected as "Vpp", "Vrms" or "dBm"), click to select. If the parameter area is a switch icon, it means that the parameter has only two states, "ON" and "OFF", click the icon to switch. If the parameter value is followed by an icon, it means that there are more detailed parameter settings, click the icon to enter the setting page.

Basic Operations

This manual provides instructions for the basic operations of the instrument. For more advanced operations, please refer to the User Manual of the product.

AFG Mode Basic Waveform Output

Basic operation instructions: Text with boxes represents the corresponding buttons, such as Output representing Output button. The gray background text, such as AFG , indicates the corresponding function options on the display screen.

Using a 10MHz, 2Vpp, 1V offset sine wave as an example, explain the operation method of waveform output.

1. Ch1/Ch2 allows you to switch and select the channel to output the waveform. Each press will switch back and forth between the two channels.
2. Select AFG in the function selection area. If the current channel is not in AFG mode, it will switch to AFG mode. If the current channel is in AFG mode, it will enter the parameter setting page.
3. Click the waveform preview area and select Sine waveform.
4. Click the frequency parameter setting box, at the frequency value, use the virtual keyboard to enter 10, and then select the unit M.
5. Click the Amplitude parameter setting box, enter 2 at the Amplitude value using the virtual keyboard, and then press Enter .
6. Click the offset parameter setting box, enter 1 at the offset value using the virtual keyboard, and then press Enter .
7. Press Output to output 10MHz, 2Vpp, 1V offset sine waves. Connect the BNC interface of the corresponding channel to the oscilloscope, and the output waveform can be observed.

To output other waveforms, click the waveform preview area and select the desired waveform. Different waveforms can have different parameters.

Basic Waveform Setting

Click the waveform preview area and select the desired waveform. The corresponding waveform parameter will appear in the display area. By setting the waveform parameters, the corresponding waveform can be output.

The main parameters of the basic waveform are shown in the table below.

Table 1 Basic waveform parameters description

Parameter	description
Sine/Square/Pulse/Ramp/Noise/PRBS	
Frequency/Period	Set the frequency/period of the signal. The unit of frequency is Hz, and the unit of period is s. The relationship between the two is: frequency=1/period. Click the icon to switch between parameters.
Amplitude/High Level Offset/Low Level	Set the amplitude/offset of the signal to be linked with high/low levels. The amplitude value refers to the difference between the highest point (high level, unit V) and the lowest point (low level, unit V) of a signal. The supported units include Vpp, Vrms, and dBm (available when the load ≠ HiZ); The offset refers to the DC component superimposed on the signal waveform, measured in volts; The relationship between several parameters is: Amplitude value (Vpp) = high low level - low level Offset = (high level + low level)/2 Click the icon to switch between parameters.
Phase/Delay	The phase/delay of the signal is only meaningful when the dual channel phase mode is phase locked, used to set the phase relationship between two channels. The unit of phase is °, and the unit of delay is s. The relationship between the two is: Delay=- (period x phase/360 °) Click the icon to switch between parameters.
Square	
Duty	Set the ratio of the positive pulse width to the period of the square wave, The unit is %.
Pulse	
Width/Duty	Pulse width refers to the positive pulse width of a pulse, measured in seconds; Duty cycle refers to the ratio of positive pulse width to period, measured in%. The relationship between the two is: Pulse width= period x duty cycle Click the icon to switch between parameters.
Rise/Fall Edge	The rising edge refers to a rising time of 10% to 90%, and the falling edge refers to a falling time of 90% to 10%, both of which are measured in seconds. The rising and falling edges are independent of each other and can be set separately.
Ramp	
Symmetry	The ratio of the time and period during which a triangular wave is rising, The unit is %.
DC	
Offset	The "offset" parameter of the same sine wave, i.e. the DC level.
Noise	
Stdev	Standard deviation of noise sequence.
Mean	Mean value of noise sequence (mathematical expectation).
Bandwidth	-3dB bandwidth of noise.

PRBS	
Bit Rate/Period	The bit rate/symbol period of PRBS sequence, with the unit of bit rate being bps and the unit of symbol period (UI) being s. The relationship between the two is: Bit rate=1/symbol period Click the icon ▼ to switch between parameters.
Logic Level	Used to quickly set the amplitude to some standard levels.
Length	PRBS-3~32 can be set, corresponding to lengths (2^3-1)~(2^32-1).
Edge	Refers to a rise time of 10% to 90% and a fall time of 90% to 10%, expressed in seconds. Setting both rising and falling edges simultaneously.

Modulation

SDG3000X supports commonly used analog modulation (AM/DSB-SC/FM/PM/PWM, etc.) and digital keying (ASK/FSK/PSK, etc.). The modulation source can be selected from both internal and external sources.

Select Mod and turn on the switch on the right to enable the modulation function.

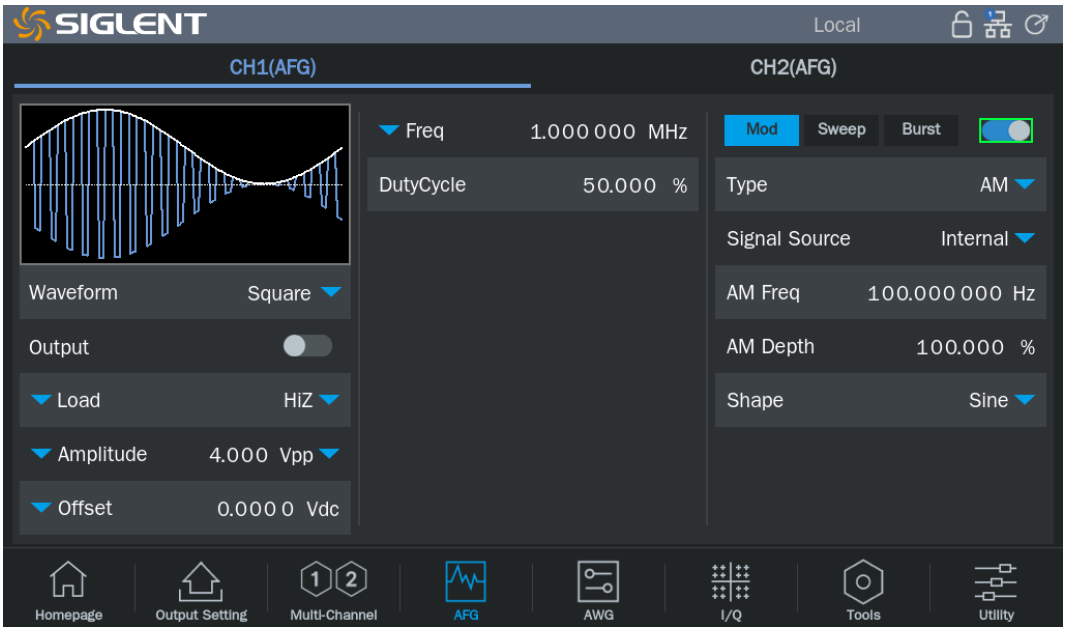


Table 2 Modulation parameters description

Parameter	description
Type	Choose modulation types, including AM, DSB-SC, FM, PM, ASK, FSK, PSK, PWM, and the modulation types supported by different carriers are the same.
Signal Source	Set modulation source, can choose internal or external modulation source.
AM Depth	AM modulation parameters, also known as amplitude modulation coefficient (m), Determined by the maximum value $U_{cm,max}$ and minimum value $U_{cm,min}$ of the amplitude modulation wave envelope:

	$m=\frac{U_{cm,max}-U_{cm,min}}{U_{cm,max}+U_{cm,min}}$ When the source is internal or channel, this value can be directly set; When the signal source is external, it is determined by the amplitude of the external modulation input.
FM Dev	FM modulation parameters. The maximum value Δf of instantaneous frequency deviation from carrier frequency f_c, When the frequency deviation reaches, it corresponds to the maximum or minimum amplitude of the modulating waveform. The modulated carrier frequency varies within the range of $f_c \pm \Delta f$. When the source is internal or channel, this value can be directly set; When the signal source is external, it is determined by the amplitude of the external modulation input, and the full amplitude of the external modulation corresponds to the set frequency deviation.
Phase Dev	PM modulation parameters. The maximum value of instantaneous phase$\varphi_c(t)$when the instantaneous phase deviates from the carrier without modulation $\Delta\phi$, When the phase deviation reaches, it corresponds to the maximum or minimum amplitude of the modulating waveform. The modulated carrier phase varies within the range of $\varphi_c(t) \pm \Delta\varphi$. When the source is internal or channel, this value can be directly set; When the signal source is external, it is determined by the amplitude of the external modulation input, and the full amplitude of the external modulation corresponds to the set phase deviation.
Hop Freq	FSK modulation parameters. The output frequency varies between carrier frequencies f_c and f_c-f_{hop}.
Polarity	PSK modulation parameters, Positive/Negative. When in positive phase, the phase is 0 ° when changing from 0 to 1; When changing from 1 to 0, the phase is 180 °; When reversed, it is opposite.
Width Dev	PWM modulation parameters, the deviation of positive pulse width from the maximum value of positive pulse width without modulation, and when the deviation of pulse width reaches, it corresponds to the maximum or minimum value of modulation waveform amplitude. When the source is internal or channel, this value can be directly set; When the signal source is external, it is determined by the amplitude of the external modulation input, and the full amplitude of the external modulation corresponds to the set pulse width deviation.
Shape	The shape of the modulated wave. When the source is internal, this value can be directly set; When the signal source is external, it is determined by the waveform of the externally modulated input.
Mod Freq	The frequency of the modulation waveform. When the source is internal, this value can be directly set; When the signal source is external, it is determined by the external modulation input frequency.
Key Freq	ASK/FSK/PSK modulation parameters. The bit rate of a binary sequence. When the signal source is internal, this value can be directly set, and the internal source is a clock sequence with a specified frequency; When the source is external, it is determined by the 0/1 state of the modulation input.

Sweep

Sweep belongs to special frequency modulation (FM) or amplitude modulation (AM). When the sweep is turned on, the carrier output frequency or amplitude can vary according to the set (linear/logarithmic/step) and can be controlled by the trigger signal.

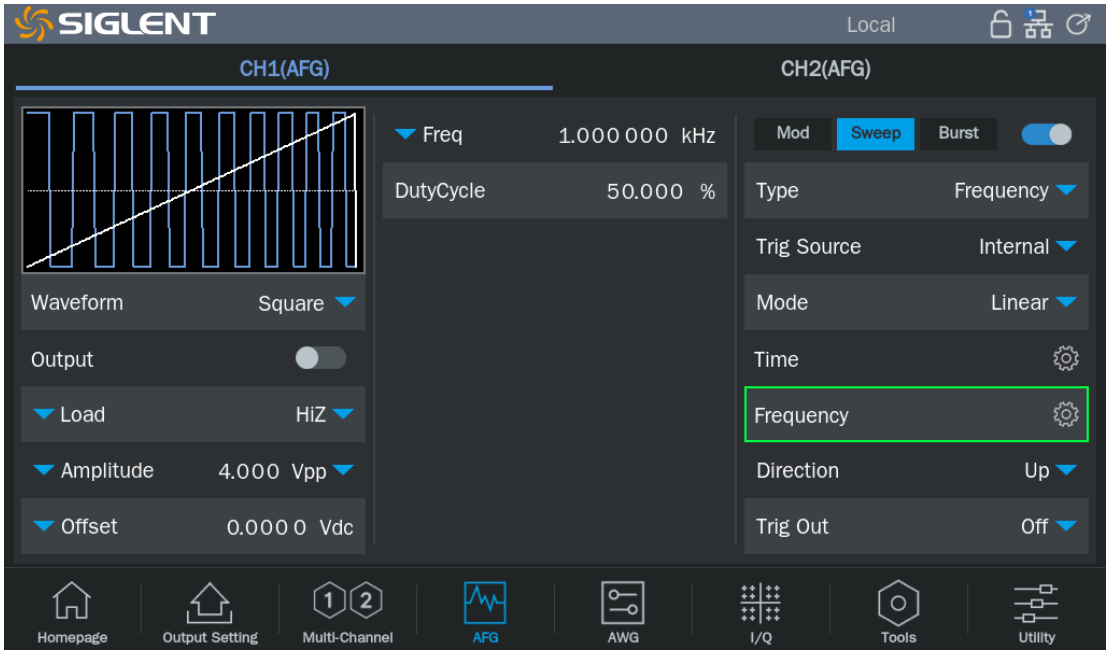


Table 3 Sweep parameters description

Parameter	description
Type	Supports three sweep types: frequency, amplitude, frequency and amplitude.
Sweep Time	Set the time required for a sweep.
Start Freq/Center Freq Stop Freq/Freq Span	Sweep frequency parameters. The relationship is as follows: Center Freq = (Start Freq + Stop Freq) / 2 Freq Span = | Stop Freq – Start Freq | Click the icon ▼ to switch between parameters.
Start Ampl/Center Ampl Stop Ampl/Ampl Span	The amplitude parameter of the scan. The relationship is as follows: Center Ampl = (Start Ampl + Stop Ampl) / 2 Ampl Span = | Stop Ampl – Start Ampl | Click the icon ▼ to switch between parameters.
Source	Three trigger sources are available: internal, external, and manual.
Trig Out	When the trigger source is internal or manual, the trigger output interface on the front panel can output a trigger signal, and the rising edge of the trigger signal corresponds to the start of sweeping.
Mode	Supports three modes of sweeping: Linear, Log, Step. Linear sweeping: FM/AM with modulated waves as sawtooth waves. Its frequency/amplitude changes linearly from the starting frequency/amplitude to the ending frequency/amplitude during the scanning cycle. Logarithmic sweep: The frequency change follows a 10x rule and is commonly

	used for frequency response testing in some channels. The frequency response is generally plotted in logarithmic coordinates (10 octaves), so in order to see a uniform distribution of samples on the logarithmic coordinate plot, logarithmic scanning (only frequency scanning is supported) is needed. Step sweeping: The output signal frequency varies in a stepped manner from the start frequency to the end frequency. The frequency points are controlled by the “Step Number”.
Direction	There are three modes: up, down, and up and down. Up represents sweeping frequency from low to high; Downward represents sweeping frequency from high to low; The up and down mode is only applicable to linear sweeping, which sweeps from the start frequency to the end frequency within the sweep time, and then sweeps back to the start frequency. This method is equivalent to using a triangular waveform for frequency modulation, and the symmetry of the triangular waveform can be set, corresponding to different up sweep times and down sweep times (the amplitude parameters are also the same during amplitude sweeping).
Symmetry	When the sweeping direction is "up and down", set the symmetry of the modulated triangular waveform.

Burst

Burst is a burst signal that triggers the output of a certain number of carrier cycles through a certain control signal.

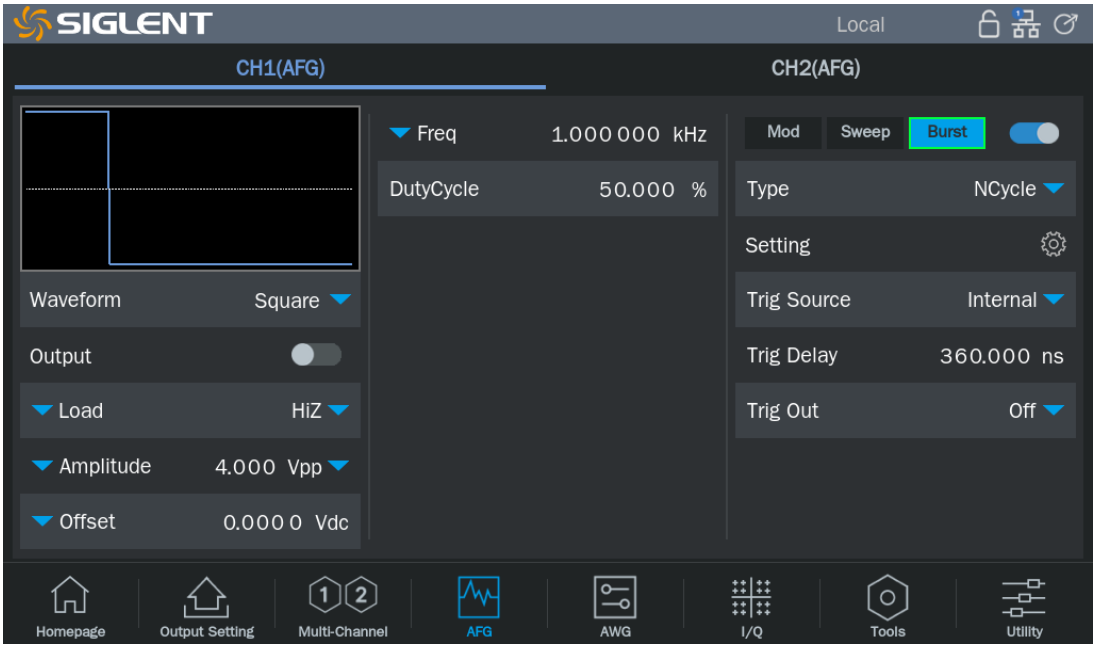


Table 4 Burst parameters description

Parameter	description
NCycle/Gated	Supports two Burst types. NCycle: Output a specified number of carrier cycles (N) each burst signal. Gated: When the gate control signal is effective, the carrier is output; otherwise, it is not output. The gate control signal can be high or low effective. Click the icon ▼ to switch between parameters.
Cycle/Infinite	Under the NCycle type, set the number of cycles for each N-loop burst train. Click the icon ▼ to switch between parameters.
Start Phase	Set the Initial phase at the start of the burst.
Burst Period	This parameter is used to set the period of the burst signal (i.e. time interval between burst trains). It only effective when the trigger source is internal or manual.
Source	Three trigger sources are available: internal, external, and manual.
Trig Delay	Set the delay time from triggering the NCycle burst train to starting output.
Edge	Set the trigger signal edge, rising edge, or falling edge.
Burst Counter	Set the number of burst trains output when the trigger source is external and manual under Ncycles.
Polarity	Set the gate signal to "positive" or "negative" to output a burst signal.

Arbitrary Waveform(Sequence) Setting

SDG3000X can output built-in waveform or user-defined arbitrary waveform. The built-in arbitrary waveform is stored in the instrument's internal non-volatile storage area. The maximum number of waveform points supported by SDG3000X is 40 Mpts.

A sequence consists of multiple waveforms, each of which is called a segment. SDG3000X supports up to 1024 segments. Each segment can be set loop times and trigger source.

Select AWG to switch to AWG mode, enter the sequence setting page, click the waveform preview area in the sequence editing table to select the waveform to be output. It can set the run mode, sample rate, interpolation method, etc. of the sequence wave. The parameters for setting arbitrary waveforms mainly include: waveform length, amplitude/high level, offset/low level, trigger conditions, interpolation method, etc., and you can get the waveform you want by changing the corresponding parameter values.

For arbitrary waveform output, you need to click the Output switch after setting the parameters, and click the RUN button before the waveform is output.

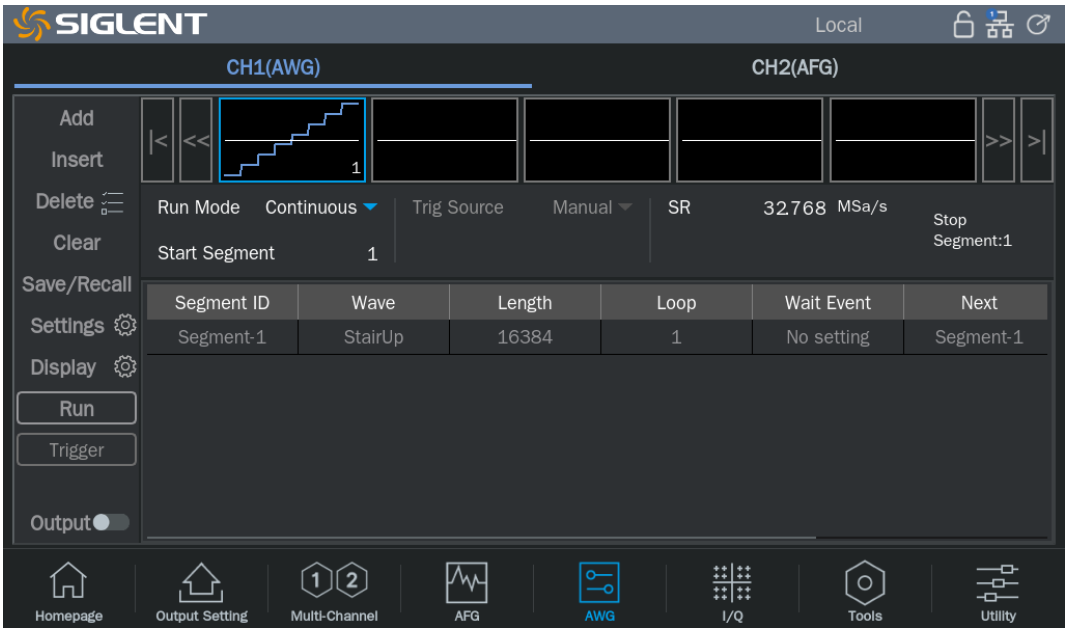


Table 5 Sequence parameters description

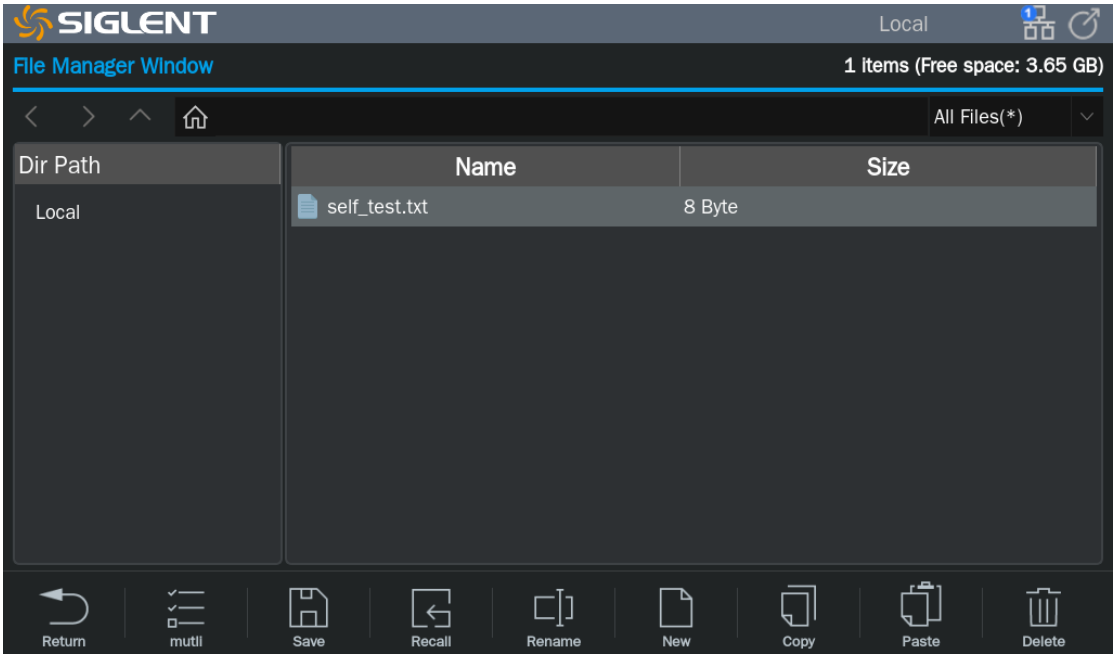
Parameter	description
SR	Sample rate ,the rate of waveform points output.
Amplitude/High Level Offset/Low Level	Same as the basic waveform.
Length	The length of the waveform. If the set length is different from the length of the waveform file, the original waveform file will be interpolated or decimated to fit the set waveform length.

Loop	The number of repetitions of the waveform segment
Wait Event	The trigger source of segment playback. When this trigger condition occurs, the waveform starts to play.
Next	Indicates the next segment to be played after the current segment has played a specified number of times.
Increasing	When the set segment length is greater than the original length of the waveform file, the waveform interpolation method.
Decreasing	When the set segment length is less than the original length of the waveform file, the waveform extraction method.
Interpolation	Refers to the interpolation method when waveform output.
Run Mode	Sequence playback mode, including Continuous, Trigged, Burst, Step, and Advanced mode.

Save & Recall

SDG3000X supports the storing and recalling of state files, waveform files, and firmware upgrade files. The storage and recall file locations include internal memory (Local) and external USB storage devices (e.g., USB flash drives). The storage and recall operations are implemented through the file manager.

Select Save/Recall to enter the file management and select the corresponding waveform file.



Then select Recall to import the waveform file into the generator.

Troubleshooting

1. If the power switch is pressed, the generator LCD screen still appears black. Please follow the following steps to handle it:
   - Check if the power supply is powered on
   - Restart the instrument
   - If you still cannot use this product normally, please contact SIGLENT and let us serve you

2. If the settings are correct but there is no waveform output, please follow the following steps to handle it:
   - Check if the BNC cable is properly connected;
   - Check if the channel output is turned on;
   - After completing the above checks, set the power on setting to the previous setting and restart the instrument

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