SSG5000A Signal Guide

SIGLENT®

Quick Guide

EN01A

SIGLENT TECHNOLOGIES CO.,LTD

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Declaration

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Product Certification

SIGLENT guarantees this product conforms to the national and industrial standards in China as well as the ISO9001: 2008 standard and the ISO14001: 2004 standard. Other international standard conformance certification is in progress.

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.

Use proper power cord

Only the power cord designed for the instrument and authorized by local country could be used.

Ground the instrument

The instrument is grounded through the protective earth conductor of the power cord. To avoid electric shock, please make sure 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, so do not connect the signal wire to a high voltage.

Look over all terminals' ratings

To avoid fire or electric shock, please look over all ratings and sign instruction of the instrument. Before connecting the instrument, please read the manual carefully to gain more information about the ratings.

Use proper overvoltage protection

Make sure that no overvoltage (such as caused by a thunderstorm) can reach the product, or else the operator might be exposed to danger of electric shock.

Electrostatic prevention

Operate the instrument in an electrostatic discharge protective area to avoid damages induced by static discharge. Always ground both the internal and external conductors of the cable to release static before connecting.

Maintain proper ventilation

Inadequate ventilation may cause increasing of the instrument's temperature, which may eventually damage the instrument. So keep well ventilated and inspect the intake and fan regularly.

Avoid circuit or components exposed

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

Do not operate without covers

Do not operate the instrument with covers or panels removed.

Use only the specified fuse

Keep product surfaces clean and dry.

To avoid the influence of dust and moisture in the air, please keep the surface of the device clean and dry.

Do not operate in wet conditions.

In order to avoid short circuiting to the interior of the device or electric shock, please do not operate the instrument in a humid environment.

Do not operate in an explosive atmosphere.

In order to avoid damage to the device or personal injury, it is important to operate the device away from an explosive atmosphere.

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Safety terms and symbols

Terms on the product. These terms may appear on the product:

DANGER   Indicates direct injuries or hazards that may happen.

WARNING   Indicates potential injuries or hazards that may happen.

CAUTION   Indicates potential damages to the instrument or other property that may happen.

Symbols on the product. These symbols may appear on the product:

Hazardous   Protective   Warning   Earth Chassis
Voltage   Ground   Ground

Content

General Inspection

Inspect the shipping container

Keep the shipping container or 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.

Inspect the instrument

If the instrument is found to be damaged, defective or fails in electrical 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.

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Preparing for Use

Adjust the supporting legs

For benchtop operation, you may want to use the supporting legs. Adjust the supporting feet appropriately to tilt the RF signal source upwards.
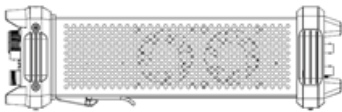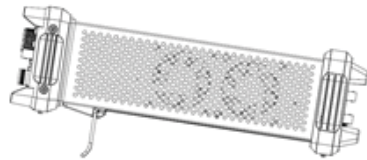

Figure 1-1 Before adjusting
Figure 1-2 After adjusting

Connect to AC power supply

The RF signal source accepts from 100 V - 240 V, 50/60 Hz or 100 V - 120 V, 400 Hz AC power supply. Please use the power cord provided in the accessory to connect the instrument to the power source as shown in the figure below.
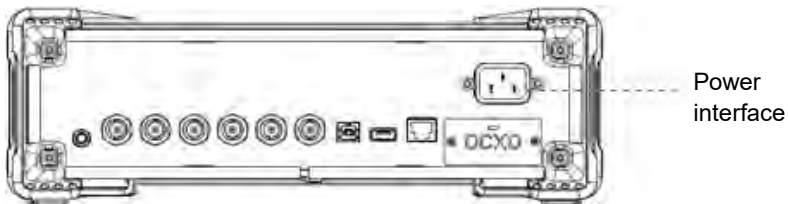

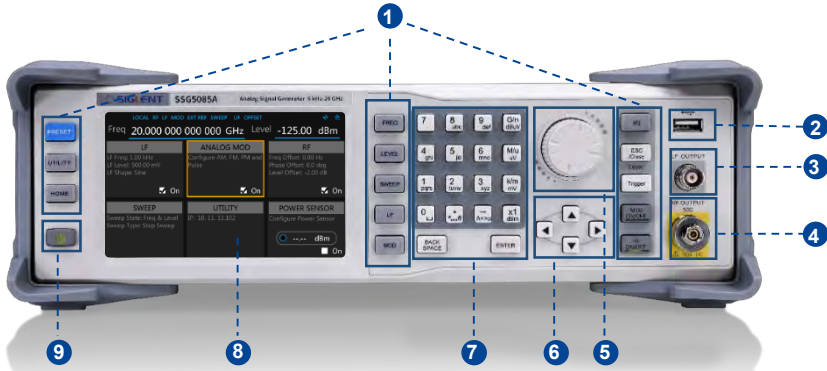Power interface

Figure 1-3 Power Interface

The Front Panel

Figure 1-4 The Front Panel

Table 1-1 Front Panel Description

NO	Description	NO	Description
1	Function key	6	Direction key
2	USB Host	7	Digital keyboard
3	LF output	8	Touch screen display area
4	RF output	9	Power button
5	Knob		

Front panel function button

Table 1-2 Function keys description

Control Keys	Description
FREQ	Set frequency, frequency offset, phase offset and other related parameters
LEVEL	Set level, level offset, ALC state, flatness and other related parameters
SWEEP	Set sweep state, step sweep, list sweep, direction and other related parameters
LF	Set LF state, LF level, LF frequency and other related parameters
MOD	Set various modulation parameters (AM, FM, PM and PULSE)
I/Q	Set IQ related parameters (SSG5000A not support)
ESC/Close	During the parameter editing process, pressing this key will clear the input of the active function area and exit the parameter input state. Press this button to return to local control if previously controlling the instrument remotely
Trigger	When the trigger type is set to Key, press this button to perform one operation
MOD ON/OFF	The main switch of various modulation modes
RF ON/OFF	RF signal output switch
PRESET	Press this button to revert to the default parameters. The default parameters refer to the default parameter table
UTILITY	System and file related operations
HOME	You can get back to the main interface quickly

Digital keyboard

The front panel of the RF signal source provides a numeric keypad (as shown below). The keyboard supports English uppercase and lowercase characters, numbers and common symbols (including decimal point, space, negative sign and !, @, #, $, %, ^, &, *), mainly for editing the name of files or folders and setting parameters (refer to the "parameter setting" section).

Figure 1-5 Digital Keyboard

Control Keys	Description
0 ␣	Digit 0 and space bar switch
*...#	In the English state, enter the special symbol !, @, #, $, %, ^, &, *. In the digital state, enter the decimal point
─ A< >a	In the digital state, enter the "-" sign. In the English state input for case switching
G/n dBuV	When setting the amplitude, press this key to set the unit as dBuV. When setting the frequency, press this key to set the unit as GHz. If the input is a time-related parameter, press this key to set the unit as ns
M/u uV	When setting the amplitude, press this key to set the unit as uV. When setting the frequency, press this key to set the unit as MHz. If the input is a time-related parameter, press this key to set the unit as us

k/m **mV**	When setting the amplitude, press this key to set the unit as MV. When setting the frequency, press this key to set the unit as kHz. If the input is a time-related parameter, press this key to set the unit as ms
x1 **dBm**	When setting the amplitude, press this key to set the unit as dBm. When setting the frequency, the unit selected will be Hz. If the input is time, the unit will be set to s
BACK SPACE	During the parameter editing process, pressing this key will delete the character to the left of the cursor
ENTER	In the parameter input process, pressing this key will end the parameter input and add the currently set unit for the parameter

Direction knob and keys operation

1.   Direction knob

Rotate left and right to increase or decrease the value of the active parameter, or adjust the focus position in non-parametric input state. Pressing it down is equal to "Enter".

2.   Direction keys

In the non-parametric input state, press the up, down, left and right direction keys to move the focus frame in sequence.

Press the knob in the parameter input area, the cursor will focus to a certain position, then press the left and right direction keys to change the position of the cursor, and use the up and down keys to fine tune the value of the cursor position.

Front panel key backlight

1.   Power switch

Orange light constantly on indicates the instrument is in stand-by state.

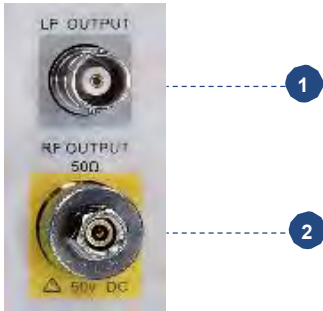Green light constantly on indicates the instrument is in power on state.

2.   MOD ON/OFF

When the MOD ON/OFF is set to turn on the modulation, the backlight will illuminate. If modulation is off, the backlight will be dark.

3.   RF ON/OFF

When the RF signal is turned on, the backlight is on. If the RF signal output is turned off, the backlight will be dark.

Front panel connectors

1. LF output
Output the LF (low frequency) signal. This is a BNC connection. The output can also be configured to source the modulation waveform for FM and PM modulation types.

2. Radio frequency output terminal
RF signal output N-type connector with an impedance of 50 ohms

Figure 1-6 Front panel connectors

⚠ **CAUTION**
To avoid damage to the instrument, the RF input signal must meet the followings: The DC voltage component and the maximum continuous power of the AC (RF) signal component cannot exceed 50 V and +25 dBm respectively.
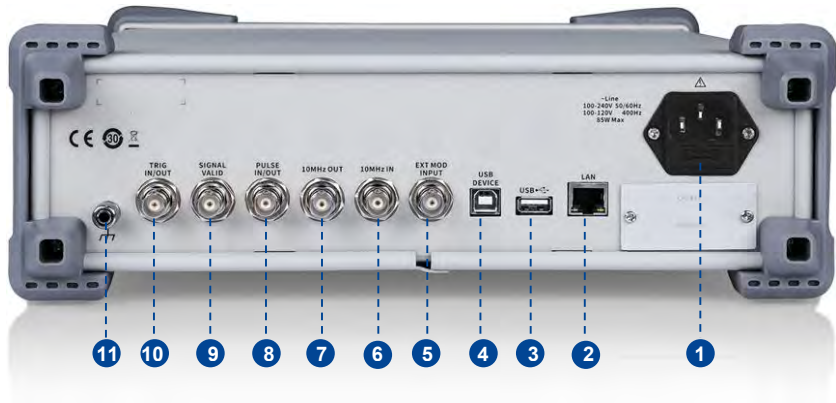
Rear Panel

Figure 1-7 Rear Panel

1. AC power input terminal

The RF signal source can operate with AC power from 100 V - 240 V, 50/60 Hz or 100 V – 120 V, 400 Hz. Please connect the RF signal source to the AC power supply with the supplied power cord.

2. LAN interface

The RF signal source can be connected to a network through the interface and remotely controlled.

3. USB host

The RF signal source can be used as the "main device" to connect to an external USB device, like a USB RF power meter. The interface reads the data or state file in the U disk, or stores the current instrument state or data in the U disk.

4. USB device interface

The interface can be connected to a compatible computer and controlled by software on the host computer.

5. EXT MOD INPUT

Input BNC connection for external modulation.

6. 10 MHz IN

■ The [10MHz IN] and [10MHz OUT] connectors are commonly used to establish synchronization between multiple instruments.

■ The RF source can use the internal reference source or an external reference source.

If the instrument detects that there is a valid 10MHz signal at the [10MHz IN] connector, it will use it as an external reference source. At this point the user interface status bar shows "Ext Ref". When an external reference is lost, exceeded, or disconnected, the instrument automatically switches to the internal reference, and the screen status bar will no longer display " Ext Ref "

7. 10 MHz OUT

■ The [10MHz OUT] and [10MHz IN] connectors are commonly used to establish synchronization between multiple instruments.

■ The RF source can use the internal or an external reference source.

If the instrument uses the internal reference source, the [10MHz OUT] connector can output a 10 MHz clock signal generated by the instrument and can be used to synchronize other devices.

8. PULSE IN/OUT

The function of the connector is determined by the current mode of pulse modulation.

1) PULSE IN: When the pulse source is "Ext", it is used to input external

pulse signals.

2) PULSE OUT: When the Pulse modulation source is "Int" and the pulse output switch is turned on, it is used to output the pulse signal generated by the internal generator. The output signal is related to "Pulse Mode", and can be set to "Single", "Double" or "Train".

9. SIGNAL VALID

When the RF output frequency or amplitude is modified, the RF output connector of the front panel outputs the RF signal at the specified frequency and amplitude after a certain response and processing time in the internal circuit of the instrument. In this process, the [SIGNAL VALID] connector outputs an impulse synchronization signal to indicate the validity of the RF output signal:

■ High level (3.3 V): Indicates that the RF signal is being configured.

■ Low level (0 V): Indicates that the RF signal is stable (effective).

10. TRIG IN/OUT

When PULSE trigger source is "Int ", the connector can be used to output the trigger signal.

When the RF Sweep, LF Sweep, or PULSE trigger source is "Ext", the connector is used to input the external trigger signal.

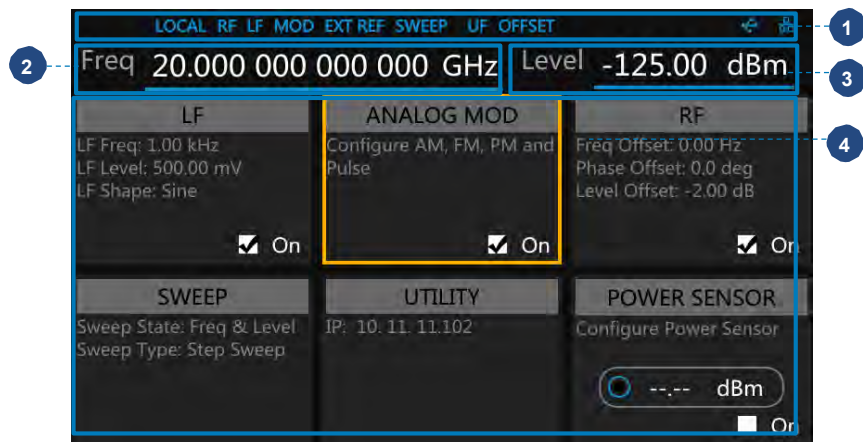## 11. Ground

The system ground terminal.

User Interface

Figure 1-8 User Interface

1. Prompt status bar

- Display LOCAL (local), or REMOTE (remote). When REMOTE is displayed, the instrument is being controlled by a remote computer and the front panel input will be locked. To unlock the front panel (enter LOCAL mode), press Esc/Close.

- EXT REF: EXT REF shows that the SSG is using an external 10 MHz reference.

- LF: Low frequency signal generator state.

- MOD: The modulation state.

- RF: The RF output state.

- SWEEP: The status of the sweep state.

- UF: Amplitude flatness function enabled.

- OFFSET: Amplitude offset enabled.

- ![USB icon] The identification is displayed when a USB disk is inserted.

- LAN: LAN state. ![LAN connected icon] indicates that LAN is successfully connected. ![LAN failed icon] indicates that there is no network connection or network connection failed.

2. RF frequency

RF output frequency setting. When the sweep type is "frequency" or "frequency & amplitude", the frequency scanning progress bar is displayed.

3. RF level

RF output level setting. When the sweep type is "amplitude" or "frequency & amplitude", level scanning progress bar is displayed.

4. Touch screen display area: Display the settings under each menu

- LF: LF output state, LF waveform and LF sweep related parameters can be set.

- ANALOG MOD: Analog Modulation state. Amplitude modulation, frequency modulation, phase modulation, or pulse can be set.

- RF: RF output state. Frequency and level can be set.

- SWEEP: RF Sweep state and related parameters can be set.

- UTILITY: System and file related parameters can be set.

- POWER SENSOR: Power sensor state and power sensor related parameters can be set.

Firmware Operation

Check System Information

Press [UTILITY] > [System] > [System Info] to view the instrument's
system information, including:

- Startup Times
- Model
- Software Version
- Hardware Version
- Host ID
- Serial Number

Load Option

1. Press [UTILITY] > [Option] to enter option interface. Click the drop-down box under the "Install" to choose the license type need to be installed. Enter a license in the input box and click [Install] to finish the license installing.

2. If the installations succeed, the prompt message "license was successfully installed" will be pop-up. If not, the prompt message "license was entered incorrectly" will be pop-up.

Note: The SSG comes with trial options that have a finite number of uses. It allows users to evaluate the options without purchasing them. You can find the remaining number of trials at the top of the option interface. When the remaining time of a certain function is zero, the function will be disabled. When a license is successfully installed for a certain function, the remaining times will be shown as "--" and the type of the license will be permanent, which means users have unrestricted access to the function.

Firmware Upgrade

Follow this procedure to update the instrument firmware:

1. Download the firmware package from an official SIGLENT website

    www.siglentamerica.com

    http://www.siglent.com/ens

    https://www.siglenteu.com

2. Extract and copy the .ADS file into the root directory of a USB disk.

3. Press [UTILITY] > [Update] , and select the update file.

4. Click [Recall] to update the system software.

The progress bar will appear on the screen while updating. The instrument will restart automatically if updates succeed or display a pop-up prompt box if updates fail.

Touch Operation

The RF signal source provides a 5-inch capacitive touch screen to support various gesture operations, including:

- Click on the screen parameters or menu to edit the parameters.
- Left or right slide switches menus.
- Up or down slides the display menu.

Help Information

The built-in help system provides help information for each function and menu option on the front panel.

- Press [UTILITY] button and select help. The center of the screen will pop up to help.
- Click to enter the corresponding directory.

Remote Control

The generator supports communication with compatible computers via USB, LAN or GPIB-USB interface. By using these interfaces, in combination with programming languages and/or NI-VISA software, users can remotely control the signal generator. More information can be found in the SSG5000A Programming Guide available on the SIGLENT website.

For More Product Information

You can obtain the instrument information and installation status of all options through **[UTILITY] System Info.**

For more information of this product, please refer to the following manuals (you can also download them from the **SIGLENT** Web site):

SSG5000A User's Guide: Provides detailed introductions of the functions of this product;

SSG5000A Programming Guide: Provides detailed introductions of the SCPI commands and programming of this product;

SSG5000A Datasheet: Provides the main characteristics and specifications of this product.

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About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

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