

RIGOL

Quick Guide

DSA1000 Series

Spectrum Analyzer

Apr. 2015

RIGOL Technologies, Inc

Guaranty and Declaration

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Publication Number

QGD02108-1110

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RIGOL 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.

Contact Us

If you have any problem or requirement when using our products or this manual, please contact **RIGOL**.

E-mail: service@rigol.com

Websites: www.rigol.com

General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injury or damage to the instrument and any product connected to it. To prevent potential hazards, please use the instrument only specified by this manual.

Use Proper Power Cord.

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

Ground the Instrument.

The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, it is essential to connect the earth terminal of power cord to the Protective Earth terminal before any inputs or outputs.

Connect the Probe Correctly.

If a probe is used, do not connect the ground lead to high voltage since it has the isobaric electric potential as ground.

Observe all Terminal Ratings.

To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your

manual for more information about ratings before connecting.

Use Proper Overvoltage Protection.

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

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels removed.

Do Not Insert Anything Into the Holes of Fan.

Do not insert anything into the holes of the fan to avoid damaging the instrument.

Use Proper Fuse.

Please use the specified fuses.

Avoid Circuit or Wire Exposure.

Do not touch exposed junctions and

components when the unit is powered.

Do Not Operate With Suspected Failures.

If you suspect damage occurs to the instrument, have it inspected by **RIGOL** authorized personnel before further operations. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by **RIGOL** authorized personnel.

Keep Well Ventilation.

Inadequate ventilation may cause increasing of temperature or damages to the device. So please keep well ventilated and inspect the intake and fan regularly.

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 in a humid environment.

Do Not Operate in an Explosive Atmosphere.

In order to avoid damages to the device or personal injuries, it is important to operate the device

away from an explosive atmosphere.

Keep Product Surfaces Clean and Dry.

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

Electrostatic Prevention.

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

Protect the Input Terminals of Instrument.

Do not exert excessive deformative physical and mechanical stress on the input terminals and the connected devices, (such as filter, attenuator, etc.) as such stress may cause damages to devices and the instrument. Do not mix the use of 50Ω and 75Ω connectors and/or cables.

Do Not Overload the Input.

To avoid damaging the instrument, make sure the signals at input terminal must be less than 50V DC

voltage components and 30 dBm (1W) AC (RF) components.

Appropriate Use of Power Meter.

If you are not sure of the characteristics of signal under measure, follow these recommendations to ensure safe operations: if a RF power meter is available, use it to measure the power level of this signal first; or add a rated external attenuator between signal cable and input terminal of the instrument. Maximum attenuation, reference level and maximum span frequency should be selected, so as to make the signals displayed within the screen.

Know About the Specification Conditions of the Instrument.

For maximum performance of the instrument, use the analyzer under specified conditions.

Proper Use of Battery.

If a battery is supplied, it must not be exposed to high temperature or in contact with fire. Keep it out of the reach of children. Improper change of battery (note: lithium battery) may cause explosion. Use **RIGOL** specified battery only.

Handling Safety.

Please handle with care during transportation to avoid damages to buttons, knob, interfaces and other parts on the panels.

Safety Terms and Symbols

Terms Used in this Manual. These terms may appear in this manual:



WARNING

Warning statements indicate the conditions or practices that could result in injury or loss of life.



CAUTION

Caution statements indicate the conditions or practices that could result in damage to this product or other property.

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

DANGER It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.

WARNING It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.

CAUTION It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

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



**Hazardous
Voltage**



**Safety
Warning**



**Protective
Earth
Terminal**



**Chassis
Ground**



**Test
Ground**

Allgemeine Sicherheits Informationen

Überprüfen Sie die folgenden Sicherheitshinweise sorgfältig um Personenschäden oder Schäden am Gerät und an damit verbundenen weiteren Geräten zu vermeiden. Zur Vermeidung von Gefahren, nutzen Sie bitte das Gerät nur so, wie in diesem Handbuch angegeben.

Um Feuer oder Verletzungen zu vermeiden, verwenden Sie ein ordnungsgemäßes Netzkabel.

Verwenden Sie für dieses Gerät nur das für ihr Land zugelassene und genehmigte Netzkabel.

Erden des Gerätes.

Das Gerät ist durch den Schutzleiter im Netzkabel geerdet. Um Gefahren durch elektrischen Schlag zu vermeiden, ist es unerlässlich, die Erdung durchzuführen. Erst dann dürfen weitere Ein- oder Ausgänge verbunden werden.

Anschluss eines Tastkopfes.

Die Erdungsklemmen der Sonden sind auf dem gleichen Spannungspegel des Instruments geerdet. Schließen Sie die Erdungsklemmen an keine hohe Spannung an.

Beachten Sie alle Anschlüsse.

Zur Vermeidung von Feuer oder Stromschlag, beachten Sie alle Bemerkungen und Markierungen auf dem Instrument. Befolgen Sie die Bedienungsanleitung für weitere Informationen, bevor Sie weitere Anschlüsse an das Instrument legen.

Verwenden Sie einen geeigneten

Überspannungsschutz.

Stellen Sie sicher, daß keinerlei Überspannung (wie z.B. durch Gewitter verursacht) das Gerät erreichen kann.

Andernfalls besteht für den Anwender die Gefahr eines Stromschlages.

Nicht ohne Abdeckung einschalten.

Betreiben Sie das Gerät nicht mit entfernten Gehäuse-Abdeckungen.

Betreiben Sie das Gerät nicht

geöffnet.

Der Betrieb mit offenen oder entfernten Gehäuseteilen ist nicht zulässig. Nichts in entsprechende Öffnungen stecken (Lüfter z.B.)

Passende Sicherung verwenden.

Setzen Sie nur die spezifikationsgemäßen Sicherungen ein.

Vermeiden Sie ungeschützte Verbindungen.

Berühren Sie keine unisolierten Verbindungen oder Baugruppen, während das Gerät in Betrieb ist.

Betreiben Sie das Gerät nicht im Fehlerfall.

Wenn Sie am Gerät einen Defekt vermuten, sorgen Sie dafür, bevor Sie das Gerät wieder betreiben, dass eine Untersuchung durch **RIGOL** autorisiertem Personal durchgeführt wird. Jedwede Wartung, Einstellarbeiten oder Austausch von Teilen am Gerät, sowie am Zubehör dürfen nur von **RIGOL** autorisiertem Personal durchgeführt werden.

Belüftung sicherstellen.

Unzureichende Belüftung kann zu Temperaturanstiegen und somit zu thermischen Schäden am Gerät führen. Stellen Sie deswegen die Belüftung sicher und kontrollieren regelmäßig Lüfter und Belüftungsöffnungen.

Nicht in feuchter Umgebung betreiben.

Zur Vermeidung von Kurzschluß im Geräteinneren und Stromschlag betreiben Sie das Gerät bitte niemals in feuchter Umgebung.

Nicht in explosiver Atmosphäre betreiben.

Zur Vermeidung von Personen- und Sachschäden ist es unumgänglich, das Gerät ausschließlich fernab jedweder explosiven Atmosphäre zu betreiben.

Geräteoberflächen sauber und trocken halten.

Um den Einfluß von Staub und Feuchtigkeit aus der Luft auszuschließen, halten Sie bitte die Geräteoberflächen sauber und trocken.

Schutz gegen elektrostatische Entladung (ESD).

Sorgen Sie für eine elektrostatisch geschützte Umgebung, um somit Schäden und Funktionsstörungen durch ESD zu vermeiden. Erden Sie vor dem Anschluß immer Innen- und Außenleiter der Verbindungsleitung, um statische Aufladung zu entladen.

Die richtige Verwendung des Akku.

Wenn eine Batterie verwendet wird, vermeiden Sie hohe Temperaturen bzw. Feuer ausgesetzt werden. Bewahren Sie es außerhalb der Reichweite von Kindern auf.

Unsachgemäße Änderung der Batterie (Anmerkung: Lithium-Batterie) kann zu einer Explosion führen. Verwenden Sie nur von **RIGOL** angegebenen Akkus.

Sicherer Transport.

Transportieren Sie das Gerät sorgfältig (Verpackung!), um Schäden an Bedienelementen, Anschlüssen und anderen Teilen zu vermeiden.

Sicherheits Begriffe und Symbole

Begriffe in diesem Guide. Diese Begriffe können in diesem Handbuch auftauchen:



WARNING

Die Kennzeichnung WARNING beschreibt Gefahrenquellen die leibliche Schäden oder den Tod von Personen zur Folge haben können.



CAUTION

Die Kennzeichnung Caution (Vorsicht) beschreibt Gefahrenquellen die Schäden am Gerät hervorrufen können.

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

DANGER

weist auf eine Verletzung oder Gefährdung hin, die sofort geschehen kann.

WARNING

weist auf eine Verletzung oder Gefährdung hin, die möglicherweise nicht sofort geschehen.

CAUTION

weist auf eine Verletzung oder Gefährdung hin und bedeutet, bedeutet, dass eine mögliche Beschädigung des Instruments oder anderer Gegenstände auftreten kann.

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



**Gefährliches
pannung**



**Sicherheits-
Hinweis**



Schutz-erde



**Gehäuse
masse**



Erde

General Care and Cleaning

General Care

Do not store or leave the instrument in where the instrument will be exposed to direct sunlight for long periods of time.

Cleaning

Clean the instrument regularly according to its operating conditions. To clean the exterior surface, perform the following steps:

1. Disconnect the instrument from all power sources.
2. Clean the loose dust on the outside of the instrument with a lint- free cloth (with a mild detergent or water). When cleaning the LCD, take care to avoid scarifying it.



CAUTION

To avoid damages to the instrument, do not expose them to liquids which have causticity.



WARNING

To avoid injury resulting from short circuit, make sure the instrument is completely dry before reconnecting to a power source.

Environmental Considerations

The following symbol indicates that this product complies with the WEEE Directive 2002/96/EC.



Product End-of-Life Handling

The equipment may contain substances that could be harmful to the environment or human health. In order to avoid release of such substances into the environment and harm to human health, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately. Please contact your local authorities for disposal or recycling information.

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Front Panel

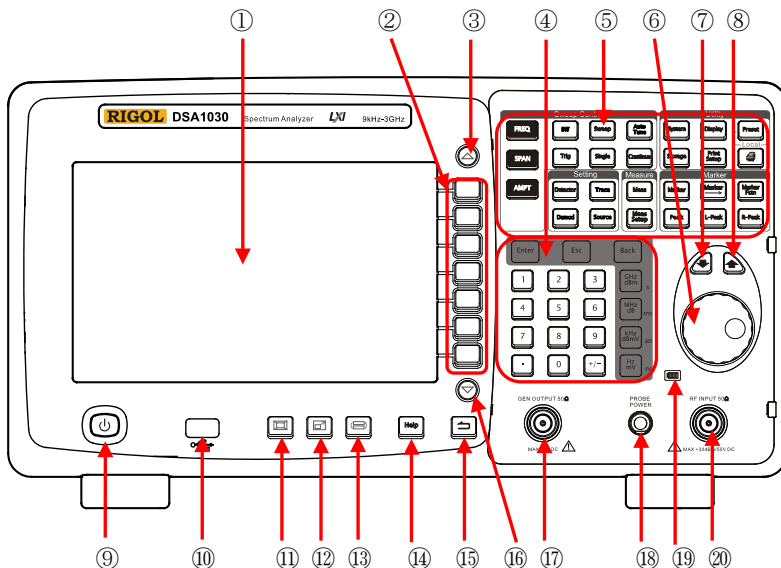


Figure 1 Front panel overview

Table 1 Front Panel Description

No.	Description	No.	Description
①	LCD	⑪	Full screen
②	Menu keys	⑫	Zoom window
③	Page up	⑬	Switch window
④	Numeric keyboard	⑭	One-button help
⑤	Function key area	⑮	Back
⑥	knob	⑯	Page down
⑦	Down	⑰	Tracking generator output*
⑧	Up	⑱	Probe power output
⑨	Power key	⑲	Battery status indicator (China only)
⑩	USB Host interface	⑳	RF input

Note: *For DSA1030-TG only.

Front Panel Function Key

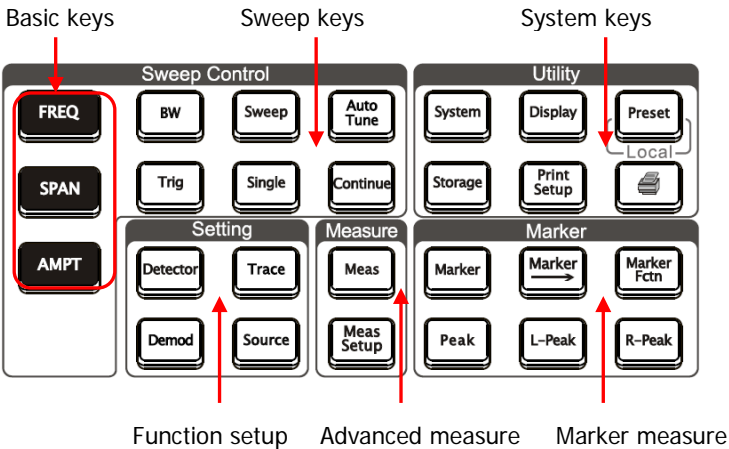














Figure 2 Function key area











Table 2 Function keys description

Keys	Description
Sweep keys	
	Sets the center, start and stop frequency, as well as the signal tracking function.
	Sets the frequency sweep span.
	Sets the reference level, RF attenuator, scale and the unit of Y-axis, etc.
	Sets the resolution bandwidth and video bandwidth of the analyzer.
	Sets the sweep time, sweep mode, sweep numbers in single mode and the sweep points.

Function keys description (Continued)

Keys	Description
	Searches signals automatically within full frequency range.
	Sets the trigger mode and corresponding parameters.
	Sets the sweep mode to Single.
	Sets the sweep mode to Continue.
Function setup	
	Sets the detection mode of the analyzer.
	Sets the parameters relate to sweep trace.
	Sets the demodulation.
	Sets the tracking generator*.
Advanced measure**	
	Select a desired advanced measurement function.
	Sets the parameters for the selected measurement function.
Marker measure	
	Reads the amplitude, frequency and sweep time of a certain point on the trace.
	Sets other system parameters based on the current marker value.

Function keys description (Continued)

Keys	Description
	Special function such as noise marker, N dB bandwidth measure and frequency counting.
	Searches the peak and opens the Peak menu immediately.
	Measures the left peak directly.
	Measures the right peak directly.
System keys	
	Sets the system parameters.
	Sets the display parameters.
	Executes the selected preset function; resets the system into specified status; modifies all sweep parameters, measurement settings and system parameters for following measure.
	Enter the storage interface.
	Sets the print parameters.
	Print or save current screen.

Note:

*For DSA1030-TG only.

** This function is the option of DSA1030/DSA1030-TG.

Front Panel Backlight Key

The backlight status of some keys at the front panel, off, bright or different color indicates different working mode.

1. Auto Tune

When **Auto Tune** is pressed, the backlight turns on, which indicates that the instrument starts sweeping at full range, searching the signal of maximum amplitude, and moves it to the center of the screen. Then the backlight turns off.

2. Single, Continue

When backlights of **Single** or **Continue** are on, it indicates the current sweep mode is Single or Continue, respectively.

3. Meas**

The backlight of **Meas** will be automatically turned on once any measurements are active, and stay on until all measurement functions are disabled.

4. Source*

When backlight of **Source** is on, it indicates that the tracking generator is enabled, and vice versa.

5. Power light

In AC power supply mode:

- Flashes on and off alternatively: indicating the unit is in stand-by state.
- Constant on: indicating the unit is in normal operating condition.

In battery power supply mode (China only):

- Off: indicating the standby state.
- Constant on: indicating the normal operating condition.

6. Battery status indicator (China Only)

It is used to indicate the installation status and the current amount of electricity of the battery.

- Green: battery electricity > 80%
- Orange: 20% < battery electricity < 80%
- Red: battery electricity < 20%
- Off: the battery is not installed or the battery contains no electricity

Note:

* For DSA1030-TG only.

** This function is the option of DSA1030/DSA1030-TG.

Front Panel Connector

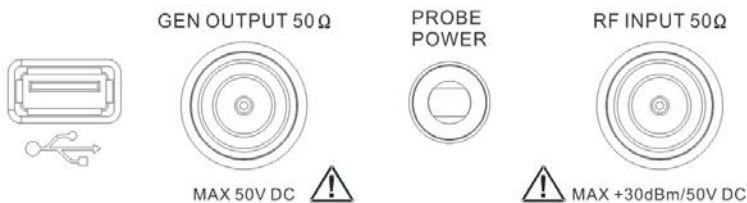
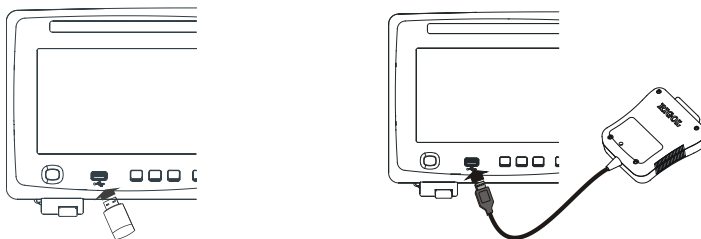


Figure 3 Front Panel Connectors

1. USB Host

The analyzer may serve as a “host” device to connect to external USB devices. This interface is available for USB flash device and the USB-GPIB module. See the following connections:



USB flash device connection

GPIB extended connection

Figure 4 USB Host interface connections

2. GEN OUTPUT 50Ω

The output of the tracking generator can be connected to a receiver through an N male connector, see figure below. Note that the tracking generator is valid only when the instrument is DSA1030-TG.

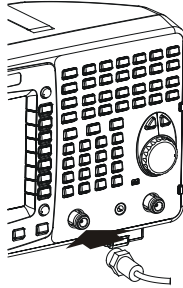


Figure 5 Tracking generator output connection



CAUTION

Reverse power or voltage mustn't be higher than 1 W or 50 V DC to avoid damages to the tracking generator.

3. PROBE POWER

This connector provides two lines of power supply to a RF probe: 15 V, 150 mA, and -12.6 V, 150 mA.

4. RF INPUT 50 Ω

The RF input may be connected to a device under measure via an N male connector, see figure below.

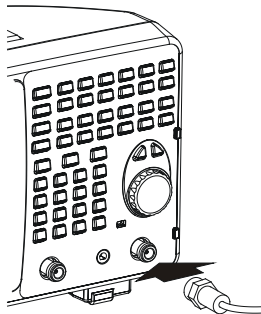


Figure 6 RF input connection



CAUTION

To avoid damages to the instrument, signals at the input terminal must be less than 50 V DC voltage components and 30 dBm (1 W) AC (RF) components.

Rear Panel

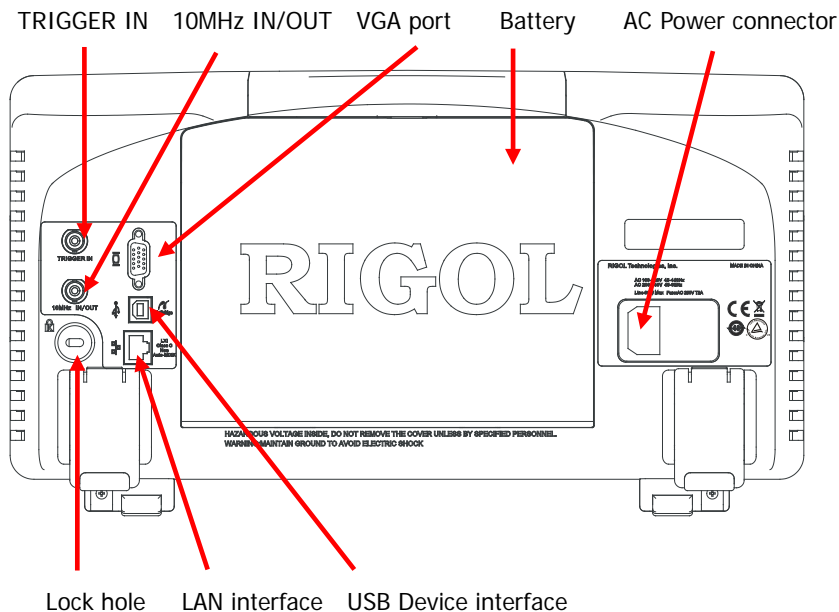


Figure 7 Rear panel overview

1. AC power connector

Available AC power supply types:

AC: 100 V – 120 V, 45 Hz – 440 Hz

AC: 200 V – 240 V, 45 Hz – 65 Hz

2. Rechargeable battery (China Only)

An optional power source of 10 V – 18 V, a fully charged battery can provide 3 hours of continuous operation.

3. TRIGGER IN

A BNC external trigger signal input port, see figure below.

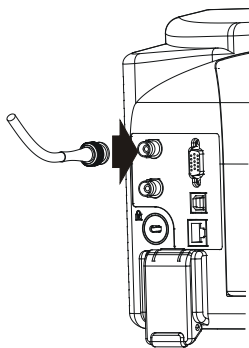


Figure 8 TRIGGER IN connection

4. 10 MHz IN/OUT

The BNC input or output of the 10 MHz reference clock, see figure below.

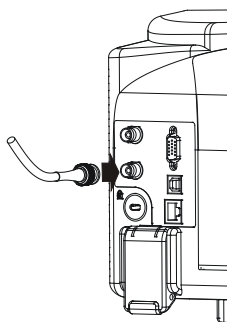


Figure 9 10 MHz IN/OUT connection

5. VGA port

This port provides a VGA signal output which is used through a VGA cable, see figure below.

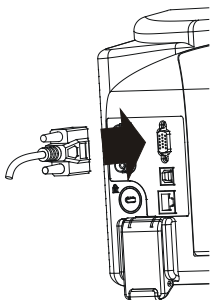


Figure 10 VGA port connection

6. USB Device Interface

This configurable USB port permits interface external USB devices. It supports PictBridge printer and remote control connection.

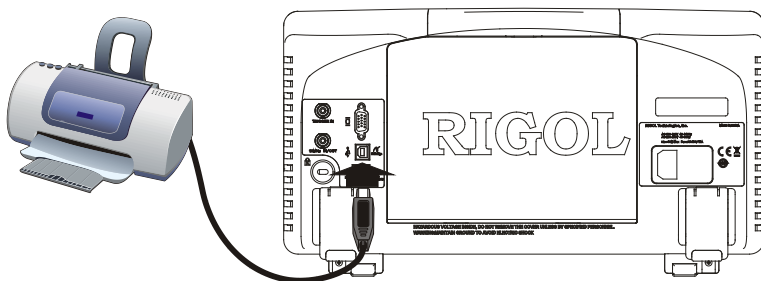


Figure 11 PictBridge printer connection

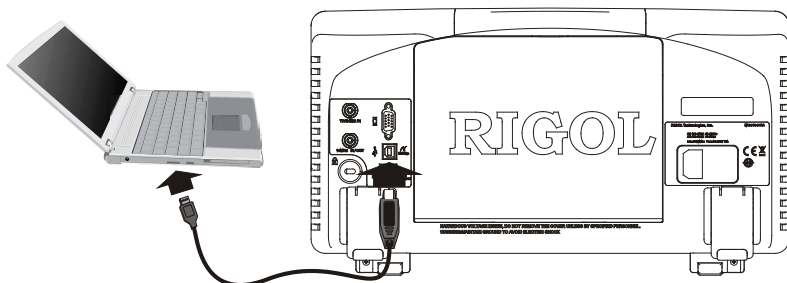


Figure 12 USB remote control connection

7. LAN interface

Through this interface, the analyzer can be connected to your local network for remote control. An integrated testing system can be built quickly, as the analyzer conforms to the LXI Core 2011 Device class instrument standards.

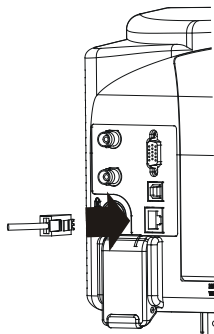


Figure 13 LAN connection

Prepare for Use

General Inspection

Please inspect your new analyzer according to the following steps:

1. Inspect the shipping container for damage

Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the instrument has passed both electrical and mechanical tests.

The consigner or carrier shall be liable for the damage to instrument resulting from shipment. **RIGOL** would not be responsible for free maintenance/rework or replacement of the unit.

2. Inspect the instrument

In case of any damage, or defect, or failure, notify your **RIGOL** Sales Representative.

3. Check the accessories

The accessories supplied with the instrument are listed as follows. If your contents are incomplete or damaged, please notify your **RIGOL** Sales Representative.



A power cord that meets the standard of destination country



A USB Cable



A Quick Guide



A CD*



Front Panel Cover

Note*: CD contains user documentation such as *User's Guide*.

Disassemble the Front Panel Cover

Before putting your analyzer into action, remove the front panel cover by releasing latches at both sides, and sliding in the direction of the arrows as shown in the figure below.

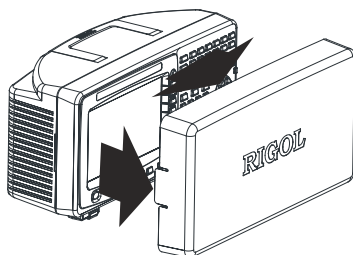


Figure 14 Disassemble the front panel cover

Adjust the Supporting Legs

If necessary, adjust the supporting legs of the analyzer to an appropriately position in the direction of the arrows as shown in the figure below.

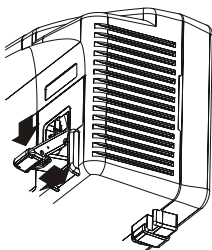


Figure 15 Adjust the supporting legs

Connect the Power

The spectrum analyzer can use AC power or rechargeable battery (China only) for power supply.

Connect the AC Power

Please use the power cord provided for AC powering, see figure below. For the AC voltage and frequency requirements, refer to "**Rear Panel**".

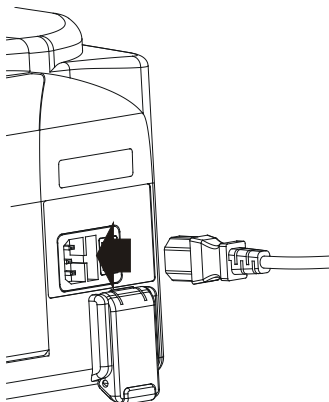



Figure 16 Power cord connection



CAUTION

Please ensure the instrument has been grounded correctly to avoid electrical shock.

Use the Battery (China Only)

The spectrum analyzer provides optional rechargeable battery. Please install the battery according to Figure 17. The battery status indicator  at the front panel indicates the installation status and the current amount of electricity of the battery.

- Green: battery electricity > 80%
- Orange: 20% < battery electricity < 80%
- Red: battery electricity < 20%
- Off: the battery is not installed or the battery contains no electricity

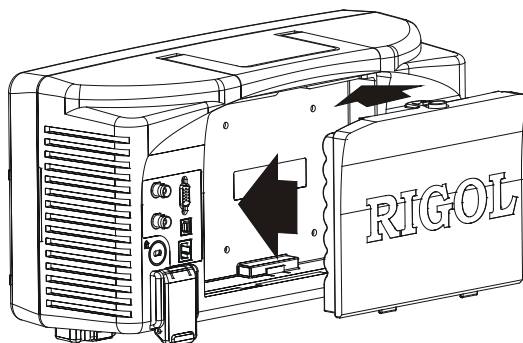


Figure 17 Install the Battery

The battery is rechargeable. For the charge method, refer to the introduction in “Charge the Battery”.



WARNING

Make sure the instrument is not connected to the AC power before installing the battery.

Power-on Check

Turn on the power switch at the rear panel, then press down the power button



on the front panel. You can monitor the initialization process according to the progress indicator during power-on. Upon completion of the initialization process, a sweep curve would be displayed.

Self Calibration

Press **System** → **Calibrate** → **Cal Now**, to use internal calibration resources to calibrate the system.

Use the Lock

If necessary, use a security lock to lock the analyzer in a desired location. See figure below, place the key into the lock hole in the direction of the arrow, turn it clockwise and then remove the key.

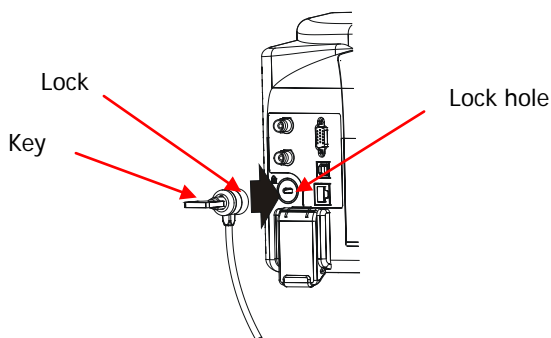


Figure 18 Use the lock

Replace Fuse

Please replace with specified fuse according to the following steps when needed:

1. Turn off the instrument, cut off the power and remove the power cord;
2. Pry out the fuse holder using a small straight screwdriver;
3. Take out the fuse;
4. Replace the old fuse with a specified one;
5. Re-install the fuse holder.

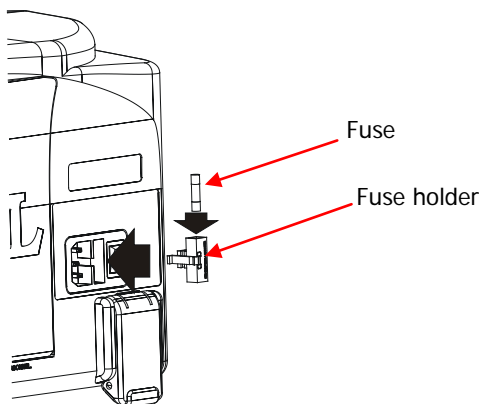


Figure 19 Replace Fuse




WARNING

Please ensure that the instrument has been turned off and the power source has been cut off before replacing the fuse in order to avoid electrical shock.

Charge the Battery (China Only)

Please install the battery by referring to the introduction in “**Use the Battery**”. Then, connect the AC power and turn on the power switch at the rear panel to charge the battery. At this point, the power key at the front panel can be in any state.

The battery status indicator  at the front panel indicates the charge progress. If the battery status indicator does not go on, the battery contains no electricity currently. If the battery status indicator still does not go on after the battery has been charged for half an hour, please cut off the AC power and check whether the battery is correctly installed or whether it is damaged.

No matter whether the spectrum analyzer is in start-up or standby state, about 10 hours are required for the battery to be fully charged.

User Interface

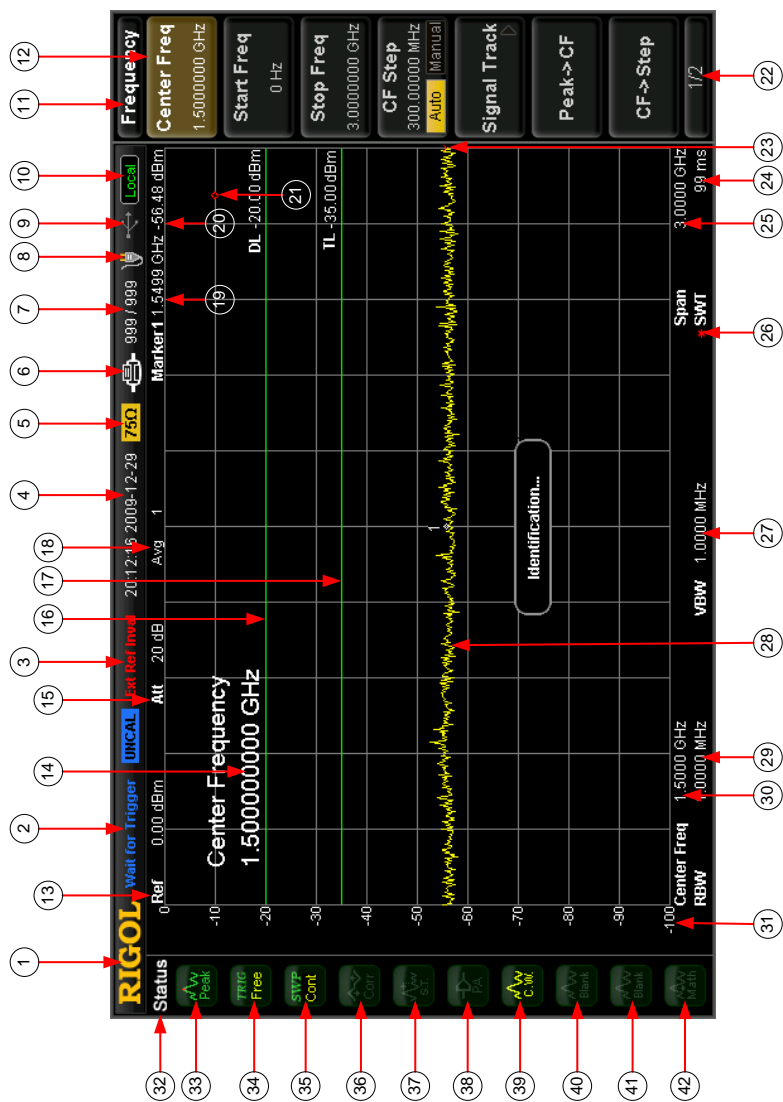











Figure 20 User interface

Table 3 User interface legends

NO.	Name	Explanation
1	LOGO	Logo of RIGOL
2	System status ("UNCAL" and "Identification..." are in different locations)	Auto Tune Auto Range Wait for Trigger Calibrating UNCAL (Measurement Uncalibrated) Identification... (LXI Identification)
3	External reference	Ext Ref Ext Ref Invalid
4	Time	System time.
5	Input impedance	Show "75Ω" if the current input impedance is 75Ω.
6	Printer status	  : Alternate display, denotes the printer now is connecting.  : Successful connection, print finish or idle.   : Alternate display, denotes printing.  : Denotes print has been paused.
7	Print process	Show current print copy and total print copies.
8	Power status	AC supply:  Battery supply (China only): show electric quantity left 
9	USB flash device	Show if USB flash device is inserted; the mark  indicates successfully installed.
10	Operation status	Local or Rmt (Remote).
11	Menu title	Function of current menu belongs to.

User interface legends (Continued)

NO.	Name	Explanation
12	Menu item	Menu item of current function.
13	Reference level	Reference level.
14	Active area	Current parameter and value.
15	Attenuator settings	Sets the Attenuator.
16	Display line	Reading reference and threshold condition for peak value.
17	Trigger level	Sets the trigger level in video trigger.
18	Average times	Average times of trace.
19	Cursor X	Current value of Cursor X. Note that X indicates different physical quantity in different functions.
20	Cursor Y	Current value of Cursor Y. Note that Y indicates different physical quantity in different functions.
21	Invalid data	Current measured data is invalid as a full sweep didn't complete after the system parameters have been modified.
22	Menu pages	Show total number of pages and current page number.
23	Sweep position	Current sweep position.
24	Sweep time	Sweep time.
25	Span or stop frequency	The frequency range of current sweep channel can be expressed by a combination of center frequency and span or a combination of start frequency and stop frequency.
26	Manual symbol	Parameters non-auto coupling.
27	VBW	Video resolution bandwidth.
28	Spectrum line area	For displaying spectrum line.

User interface legends (Continued)

NO.	Name	Explanation
29	RBW	Resolution bandwidth of frequency.
30	Center or starting frequency	The frequency range of current sweep channel can be expressed by a combination of center frequency and span or a combination of starting frequency and stop frequency.
31	Y scale	Label of Y scale.
32	Parameter status	Icons on the left side of the screen indicate the status of system parameters.
33	Detection type	Pos peak, Neg peak, Sample, Normal, RMS Avg Voltage Avg and Quasi-Peak.
34	Trigger type	Free, video and external.
35	Sweep mode	Continuous or Single sweep (with current sweeping times showing)
36	Correction switch	Turn the Correction On or Off.
37	Signal tracking	Enable or disable signal tracking.
38	Preamplifier status*	Enable or disable the preamplifier.
39	Trace 1 types and status	Trace types: Clear Write, Max Hold, Min Hold, Video Avg and Power Avg. Trace status: yellow denotes On, and gray denotes Off.
40	Trace 2 types and status	Trace types: Clear Write, Max Hold, Min Hold, Video Avg and Power Avg. Trace status: purple denotes On, and gray denotes Off.

Note*: This function is the option of DSA1030/DSA1030-TG.

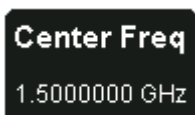
User interface legends (Continued)

NO.	Name	Explanation
41	Trace 3 types and status	Trace types: Clear Write, Max Hold, Min Hold, Video Avg and Power Avg. Trace status: light blue denotes On, and gray denotes Off.
42	MATH trace types and status	Trace types: A-B, A+C, A-C. Trace status: green denotes On, and gray denotes Off.

Menu Operation

There are 7 different menus with respect to different modes of operation:

1. Parameter Input



When selected, use the keyboard to modify the parameters directly.

For example: select **Center Freq**, input desired numbers using the keyboard and select the desired unit from the pop-up unit menu or unit keys. You can also press **Enter** to select the default unit (MHz).

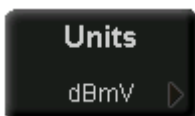
2. State Switching



Press corresponding menu key to switch the sub option shown.

For example: press **Signal Track** → **On/Off** to turn on or off the tracking.

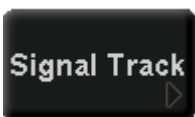
3. Enter Lower Menu (with parameter)



Press corresponding menu key to enter the lower menu and change its options.

For example: press **Units** to enter and select **dBmV**, the unit for Y axis will be changed into dBmV after you return to the previous menu.

4. Enter Lower Menu (without parameter)



Press corresponding menu key to enter the lower menu.

For example: press **Signal Track** to enter directly.

5. Direct Execution



Execute the function after each press of the menu key.

For example: press **Peak->CF** to execute a peak search and the center frequency of the analyzer will be set to the frequency of the current peak signal.

6. Function Switch + Parameter Input



Press corresponding menu key to switch between functions; change parameter directly from the keyboard.

For example: press **CF Step** and switch between **Auto** and **Manual**; if select **Manual**, you can directly input desired numbers to change CF Step.

7. Selected State



Press corresponding menu key to modify parameter and return to the menu one level up.

For example: press **Trig Type** → **Free Run**, which indicates the analyzer is in Free Run state at the present.

Parameter Input

In this part, you will learn how to enter desired parameter values from the numerical keyboard, the knob and the directional keys.

Numerical Keyboard



Figure 21 The Numerical keyboard

The numerical keyboard is consists of:

1. Numerical keys

Numbers 0~9 are available to be used.

2. Decimal point

A decimal point "." will be inserted at the cursor position when this key is pressed.

3. Sign key

Sign key "+/-" is to toggle the sign of a parameter. When pressed the first time, a "-" will be inserted and changed into "+" following the second press.

4. Unit keys

Unit keys include GHz/dBm/s, MHz/dB/ms, kHz/dBmV/μs and Hz/mV/ns.

After entering the desired numbers, choose an appropriate unit to complete the parameter input. The specific meaning of unit is decided by the type of current input parameter ("frequency", "amplitude" or "time").

5. Enter

When pressed, the system will complete the input process and insert a default measuring unit for the parameter automatically.

6. Esc

- (1) During parameter editing process this key can clear the inputs in the active area and exit editing mode at the same time.
- (2) Turn off the display of active area.
- (3) Exit current test mode while in keyboard test.
- (4) Unlock the screen while it is locked.

7. Back

- (1) During the process of parameter editing, this key will delete the characters on the left side of the cursor.
- (2) While in the process of file name editing, pressing this key will delete character that have been entered.

Knob

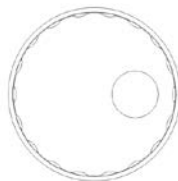


Figure 22 The knob

The knob has following functions:

1. During parameter editing, turn the knob clockwise to increase, or counterclockwise to decrease the parameter values at specified steps.
2. While editing a file name, the knob may select different character from the soft keyboard.
3. Press **AMPT** → **Corrections** → **Edit**, and use the knob to select different reference points.

Directional Keys



Figure 23 Up and down directional keys

The directional keys have following functions:

1. Increase or decrease the parameter value at specific steps while editing a parameter.
2. Move the cursor among root directory in **Storage** function.
3. Select the character in the upper or lower of roll of the soft keyboard while editing file name.
4. Select the adjacent reference points in **Edit** menu: **AMPT** → **Corrections** → **Edit**.

Basic Measurement

In this section, we introduce how to use the analyzer to do basic measurements.

Considering a 50 MHz, 0 dBm sine signal produced from a generator (such as **RIGOL** DG3101A).



CAUTION

The signal amplitude must be less than 30 dBm (equal to 1 W), when its frequency range is from 10 MHz to 3 GHz, or else it will switch the input to a high power impedance state, and consequently the signal cannot be measured by the instrument.

Procedures:

1. Power on

2. Reset to factory settings

Press **System** → **Reset** → **Preset Type** → **Factory**, and then **Preset**.

The instrument will reset all the parameters to factory settings.

3. Equipment Connection

Connect the signal output terminal of generator to the **RF INPUT 50Ω** terminal at the front panel of analyzer.

4. Setup the Center Frequency

- (1) Press **FREQ**, a corresponding menu will appear on the right of the screen, and **Center Freq** is in high-bright state, meanwhile, the center frequency parameter is shown at the top left corner of the display grid, which indicates the **Center Frequency** is active.
- (2) Center frequency could be changed through the numerical keyboard, the knob or the directional keys.
- (3) Input **50** and select **MHz** as its unit using the numerical keyboard, then the center frequency of analyzer is set to **50 MHz**.

5. Setup Span

- (1) Press **SPAN**, a corresponding menu will appear on the screen, and **Span** is in high-bright state, meanwhile, also the span parameter is shown at the top left corner of the display grid, which indicates **Span** is active.
- (2) Span value could be changed through the numerical keyboard, the knob or the directional keys.
- (3) Input **20** and select **MHz** as its unit using the numerical keyboard, then the span of analyzer is set to **20 MHz**.

6. Setup Amplitude

- (1) Press **AMPT**, **Ref Level** is in high-bright state, the reference level will be shown at the top left corner of the display grid, which indicates **Reference Level** is active.
- (2) Reference level could be changed through the numerical keyboard, the knob or the directional keys.
- (3) If necessary, you can change the reference level using the knob so as to bring the signal peak value near the top of the grid based on the signal display.

When all the steps above are finished, a 50 MHz RF curve will be shown on the analyzer.

7. Read Results

The value of frequency and amplitude could be read from the Marker. Press **Marker** → **Select Mkr** → **1** to activate Marker 1 and set the marker frequency to "50 MHz", then the frequency and amplitude of where the marker is located would be shown at the upper right of the display grid.

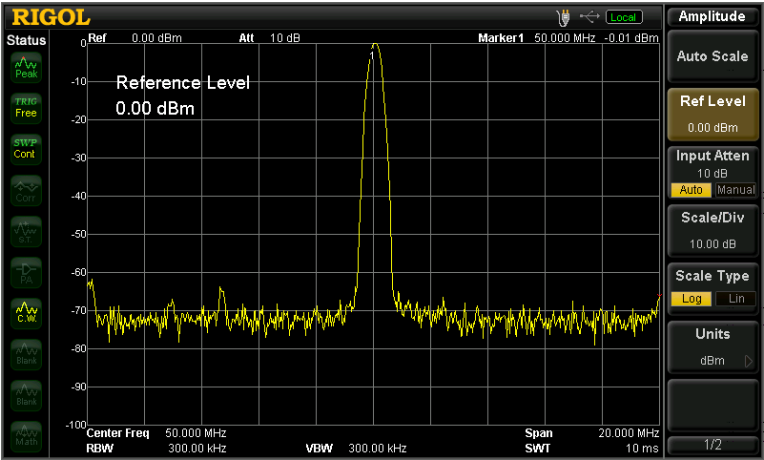


Figure 24 Measuring results

On-line Help System

The built-in help provides information refers to every function key and menu key on the front panel. Users can view this help information if required.

1. How to acquire on-line help

Press **Help**; a prompt about how to obtain help information will be shown, then, repress the key related to the desired function, and the relevant information will be shown on the screen.

2. Page up and down

If there is more than one page of information, you can read the complete information by using the directional keys or the knob.

3. Close the current help information

Press any key on the front panel (except for up and down directional keys or the knob) to close the help.

4. Acquire the help information of menu

Press **Help**, a message about how to obtain help information will be shown, then, press the menu keys F1-F7 to get corresponding help.

5. Acquire the help information of any function key

Press **Help**, a message about how to obtain help information will be shown, then, press any function key to get corresponding help.

The help information includes the menu construction, the corresponding SCPI command and the help contents. See figure below:

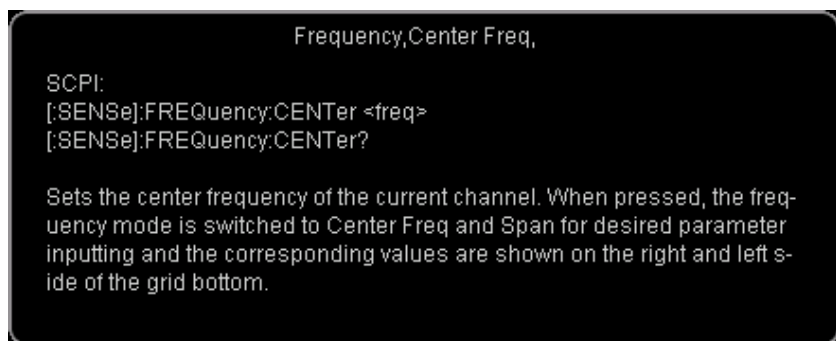


Figure 25 On-line help

Troubleshooting


To help you solve commonly encountered problems we have listed some typical issues with their respective solutions. If the problems persist contact RIGOL and prepare your device information (**System** → **Information** → **System Info**).

1. The screen still dark (no display) after power on:

(1) Check if the fan is running:

- If running, the connection of the internal screen cable may be loose.
- If not, the instrument has failed to power up, please refer to step (2) or (3).

(2) If the battery (China only) is used for power supply:

- Check whether the battery is in good condition and whether it is correctly installed.
- Check whether the battery status indicator  at the front panel goes on; if not, the battery contains no electricity and please charge the battery.

(3) If AC power is used for power supply:

- Check if the power supply has been connected correctly and power switch has been turned on.
- Check if the power fuse is burned. If a new fuse needs to be installed, please select one with these specifications: 250V AC, T2A; 5 mm×20 mm.

2. Unresponsive keys or wrong response

(1) Press all the keys on the front panel to make sure that each of them is normal after power on.

(2) Press **System** → **Self-Test** → **Key Test** to see if all keys are working properly.

(3) If a key is not working, do not disassemble the instrument by yourself

and contact **RIGOL**.

3. The spectrum lines on the screen do not update for long periods:

- (1) Check if the screen is locked, if so, press Esc to unlock.
- (2) Check if the instrument is in Remote control.
- (3) Verify if all the trigger conditions have been met and if there is a valid trigger signal.
- (4) Check if the analyzer is in Single sweep.
- (5) Check if the current sweep time is too long.

4. Wrong measurement results or poor precisions:

To verify the system errors and view the measurement accuracies and precision, refer to the tolerance specifications or characteristics from the *User's Guide*. To get the characteristics listed in the *User's Guide*, please:

- (1) Check if all the peripheral equipment has been successfully connected and is working normally.
- (2) Review the signal under measure and set appropriate instrument parameters.
- (3) Make measurements under proper conditions, for example: warm-up the instrument appropriately and operate within the specified environment and temperature.
- (4) Calibrate the instrument regularly to reduce or avoid errors that can occur over time.
 - Press **System** → **Information** → **System Info** to get the last calibration time and decide if a new calibration is required. If you need a specific calibration after the stated calibration period, contact **RIGOL** for service options.
 - The analyzer provides a self-calibration function. If required, press **System** → **Calibrate** → **Self-Cal**, and the instrument will do a self-calibration once the operating temperature has changed.
 - Press **System** → **Calibrate** → **Cal Now** to do a self-calibration immediately.

5. Prompt Message:

The instrument may give common prompts, error prompts, or state prompts according to the current status to assist in proper use of the analyzer or to show warnings that some fault might happen to the instrument.