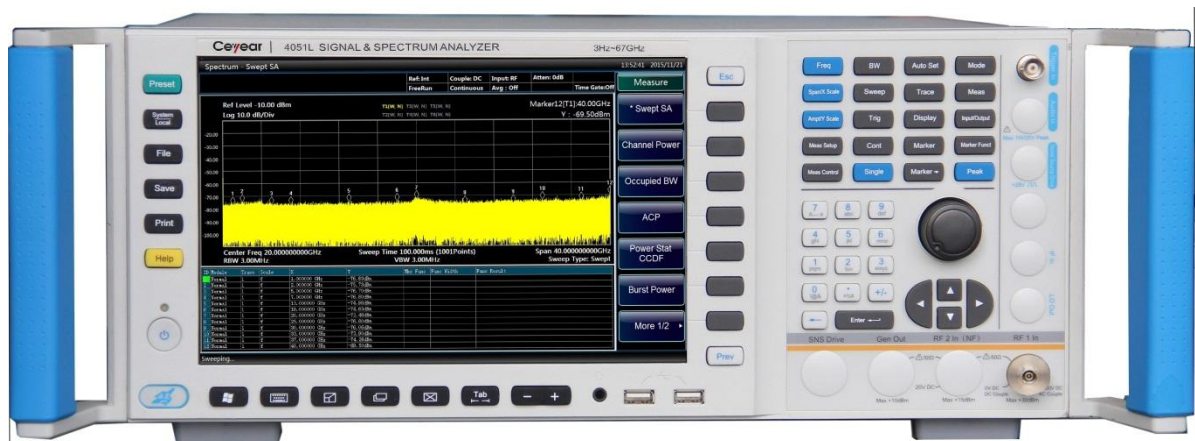




4051 Series Signal/Spectrum Analyzer Quick Start Guide



China Electronics Technology Instruments Co. Ltd

The manual applies to the following signal/spectrum analyzers:

- 4051A signal/spectrum analyzer (3Hz-4GHz).
- 4051B signal/spectrum analyzer (3Hz-9GHz).
- 4051C signal/spectrum analyzer (3Hz-13.2GHz).
- 4051D signal/spectrum analyzer (3Hz-18GHz).
- 4051E signal/spectrum analyzer (3Hz-26.5GHz).
- 4051F signal/spectrum analyzer (3Hz-40GHz).
- 4051G signal/spectrum analyzer (3Hz-45GHz).
- 4051H signal/spectrum analyzer (3Hz-50GHz).
- 4051L Series Signal/Spectrum Analyzer (3Hz-67GHz).
- 4051A-S signal/spectrum analyzer (3Hz-4GHz).
- 4051B-S signal/spectrum analyzer (3Hz-9GHz).
- 4051C-S signal/spectrum analyzer (3Hz-13.2GHz).
- 4051D-S signal/spectrum analyzer (3Hz-18GHz).
- 4051E-S signal/spectrum analyzer (3Hz-26.5GHz).

Besides the standard accessories, the following options of the 4051 series signal/spectrum analyzer are also available:

- 4051-H01, rear panel RF input: postposition the RF signal input interface.
- 4051-H02, HF/IF Output: To output the second IF signal with output frequency range of 275MHz-475MHz and step resolution of 1Hz.
- 4051-H03, IF output: To output the third IF signal with output frequency range of 10MHz-160MHz and step resolution of 1Hz.
- 4051-H04A, Reconstructed IF/video signal output: To realize any IF, AM/FM or I/Q signal output through digital reconstruction with bandwidth upper limit of 40 MHz.
- 4051-H04B, Wideband reconstructed IF/video signal output: To realize any IF, AM/FM or I/Q signal output through digital reconstruction with bandwidth limit of 50 MHz-100 MHz.
- 4051-H08, broadband logarithmic detector output: output the logarithmic detector signal reflecting the input signal level characteristics.
- 4051-H12A, 40MHz bandwidth digital interface: output real-time signal data through optical fiber and support the signal data output up to 40MHz bandwidth.
- 4051-H12B, 200MHz bandwidth digital interface: output real-time bandwidth data through optical fiber and support the signal data output up to 200MHz bandwidth.
- 4051-H15, +24V DC power supply: +24V DC power supply.
- 4051-H22A, 4711 data logger: configure a SSD data logger with the same interface characteristics for a real-time and huge-capacity logging of signal data.
- 4051-H22B, 4712 data logger: configure a HDD data logger with same interface characteristics for a real-time and huge-capacity logging of signal data.
- 4051-H33, electronic attenuator: frequency range: 3Hz-4GHz, attenuation range: 30dB, step:

1dB.

- 4051-H34-04/4051-H34-09/4051-H34-13/4051-H34-18/4051-H34-26/
4051-H34-40/4051-H34-45/4051-H34-50, Low-noise Pre-amplifier: Low-band preamplifier or all-band amplifier options are available. If an all-band preamplifier is adopted, a noise optimization path of at least 4GHz frequency band should be provided.
- 4051-H36, preselector bypass: bypass the tracking preselector in the reception channel.
- 4051-H38A, 40MHz analysis bandwidth: support 10Hz-40MHz analysis bandwidth.
- 4051-H38B, 200MHz analysis bandwidth: support 10Hz-200MHz analysis bandwidth.
- 4051-H39, audio analysis: realize audio signal parameter test, distortion measurement and waveform analysis.
- 4051-H40, external frequency extension: be capable of extending frequency test range through external mixing. In this option, LO output, IF input and signal identification are provided.
- 4051-S04, phase noise measurement: provide the SSB phase noise curve and single point phase noise measurement.
- 4051-S09, analog demodulation analysis: provide modulation characteristic and distortion characteristic analysis of AM, FM and PM signals.
- 4051-S10, transient analysis: test and analyze transient parameter spectrums, frequency spectrums and time-variant characteristics of signals and support logging data playback.
- 4051-S13, pulse signal analysis: realize automatic measurement for time, level and modulation parameters of pulse waveform and statistic analysis of pulse sequences.
- 4051-H97, racking suite: include racking handle and attachments, used for mounting the 4051 on the standard cabinet.
- 4051-H98, English suite: English panel, English instructions, English operating interface and English operation system. Power supply: AC 100/115 V: 50/60Hz; AC 220/240 V: 50/60 Hz.
- 4051-H99, aluminum alloy carrying case: high-strength and portable aluminum alloy carrying case with a handle and rolling wheels, which are convenient for transportation.

Besides the standard accessories, the following options of the 4051-S series signal/spectrum analyzer are also available:

- 4051-H03, IF output: To output the third IF signal with output frequency range of 10MHz-160MHz and step resolution of 1Hz.
- 4051-H08, broadband logarithmic detector output: output the logarithmic detector signal reflecting the input signal level characteristics.
- 4051-H34-04/4051-H34-09/4051-H34-13/4051-H34-18/4051-H34-26, Low-noise Pre-amplifier: Low-band preamplifier or all-band amplifier options are available. If an all-band preamplifier is adopted, a noise optimization path of at least 4GHz frequency band should be provided.
- 4051-S04, phase noise measurement: provide the SSB phase noise curve and single point phase noise measurement.
- 4051-H97, racking suite: include racking handle and attachments, used for mounting the 4051 on the standard cabinet.
- 4051-H98, English suite: English panel, English instructions, English operating interface and English operation system. Power supply: AC 100/115 V: 50/60Hz; AC 220/240 V: 50/60 Hz.
- 4051-H99, aluminum alloy carrying case: high-strength and portable aluminum alloy carrying case with a handle and rolling wheels, which are convenient for transportation.

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Declaration of Conformity

Certificate No. : CTL1608153120-EC
Applicant : The 41st Institute of China Electronics Technology Group Corporation
Address : No.98 Xiangjiang Rd. QingDao Economy and Technology Development Zone, QingDao city, China
Product : SIGNAL & SPECTRUM ANALYZER
Trademark : EI
Model(s) : AV4051A, AV4051B, AV4051C, AV4051D, AV4051E, AV4051F, AV4051G, AV4051H, AV4051A-S, AV4051B-S, AV4051C-S, AV4051D-S, AV4051E-S
Manufacturer : The 41st Institute of China Electronics Technology Group Corporation
Address : No.98 Xiangjiang Rd. QingDao Economy and Technology Development Zone, QingDao city, China
Test Report : CTL1608153120-E

Complies with the requirements of the
EC EMC directive 2014/30/EU with amendments.

Test Standards:

EN 61326-1: 2013
EN 61000-3-2: 2014
EN 61000-3-3: 2013

Remarks:

The **CE** markings as shown below can be affixed on the product after preparation of necessary conformity documentation, as stipulated in article 10 of the Council Directive 93/68/EEC.



For Chief Executive
Aug. 18, 2016



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Preface

Thanks for choosing the 4051 series signal/spectrum developed and produced by China Electronics Technology Instruments Co. Ltd.

We devote ourselves to meeting your demands, providing you high-quality measuring instrument and the best after-sales service. We adhere to the philosophy of "superior quality and considerate service", and are committed to offering satisfactory products and service for our clients.

Manual No.

AV2.732.1000SK

Version

C.2 2018.02

China Electronics Technology Instruments Co. Ltd.

Statement

The information contained in this User Manual is subject to change without prior notice. China Electronics Technology Instruments Co. Ltd. reserves the right of final explanation for the contents of and terms used in this Manual.

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Product Quality Assurance

The warranty period of the product is 18 months from the date of delivery. The manufacturer will repair or replace the damaged parts according to the actual situation within the warranty period. So the user should return the damaged product to the manufacturer and prepay the mailing costs. The manufacturer will return the product and such costs to the user after maintenance.

Product Quality Certificate

The product meets the indicator requirements of the manual at the time of delivery. Calibration and measurement are completed by the measuring organization with qualifications specified by the state, and relevant data are provided for reference.

Quality/Environment Management

Research, development, manufacturing and testing of the product comply with the requirements of the quality and environmental management system. China Electronics Technology Instruments Co. Ltd. has obtained the appropriate qualifications and passed the certification of ISO 9001 and ISO 14001 management system.

Precautions



“Caution” indicates danger. It reminds the user to pay attention to a certain operation process, operation method or similar situations. Noncompliance with the rules or improper operation may result in minor or moderate personal injury and damage to the instrument. You shall fully understand and meet all the conditions in the caution before proceeding to the next step.



“Attention” indicates important prompts and no danger. It reminds the user to pay attention to a certain operation process, operation method or similar situations. Noncompliance with the rules or improper operation may result in damage to the instrument or loss of important data. You have to fully understand the caution and meet all the conditions in it before proceeding to the next step.

Contents

1. Manual Guide.....	1
1.1 About the Manual	1
1.2 Related Documents	1
2 Preparations before Operation	4
2.1 Preparations before operation	4
2.2 Configuration of operating system.....	14
2.3 Instrument Appearance	17
3 Typical applications	23
3.1 Measure sine signal.....	23
3.2 Set and move markers.....	26
3.3 Set peak list.....	28
3.4 Setting the preset status.....	29
3.5 File saving/calling method.....	30
3.6 Screenshot printing/saving.....	32
4 Access to Help	34
4.1 Basic inspections.....	34
4.2 Help information.....	35
4.3 Repair.....	35

1. Manual Guide

This chapter describes the function, organization and main content of the Quick Start Guide of 4051 Series Spectrum Analyzer and introduces associated documents of the instrument provided for the user.

- [About the manual](#).....1
- [Related documents](#).....1

1.1 About the Manual

This Manual introduces the basic functions and basic operation methods of 4051 Series Signal/Spectrum Analyzer. It describes the guidance of operation before start-up, system setting, characteristics of the front and rear panel, basic operation method, simple fault diagnosis and repair, etc., to help you rapidly get familiar with and understand key points of the instrument operation method and use. For the convenience of operation, please carefully read the manual before operating the instrument, and properly operate it according to the guidance in the manual.

The Quick Operation Guide includes the following chapters:

- **Preparation for use**

This chapter introduces the pre-operational check, operating system configuration, initialization configuration and description of appearance of the 4051 Series Signal/Spectrum Analyzer, preparing the users for correct and safe use of the device.

- **Typical application**

Hands-on samples are described in details based on the commonly used and important functions of the device, for example, measure sinusoidal signal, set and move marks, peak list function, data save/calling, so that the users can familiarize themselves with the application methods of this 4051 Series Signal/Spectrum Analyzer as soon as possible.

- **Help**

“Help” includes the basic methods of fault diagnosis, troubleshooting and repairing.

1.2 Related Documents

The documents related to 4051 series signal/spectrum analyzer include:

- Quick Start Guide

1. Manual Guide

1.2 Related Documents

- User Manual
- Program Control Manual
- Online help

Quick Start Guide

The Manual introduces the basic operations of configuration, start-up and measurement of the instrument, to help users rapidly understand the characteristics of the instrument and understand basic local and remote control operations. It mainly includes the following chapters:

- Preparation for use
- Typical application
- Help

User Manual

The Manual introduces the functions and operations of the instrument in detail, including: configuration, measurement, program control, maintenance, etc. In order to: guide the users to comprehensively understand the functional characteristics and common test methods of the instrument. It mainly includes the following chapters:

- Manual Navigation
- Overview
- Getting Started
- Operation Manual
- Menu
- Remote control
- Fault diagnosis and repair
- Technical indicators and test methods
- Appendix

Program Control Manual

This manual introduces the remote programming basis, SCPI basis, SCPI commands, programming examples, I/O drive function library, etc. In order to: Guide the user to rapidly and comprehensively grasp the program control commands and methods of the instrument. It mainly includes the following chapters:

- Remote control
- Program control commands
- Programming examples
- Error illustration
- Appendix

Online Help

Online help is integrated in the instrument to provide rapid text navigation and facilitate local

and remote operation. Hard keys on the front panel of the instrument and tool bars of the user interface can be activated with corresponding shortcut keys. Main chapters are the same as those in the user manual.

2 Preparations before Operation

- Preparation before operation.....4
- Configuration of operating system14
- Instrument Appearance17

2.1 Preparations before operation

This chapter introduces the precautions for initial setting and operation of the 4051 series signal/spectrum analyzer.

- Unpacking 5
- Instrument placement and installation6
- Power-on/off 6
- Proper use of connector.....9
- User inspection 1 1
- Online help 1 4

 **Warning**

Prevent damage to the instrument.

In order to avoid electric shock, fire and personal injury:

- Do not open the casing without permission.
- Do not disassemble or modify any part which is not described in this manual. Do not disassemble it at your own discretion, this may reduce the electromagnetic shielding performance and cause damage to parts in the instrument, etc., thus affecting the product reliability. In this case, we will not provide free maintenance services even within the warranty period;
- Users are required to carefully read the content in “[2.2 Safety guidelines](#)” and the following operational safety precautions and to pay attention to the requirements on specific operating environment required by the technical indexes.

Attention

Electrostatic protection

Pay attention to anti-static measures in the workplace to prevent damage to the instrument.

For more details, please refer to “[2.2 Safety guidelines](#)” of the User Manual.

Attention

Pay attention to the following requirements before operation:

The improper operation location or measurement setting may result in damage to the instrument or the connected instrument. Pay attention to the following requirements before powering on the instrument:

- The fan blades and ventilation holes are not blocked, and the instrument is at least 15cm away from the wall;
 - Keep the instrument dry.
 - Horizontally and reasonably arrange the instrument.
 - The ambient temperature should meet the requirement in the technical specifications;
 - The input signal power of the port is within the specified range;
 - The signal output port is properly connected and not overloaded.
-

Prompt

Influence of electromagnetic interference (EMI):

Measurement results may be affected by electromagnetic interference, therefore:

- Select the appropriate shielded cable. Example: use the dual-shielded radio-frequency/network connection cable;
 - Always open and close the cable connection port which is not used temporarily.
 - Please refer to the EMC grade indicated in the technical specifications.
-

2.1.1 Unpacking

2.1.1.1 Appearance inspection

Step 1. Check whether the outer package and shockproof package are damaged. In case of no damage, store the outer package for future use. Continue inspection according to the following steps;

Step 2. Unpack the instrument and check whether the host and accompany articles are damaged;

Step 3. Check the above articles according to the requirements of Table 2.1.

Step 4. Do not power on the instrument if the outer package is damaged or the instrument or accompanying items are damaged or inappropriate. Contact our service

2 Preparations before Operation

2.1 Preparations before operation

consultation center at the service consultation hotline in the Guide. We will rapidly repair or replace the instrument in accordance with the actual situation.

Attention

Handling: The instrument and packing box are heavy and should be handled by two people with care.

2.1.1.2 Model confirmation

Table 2.1 List of Accompanying Articles of 4051

Name	Quantity	Function
Host		
4051	1	—
Standard		
Three-core power cord	1	—
USB mouse	1	—
User Manual	1	—
Programming Manual	1	—
Packing list	1	—
Options		
Depend on users' options	—	—

2.1.2 Instrument placement and installation

To ensure normal functioning of the 4051 Series Signal/Spectrum Analyzer, attention should be paid to the following:

- The operation site should meet the requirements for operating environment and cooling. Appropriate static protection measures should be taken. Refer to “[3.1.1.2 Environmental requirements](#)” in the User Manual for details.
- Compliance with the operating requirements: The device can be horizontally placed at a workbench covered by an anti-static mat. For more details, please refer to “[2.2.2 Operating Status and Location](#)” of the user manual.

2.1.3 Power-on/off

The method and precautions of initial power-on are as follows.

2.1.3.1 Connection of power supply

Check the power supply parameters and power cord before initial powering-on. For more details, please refer to the “3.1.1.3 Precautions Before Powering-on” in the User Manual.

Step 1. Connect the power line: Use one end of the power cord of the Signal/Spectrum Analyzer in the packing box or three-core power cord which meets relevant requirements to insert into the power socket on the rear panel of the Signal/Spectrum Analyzer (as shown in Fig. 2.1) and the other end of the power cord should be connected to a required AC power source;

Step 2. Turn on the power switch at the rear panel: As shown in Fig. 2.2, check whether the standby indicator above the power switch on the front panel (as shown in Fig. 2.3) is ON and turns yellow.

Step 3. Turn on the power switch at the front panel: As shown in Fig. 2.3, before turning on the device, do not connect any device to the Signal/Spectrum Analyzer. The device can be turned on when everything works well. After the device is turned on, the indicator above the power switch on the front panel of the device will turn green.



Fig. 2.1 Power socket on the rear panel of 4051



Fig. 2.2 Power switch on the rear panel of 4051

2.1 Preparations before operation



Fig. 2.3 Power switch on the front panel of 4051

2.1.3.2 Start-up/shutdown of instrument

1) Open instrument

Step 1. Turn the power switch on the rear panel to “I”. At such time, the power indicator above the power switch on the front panel turns yellow and the instrument is in standby mode;

Step 2. Turn on the power switch in the lower left corner of the front panel. The power indicator above the power switch turns from yellow to green;

Then the instrument can be operated.

Prompt

10MHz time base and warm-up

Under cold start condition, the 4051 series signal/spectrum analyzer (the instrument starts from complete shutdown) should be preheated for a while to reach the operating temperature at 10 MHz. If the instrument starts from standby, no preheating is required. To test indicators, the instrument needs to be preheated for 0.5h. (refer to instructions in the technical specifications for more details)

Prompt

Attenuator initializing

When entering the host program, there will be noise from attenuator gear setting due to attenuator initialization. Do not mistake it for a fault in the signal/spectrum analyzer.

2) Shutdown

Step 1. Turn off the power switch at the lower left of the front panel and wait for the power

indicator above the power switch to change from green to yellow;

Step 2. Turn the power switch on the rear panel to “O”, or connect the power supply of the instrument.

Thus the instrument is shut down.

Attention

Shutdown of Instrument

The instrument in normal operation must be shut down by operating the power switch of the front panel. Do not directly operate the power switch of the rear panel or directly cut off the power supply of the instrument; otherwise, the instrument cannot be shut down normally and may be damaged, or the current status/measurement data may be lost. **Shut down the instrument properly.**

2.1.3.3 Cutoff of power supply

In order to prevent personal injury, the power supply of the signal/spectrum analyzer shall be cut off immediately under abnormal conditions. In this case, pull off the power cord (from the AC power socket or the power socket of the rear panel of the instrument). Therefore, sufficient operating space should be reserved for direct cutoff of the power supply if necessary.

2.1.4 Proper use of connector

Connectors are commonly used in various tests of the signal/spectrum analyzer and the following items should be checked when using connectors:

2.1.4.1 Inspection of connector

Wear the anti-static wristband in connector inspection. It is recommended to use the magnifying lens to check the following items:

- 1) Check whether the plating surface is worn or deeply scratched;
- 2) Check whether threads are deformed;
- 3) Check whether there are metal particles on the connector threads and joint surfaces;
- 4) Check whether the internal conductor is bent or cracking;
- 5) Check whether the connector screw can rotate properly.

Caution

Prevent damage to the instrument port in connector inspection.

A damaged connector may also cause damage to another well-behaved connector that is connected with it even in the first measurement connection. In order to protect each interface of the signal/spectrum analyzer, the connector must be checked before connection.

2.1.4.2 Connection method

Check and clean the connector before measuring the connection. Ensure that the connector is clean and intact. Wear the anti-static wristband in connection. The correct connection method and steps are as follows.

Step 1. As shown in Fig. 2.4, align the axes of two connectors to be interconnected, and ensure that the pin of the male connector can concentrically slide into the jack of the female connector;

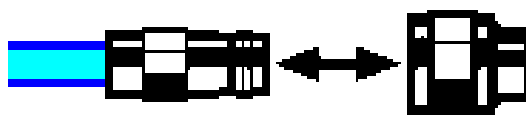


Fig. 2.4 Alignment of Axes of Interconnected Connectors

Step 2. As shown in Fig. 2.5, horizontally move the two connectors together to make them connected smoothly. Tighten the connector nut by means of rotation (do not rotate the connector). Avoid relative rotation of connectors during connection.

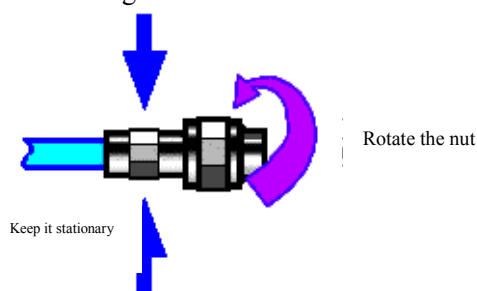


Fig. 2.5 Connection Method

Step 3. As shown in Fig. 2.6, complete the final connection by tightening with the torque wrench. Note that the torque wrench must not be beyond the initial break point. Use the auxiliary wrench to prevent the connectors from rotation.

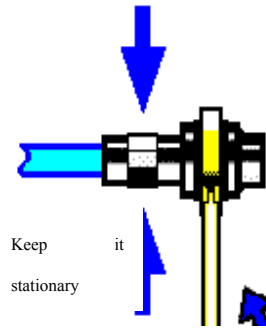


Fig. 2.6 Final Connection with Torque Wrench

2.1.4.3 Disconnection method

Step 1. Support the connectors to prevent any kind of force which may result in distortion, shaking or bending.

Step 2. Use the open-end wrench to prevent the connector body from rotation;

Step 3. Use another wrench to loosen the connector nut;

Step 4. Rotate the connector nut by hand to complete final disconnection;

Step 5. Horizontally separate two connectors.

2.1.4.4 Use of torque wrench

The use of the torque wrench is shown in Fig. 2.7. Note the following items.

- Check whether the wrench has a torque set properly before use.
- Keep the angle between the torque wrench and another wrench (supporting the connector or cable) 90° before applying force.
- Carefully grip the handle end of the torque wrench, and apply force in the direction vertical to the handle to reach the break point of the wrench.

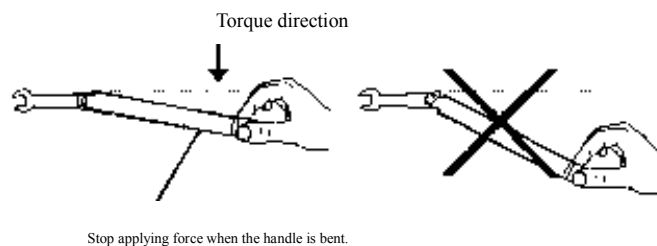


Fig. 2.7 Use of Torque Wrench

2.1.5 User inspection

After the 4051 series signal/spectrum analyzer is energized for the first time, the instrument should be checked for normal operation to prepare for subsequent measurement operations.

Prompt

Description of hard/soft keys on the front panel

Hard/soft keys on the front panel are described in the following forms:

- 1) Hard key description: **【XXX】** , where XXX is the hard key name.
- 2) Soft key description: [XXX], where XXX is the soft key name.

If soft keys correspond to more than one state and their selected values have blue background color, it means relevant keys are enabled. For example: [Sweep Time **Auto** Man], indicating Sweep Time Auto is enabled.

2.1.5.1 Self-test

1) Calibrate

When the instrument is used for the first time, or there is obvious temperature change, self-calibration is required and the instrument should be calibrated according to the calibration signal. Power the instrument up and check that the power indicator above the power switch at the lower left corner of the front panel turns yellow, which means the standby power is working properly. Slightly touch the power switch on the front panel, check that the power indicator on the front panel turns green and the display backlight is on. It takes about 40s to start the display and show the starting status interface.

The signal/spectrum analyzer should be set as follows:

- Step 1. Press **【System】** on the front panel to enter the system menu; press [Align] and [Align All] to begin whole-machine calibration of the instrument. In this case, a yellow dialog box will appear on the screen, prompting “Align is underway”;
- Step 2. Wait for the calibration to finish:

The calibration finishes when the dialog box disappears. If no error message is prompted at the lower right corner of the screen, it means the instrument is working properly; if there is an error message, the instrument may work abnormally. In this case, please contact our service center by calling the service hotline provided in this Guide and we will offer immediate repair or replacement service as appropriate.

2) Self test

Self-test may not be required at every startup of the instrument. Self-test is only necessary if the device is believed to be at fault. For necessary self-test, set the device as follows:

- Step 1.** Press **【System】** on the front panel to enter the system menu;
- Step 2.** Press [Self-Test ▶] in the soft menu of the front panel to enter self-test interface;
- Step 3.** Select the item to be tested and press [Start] soft menu to start the test. Relevant test result will be displayed in the result column. Observe test results: if the test is successful, “PASSED” will appear, indicating that the instrument operates normally; otherwise, “FAILED” will appear, indicating that the instrument does not operate normally. In this case, contact our service consultation center by the hotline in the operation guide. We will rapidly repair or replace the instrument, depending on actual conditions. If all items are passed, it means the instrument is working properly; if certain item fails the test, it means the instrument is not working properly in some way. In this case, please contact our service consultation center at the service consultation hotline in the Guide. We will provide immediate repair or replacement service as appropriate.

After the above two steps, the instrument will be ready for operation.

2.1.5.2 Functional verification

After self-calibration of 4051 series signal/spectrum analyzer, the instrument should be set as follows:

- Step 1.** Press **【Input/Output】** on the front panel to pop up the input/output setting soft menu, press [Cal Port>>] and [500MHz] to select 500MHz calibration signal and press [Input Port RF Cal] soft key to select the input interface for calibration. In this case, the internal calibration signal of the instrument is connected to the RF input interface;
- Step 2.** Check the test result on the screen. If 500 MHz calibration signal can be observed, it means the instrument is working properly; if not, it means the instrument is not working properly in some way. In this case, please contact our service consultation center at the service consultation hotline in the Manual. We will rapidly repair or replace the instrument, depending on the actual situation;
- Step 3:** Press [Cal Port], [4800MHz] to select 4,800 MHz calibration signal;
- Step 4.** Observe the test result on the screen. If 4800 MHz calibration signal can be observed, it means the instrument is working properly; if not, it means the instrument is not working properly in some way. In this case, please contact our service consultation center at the service consultation hotline in the Guide. We will rapidly repair or replace the instrument, depending on the actual situation.

The 4051 series signal/spectrum analyzer features online help: press the yellow [Help] to call the online help file.

2.2 Configuration of operating system

4051 Series Signal/Spectrum Analyzer is installed with Windows 7 operating system. To ensure normal functioning of software functions of the device, please refer to the following safety precautions relating to the operating system of this Signal/Spectrum Analyzer.

- [Windows 7 configuration](#).....14
- [Windows 7 system security and maintenance](#).....16

Attention

The third-party software may affect the instrument performance

The 4051 series signal/spectrum analyzer is equipped with the open Windows system, and the third-party software may affect the performance of the signal/spectrum analyzer. The applied software must be tested by the manufacturer and compatible with the host software.

2.2.1 Windows 7 configuration

Before the instrument is delivered out of the factory, the operating system of the instrument has been set to the best configuration and any change in such setting will result in reduction in measurement performance of the instrument. Generally, no change in Window operating system settings is required.

Attention

Such BIOS setting cannot be changed.

The user must not change BIOS setting; otherwise, anomaly may occur in instrument start and operation.

Attention

Problems caused by changes in system configuration

In case of problems in instrument usage or system crash due to changes in system configuration, the system recovery tool can be used to restore the operating system and application software, or users may contact our service consultation center at the service consultation hotline in the Guide. We will resolve the problems as soon as possible.

However, users may be free to modify the following items to facilitate measurement reporting and system integration.

- [Configure GPIB](#) 15
- [Network Configuration](#) 15

2.2.1.1 Configure GPIB

The user may need to modify the GPIB address in system building. The default GPIB address of the signal/spectrum analyzer is 18. The GPIB address can be changed as follows:

Click **【System】** [Interface config ▶] [GPIB Address], and change the GPIB address of this device by inserting relevant numbers in the input box of GPIB address using the numerical keys on the front panel.

2.2.1.2 Network Configuration

1) Change host name

The host name (computer name) of the 4051 series signal/spectrum analyzer has been preset as “4051-PC” before delivery from the factory. To avoid repetition of network name, if one network is connected to more than one analyzer, users may be free to change the host name. To change the host name, please refer to the Help document of Microsoft Windows 7 for details.

2) Configure IP address, subnet mask and default gateway

Click **【System】** [Interface Config ▶] [Internet Config...], and the network connection setup page will appear. Click local connection, select Attribute by pressing the right key and double click “Internet protocol version 4 (TCP/IP)” to change the IP address, subnet mask and default gateway of this device.

3) Change system firewall settings

The firewall is used to prevent unauthorized users to remotely operate the instrument.

2 Preparations before Operation

2.2 Configuration of operating system

Therefore, it is the manufacturer's recommendation to turn on the firewall for protection. Firewall protection has been enabled for the system and all interfaces for remote operations when the 4051 Series Signal/Spectrum Analyzer is delivered from the factory.

The administrator is the only person authorized to change firewall settings.

2.2.2 Windows 7 system security and maintenance

2.2.2.1 Anti-virus software

Installation of anti-virus software may have some negative effect on performance of the instrument. It is highly recommended that users do not use the instrument as common computer for browsing the Internet or transmitting files to avoid infection of viruses.

Before using any USB mobile memory devices, they should go through anti-virus treatment with a computer installed with latest anti-virus software to ensure that such devices will not carry any virus.

Infection of the signal/spectrum analyzer system by viruses will bring adverse effect on system operation and usage by users. In such case, it is recommended that users restore the system. Refer to the "[2.2.2.2 System maintenance](#)" for more details.

2.2.2.2 System maintenance

1) Windows 7 backup

It is recommended that users regularly back up the system with the "system recovery tool" of the instrument to completely back up instrument data and the system. See "[System backup and recovery](#)" for more details.

It is recommended that before the instrument is used for purposes other than common purposes, such as long-term access to Internet and installation of third-party software, system backup of the instrument should be made to avoid accidental infection of viruses and other damages to operations of the instrument system.

The Windows 7 operating system has similar data backup function and is capable of copying all data in the instrument and creating a system disk to recover Windows system in case of serious failure. Refer to helps and references of Windows 7 system for more information. At the same time, third-party backup software that is compatible with the system software of the instrument can be used. It is recommended to use external devices for backup of the system data, such as network hard disk or USB hard disk.

2) Windows 7 system recovery

The Windows 7 system is capable of system recovery to restore the system to its previous state at certain point. However, the system backup and recovery function of Windows may fail in some cases. Thus, it is recommended not to use this backup solution. For specific recovery methods, please refer to “3.1.2.5 System backup recovery” of the User Manual for details.

2.2.2.3 Hard disk partition and usage

The hard disk has been divided into three parts: “C:”, “D:” and “E:”.

Disk C contains Windows 7 operating system and instrument application programs. Third-part software can also be installed to Disk C. Disk C is the only disk for program backup and recovery.

Disk D mainly contain the response program for keys: KeyMap.

Disk E is mainly used for data storage. It contains software data saved by users and Disk C system backup data. Users can copy the backup data on Disk E to external memory devices. In this case, all that is needed is to restore backup data to the new disk if the hard disk is to be replaced.

2.3 Instrument Appearance

This chapter introduces the elements and functions of the front panel, the rear panel and the operation interface of the 4051 series signal/spectrum analyzer. Composition and functions of the front panel:

- [Front panel](#) 17
- [Operation interface](#)..... 19
- [Rear panel](#) 20

2.3.1 Front panel

This section describes the composition and function of the front panel of 4051 Series Signal/Spectrum Analyzer. The front panel is shown below (Fig. 2.8) and the description of each item is listed in Table 2.2.

2 Preparations before Operation

2.3 Instrument Appearance

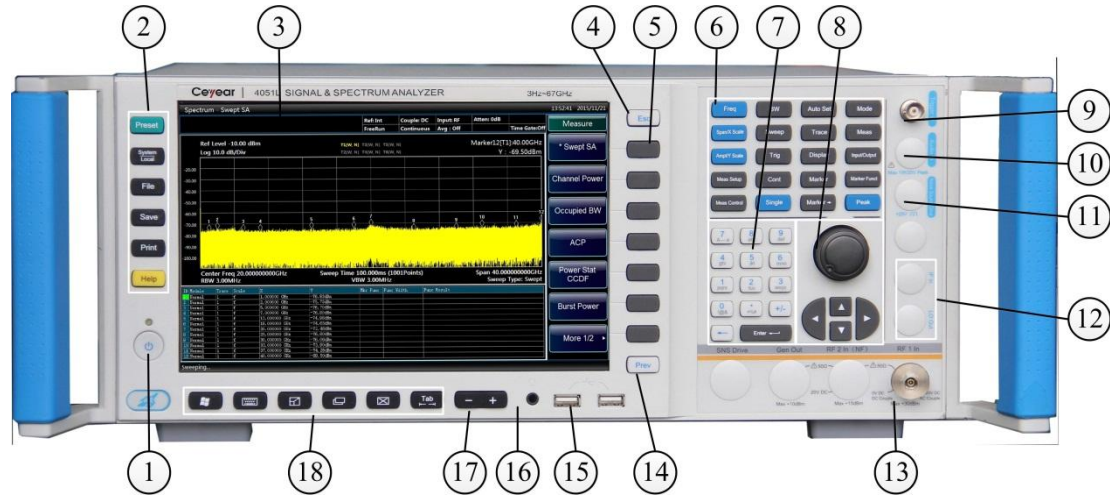


Fig. 2.8 Front panel of 4051 Series

- | | | |
|---------------------------------|-------------------------------|-------------------|
| 1. Power button | 7. Numeric keypad | 14. Back |
| 2. System function area | 8. Knob and arrow keys | 15. USB interface |
| 3. Display zone | 9. Trigger input | 16. Headset jack |
| 4. Cancel key | 10. Audio input | 17. Volume key |
| 5. Soft key | 11. Noise source drive | 18. Window keys |
| 6. Measurement setting key area | 12. External mixing interface | |
| | 13. RF input | |

Table 2.2 Front Panel Description

No.	Item	Description
1	Power button	When instrument is under “standby” condition, yellow indicator of power switch is on; press the power switch once, green indicator is on, that is, instrument is under “working” condition.
2	System function area	The system function area is used for setting system functions and consists of six hard keys, including Reset, System/Local, File, Save, Print and Help.
3	Display zone	LCD display for displaying all measurement results, states and settings information and allowing switching between different measurement tasks. If touchscreen option is configured, this display will be touchscreen. In this case, the user can operate and use the device in a rapid and easy manner.
4	Cancel key	You can use this key to exit from any functional operation without changing current parameter. Cancel the active function, and exit the number operation and file dialog box.
5	Soft key	The soft key zone consists of 7 unmarked dark keys at the right of the display area and the instructions to which these keys correspond are dynamic. That is to say, depending on the function key currently selected, different soft key lists will appear at the right of the screen and by pressing relevant soft key, the function corresponding to the soft key

		will be highlighted.
6	Measurement setting key area	The measurement setting key area provides the most common measurement settings and functions, including measure, measurement setting, measurement control, frequency, frequency span/horizontal axis, amplitude/vertical axis, bandwidth, correlation, track, sweep, trigger, display, single, continuous, input/output, mark, mark →, mark function, peak search, and other functions.
7	Numeric keypad	For inputting alphabetic and numeric parameters.
8	Knob and arrow area	For changing a parameter or moving to select an object, etc.
9	Trigger input	BNC female, for external trigger signal input on the front panel with input voltage range of [-5V, +5V].
10	Audio input	BNC female, for test and analysis of audio signal input with input frequency range of [-5V, +5V].
11	Noise source drive	Reserved for function extension.
12	External mixing interface	Available when relevant option is selected. LO output interface: 2.4mm connector; external IF input interface: 3.5mm SMA female connector.
13	RF input	For subsequent analysis by connecting the tested device via the cable to RF input interface.
14	Back	Press Esc to return the soft menu to the previous level.
15	USB interface	Standard USB2.0 interface, A type. For connecting peripherals of the USB interface, such as keyboard, mouse, drive and hard disk.
16	Headset jack	To connect the headset. If it is connected, the internal loudspeaker will be turned off automatically.
17	Volume key	To set headset or loudspeaker volume.
18	Window keys	Function keys related to window operation, including Windows system start menu, keys of virtual keyboard, window zoom-in/out keys, window switch key, window close key and Tab key.

2.3.2 Operation interface

LCD front panel of the 4051 Signal/Spectrum Analyzer is used for displaying user operation interface, including the status of all measurement tasks, parameter settings and measurement results. The operation interface is shown in Fig. 2.9, and its items are listed in Table 2.3.

2 Preparations before Operation

2.3 Instrument Appearance

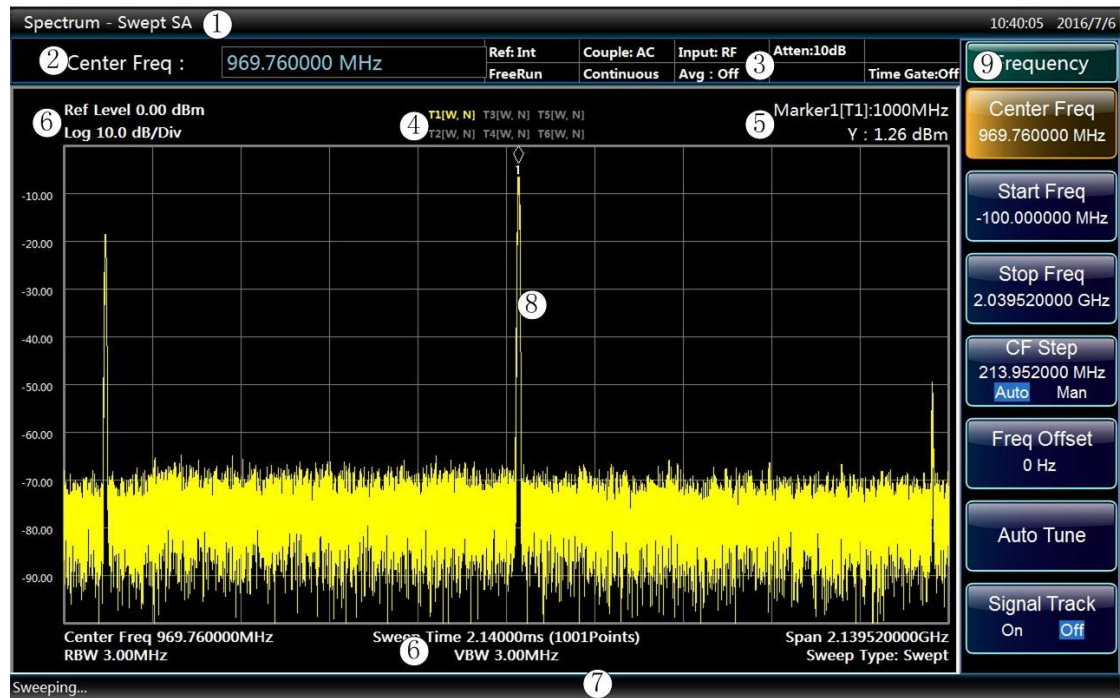


Fig. 2.9 Operation Interface of 4051

Table 2.3 Description of Operation Interface

Graphic No.	Function description
1	Title bar to display currently active measurement mode/function.
2	Parameter input area as the input field of the measurement setting.
3	Instrument setting information panel for displaying current setting information of the instrument, such as reference clock: Internal/external; input source; trigger mode; sweep mode; attenuator decrements; track average type and times; time gate on/off, etc.
4	To display trace information.
5	To display active marker information.
6	To display measurement setting of graticule area data. The example displays: Reference level, scale type, scale/division, center frequency, sweep time (sweep point), frequency span, resolution bandwidth, video bandwidth, sweep type.
7	Instrument and status information for displaying measurement progress and prompting error messages.
8	To display test table.
9	To display the soft key menu of the last key pressed.

2.3.3 Rear panel

This section describes the composition and function of the rear panel of 4051

Signal/Spectrum Analyzer. The rear panel is shown in the figure below (Fig. 2.11). Description of detailed item is shown in Table 2.4.

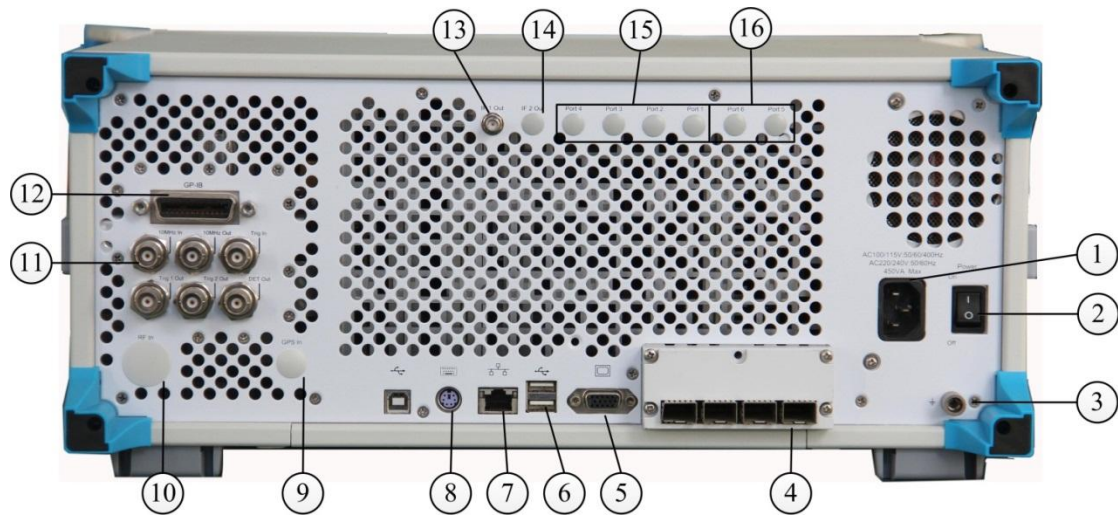


Fig. 2.11 Rear Panel of the 4051 Signal/Spectrum Analyzer

- | | | |
|------------------------------------|--|-----------------------|
| 1. Input interface of power supply | 6. USB interface | 11. GPIB interface |
| 2. Power switch | 7. LAN interface | 12. IF Out 1 |
| 3. Earthing terminal | 8. Positioning antenna input | 13. IF Out 2 |
| 4. PV module interface | 9. RF input on the rear panel | 14. Wideband output |
| 5. Monitor | 10. BNC input/output on the rear panel | 15. Narrowband output |

Table 2.4 Description of Rear Panel

No.	Name	Description
1	Input interface of power supply	AC power input of the instrument.
2	Power switch	Main power control switch of the instrument.
3	Earthing terminal	To reliably ground the instrument.
4	PV module interface	To realize IQ data input and output via PV conversion module.
5	Monitor	VGA interface, for external connection with VGA display device.
6	USB interface	Standard USB2.0 interface, A type. For connecting peripherals of the USB interface, such as keyboard, mouse, drive and hard disk.
7	LAN interface	RJ45 interface, TCP/IP interface, 10/100/1000M self-adaptive, for remote operation of the analyzer.
8	Positioning antenna input	SMA female, GPS / Beidou positioning module antenna input interface (reserved for extension)
9	RF input on the rear panel	Option with interface type subject to the frequency range of the instrument for signal connection during test system building.

2 Preparations before Operation

2.3 Instrument Appearance

10	BNC input/output on the rear panel	Covering six BNC input/output ports. Refer to Table 2.5 for description of each port.
11	GPIB	Remote control port, standard IEEE488 interface, SCPI Language supported.
12	IF Out 1	To output the second IF signal with output frequency range of 275MHz-475MHz and step resolution of 1Hz.
13	IF Out 2	To output the third IF signal with output frequency range of 10MHz-160MHz and step resolution of 1Hz.
14	Wideband output	To realize any IF, AM/FM or I/Q signal output through digital reconstruction with bandwidth limit of 50 MHz-100 MHz.
15	Narrowband output	To realize any IF, AM/FM or I/Q signal output through digital reconstruction with bandwidth upper limit of 40 MHz.

Table 2.5 Description of BNC input/output on the rear panel

Interface name	Interface description
10MHz input	BNC female for 10 MHz reference signal input with required amplitude over 0 dBm.
10MHz output	BNC female for 10 MHz reference signal output of the analyzer. To lock the frequency of other test devices to the frequency reference of the analyzer.
Trigger input	BNC female for external trigger signal input on the rear panel with input voltage range of [-5V, +5V].
Trigger output 1	BNC female, TTL level, trigger signal output for synchronizing with other test devices. Output signal type configured by the output/input menu.
Trigger Output 2	BNC female, TTL level, trigger signal output for synchronizing with other test devices. Output signal type configured by the output/input menu.
Detector output	BNC female for video detector signal output.

3 Typical applications

This section explains common and important basic settings and functions of 4051 Series Signal/Spectrum Analyzer step by step through examples and the purpose is to enable the user to quickly understand the characteristics of the device and master basic measurement methods.

- [Measure sine signal](#).....23
- [Set and move markers](#).....26
- [Set peak list](#)28
- [Setting the preset status](#)29
- [File saving/calling method](#).....30
- [Screenshot printing/saving](#).....32

Prompt

Support the front panel and mouse operation.

The user panel of the 4051 Series Signal/Spectrum Analyzer supports front panel and mouse operations. The examples below mainly explains front panel operations. The hard keys of the front panel correspond to the mouse menu.

Firstly, complete preparations before operation according to the following steps:

Step 1. Energize and start the instrument;

Step 2. Enter the system and initialize settings;

Step 3: proceed to the next operation if there is no prompt error message in the main operating interface of the front panel.

3.1 Measure sine signal

The most common measurement task of the signal/spectrum analyzer is to determine level and frequency of signals. When measure certain unknown signal, usually you can use the **【Preset】** key to switch the device to preset setting and start measurement. This section explains how to measure a simple sin signal by using the internal calibration signal in the device as an input.

Attention

Signal input

If the level is higher than +30 dBm (=1 W), then a power attenuator must be added in front of the RF input end of the Signal/Spectrum Analyzer. Otherwise, signal level beyond 30 dBm may damage the RC attenuator or input mixer. At the same time, the total power of all current signals should be taken into consideration.

Prompt

Instrument preset state

Based on user demand, the reset condition of the Signal/Spectrum Analyzer can be set as a state specified by the user. In these examples we use preset state defined for factory delivery.

1) Display the internal 500 MHz calibration signal

Step 1. Reset the instrument:

- Press **【Preset】** key to restore the instrument to a predefined configuration status.

Step 2. Turn on the internal 500 MHz calibration signal:

- Press **【Input/Output】** key to pop up input/output setting soft menu;
- Press [Cal Port>>] and [500MHz] to select the internal 500 MHz calibration signal;
- Press [Input Port **RF** Calibrate] soft key to select the input interface for calibration and terminate the input process.

At such time, the internal calibration signal of the instrument is connected to the RF input interface and the 500 MHz calibration signal can be observed on the instrument screen as shown in Fig. 3.1.

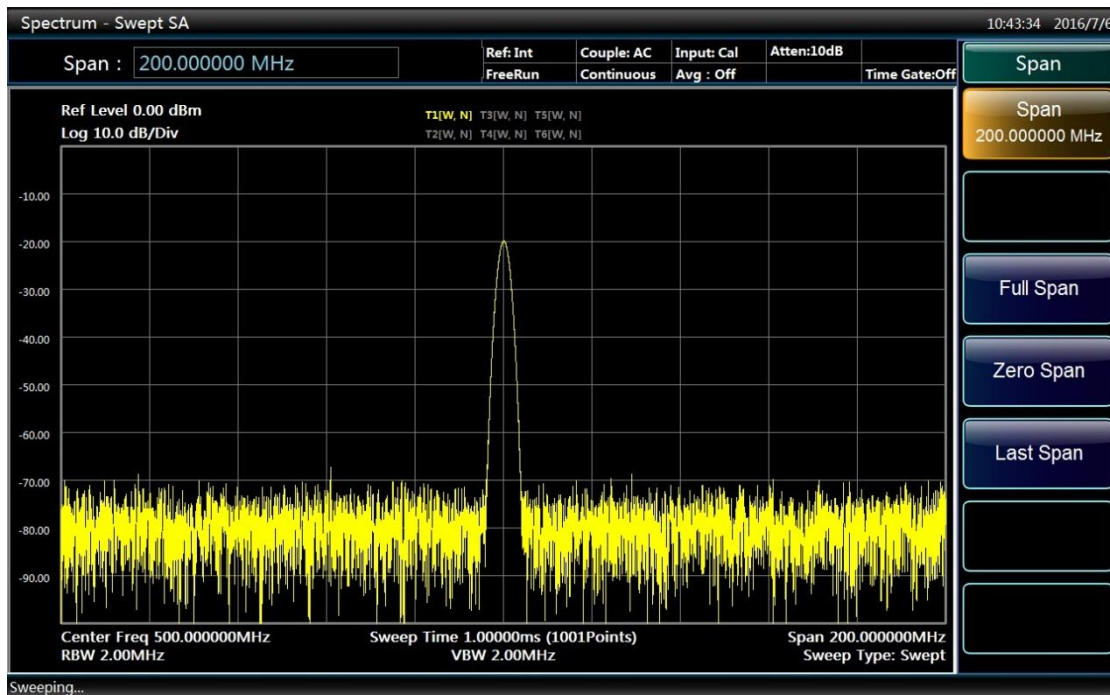


Fig. 3.1 Open 500MHz calibration signal interface

2) Optimize signal display

Adjust the main measurement settings to observe the calibration signal in a better way.

Step 1. Set the center frequency as the calibration signal frequency (500 MHz):

- Press **【Frequency】** key;
- Press [Center Freq] soft key and input 500 MHz via the numeric keys on the instrument panel.

Step 2. Reduce the frequency span to 20 MHz:

- Press **【Span/X Axis】** key;
- Input 20 MHz via the numeric keys on the instrument panel.

Step 3. Set the reference level as -10 dBm:

- Press **【Ampld/YScale】** key;
- Input -10 dBm via the numeric keys on the instrument panel.

At such time, the calibration signal spectrum is displayed in the middle of the trace and the calibration signal can be observed more directly and clearly as shown in Fig. 3.2.

3 Typical applications

3.2 Set and move markers

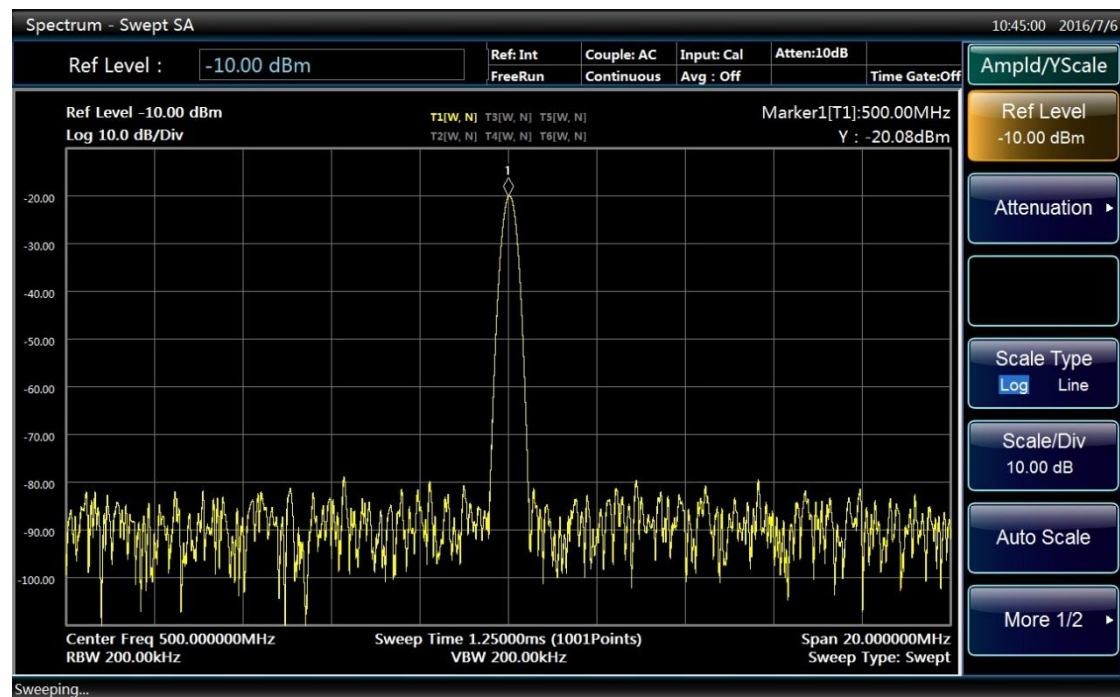


Fig. 3.2 Set optimized calibration signal interface

3.2 Set and move markers

The marker is used to determine the position of specific function in the trace. Its most common purpose is to determine certain peak. When a marker is enabled, the default settings will be applied. Here we are going to set a peak marker on the spectrum trace.

Step 1. Reset the instrument:

- Press **【Preset】** key to restore the instrument to a predefined configuration status.

Step 2. Execute single sweep:

- Press **【Single】** key on the front panel;
Execute Single Sweep for once to generate a trace to help set a marker on it.

Step 3. Enable Marker:

- Press **[Marker]** key on the front panel to display Marker soft menu;
At such time, Marker 1 is activated default as on Trace 1 and automatically set as the center frequency of Trace 1 as shown in Fig. 3.3. Such marker is indicated at the top right corner of the table as "Marker 1 [T1]". See "3.3.1.1

Display area information” of the Guide for more details the marker.

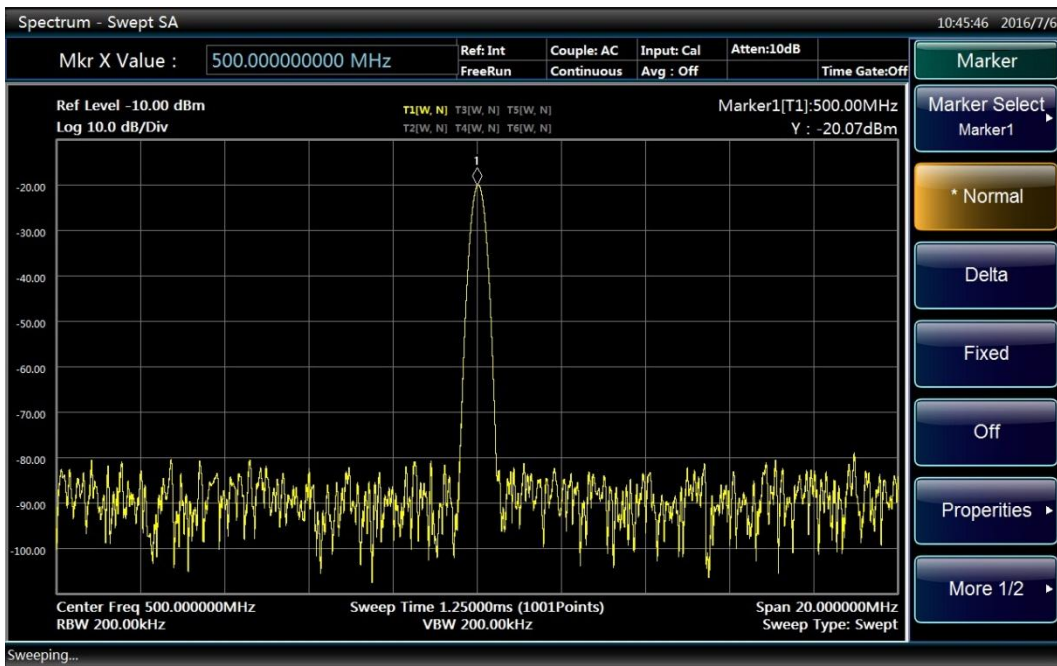


Fig. 3.3 Marker 1 activation interface

Step 4. Move the marker:

- Click and drag the marker with the mouse or use the knob or the arrow keys to move the marker to other places. Current position of the marker is indicated with a white diamond box as shown in Fig. 3.4.

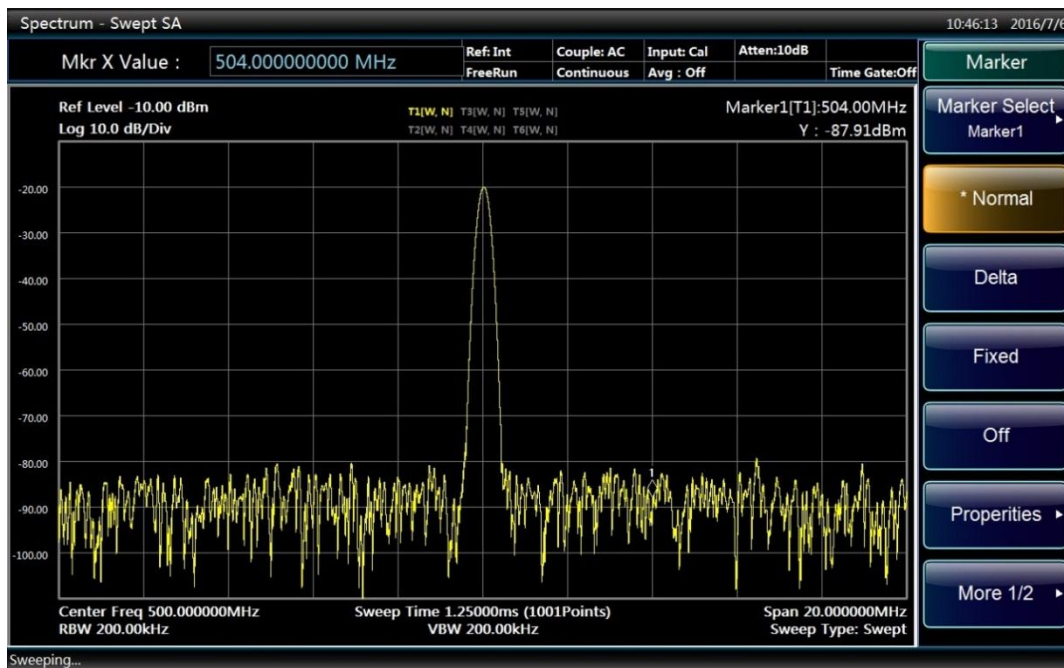


Fig. 3.4 Marker moving interface

3.3 Set peak list

The marker peak list can automatically determine frequency and level in the spectrum.

Step 1. Execute single sweep:

- Press **【Single】** on the front panel for the instrument to sweep once.

Step 2. Open Peak List window:

- Press **【Peak Search】** to open the peak search soft menu;
- Press [More1/2], [Peak Table>>] and [Peak Table ON OFF] to open a new window of marker peak list as shown in Fig. 3.5.

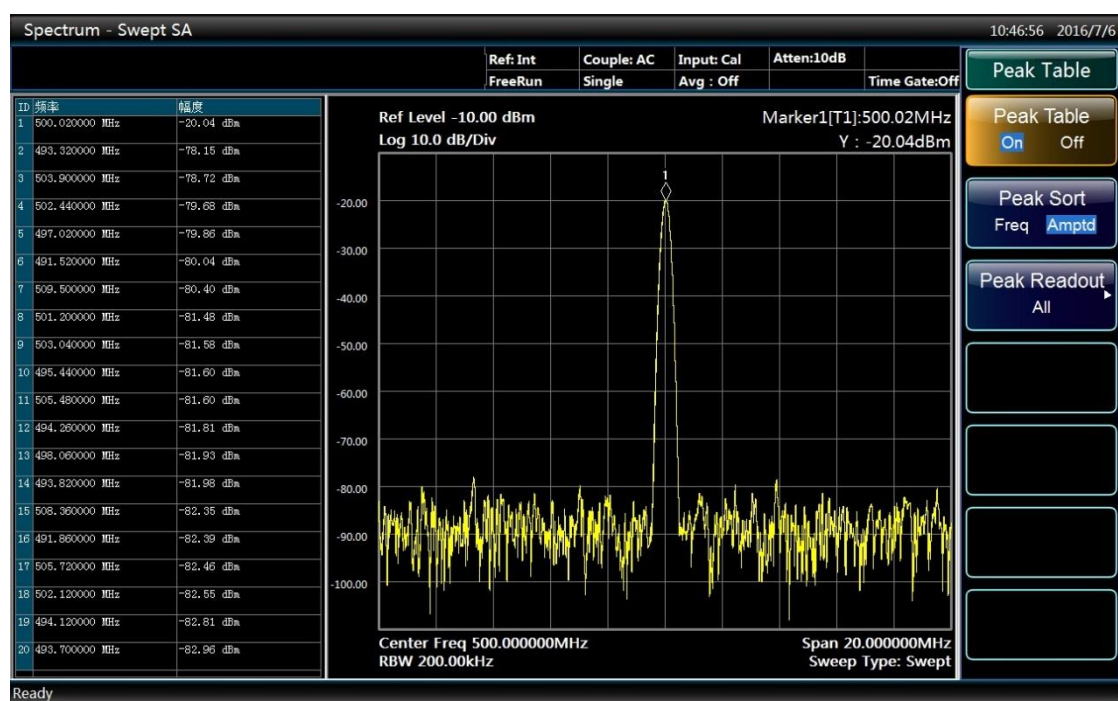


Fig. 3.5 The interface of opening peak table

Step 3. Open Peak Search function:

- Press **【Peak Search】** to open the peak search soft menu; press [More1/2], [Peak Criteria>>] and [Pk Threshold ON OFF] to set the peak threshold as -68 dBm as shown in Fig. 3.6;

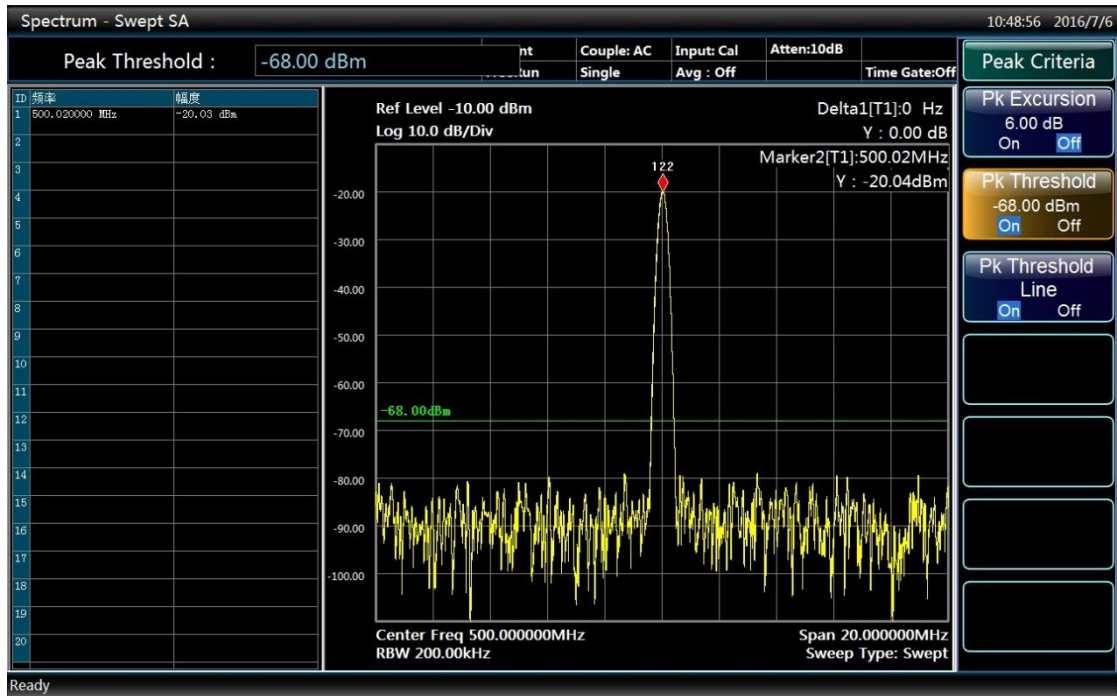


Fig. 3.6 The interface of opening peak threshold

In order to obtain the noise-free peak and meet users' peak requirement, parameter such as the peak offset and the peak threshold in the peak criteria menu can be set to screen the peak list. For example, to set a threshold higher than the noise floor.

In the peak list, only a peak over -68 dBm is included. The marker peak list displays determined peaks higher than the set threshold.

3.4 Setting the preset status

The 4051 series signal/spectrum analyzer uses the startup state previously saved by users as the initial state of startup measurement. If there is no such startup state, the factory default startup state will be called. Usually when the measurement state of the instrument goes wrong, the initial state when the instrument works properly can be restored by presetting the instrument state.

The preset state of the signal/spectrum analyzer is saved and called as follows:

Step 1. Save preset state:

- Press **【System】** key on the front panel;
- Press [Power On/Prest] soft menu;
- Press [Save UserPreset] soft menu.

3.5 File saving/calling method

Step 2. Calling preset state:

- Firstly, press **【System】** key on the front panel;
- Press [Power On/Prest] soft menu;
- Press [Preset Fact User] to select reset switch.

If the factory state is required, set the preset switch as Factory; if the measurement state previously saved by users is required, set the reset switch as User.

- Press **【Preset】** key on the front panel to calling the reset state.

3.5 File saving/calling method

The 4051 series signal/spectrum analyzer features data file saving/calling function, in which file saving means saving the measurement data into relevant file according to agreed format (such as: ASCII, *.dat) and file calling means opening selected data file, refreshing such display information as measurement parameters and list parameters to facilitate observation and assessment by users.

1) File saving method

Step 1. set file save type:

- Press **【File】** key on the front panel;
- Press [Save Type State >>] soft menu to select file type.

If it is required to save current measurement state, press [State] soft menu to change current save type as “State”; if it is required to save trace data, change the save type to “Trace (+ state)”; if it is required to save current screen image, change the save type to “Image”; if it is required to save IQ data in IQ analysis mode, change current save type as “IQ Data”. The state of saving IQ data can be set in “IQ Data” menu, including auto on/off. In auto mode, saved IQ data is consistent with that used for analysis with no need to set IQ data time and length; in auto off mode, IQ data time and length can be set manually and re-collection of IQ data is required when saving.

Step 2. Save files:

- Press [Save...] soft menu;

Pop up File Save As dialog to select the path and file name to be saved and click Save as shown in Fig. 3.7.

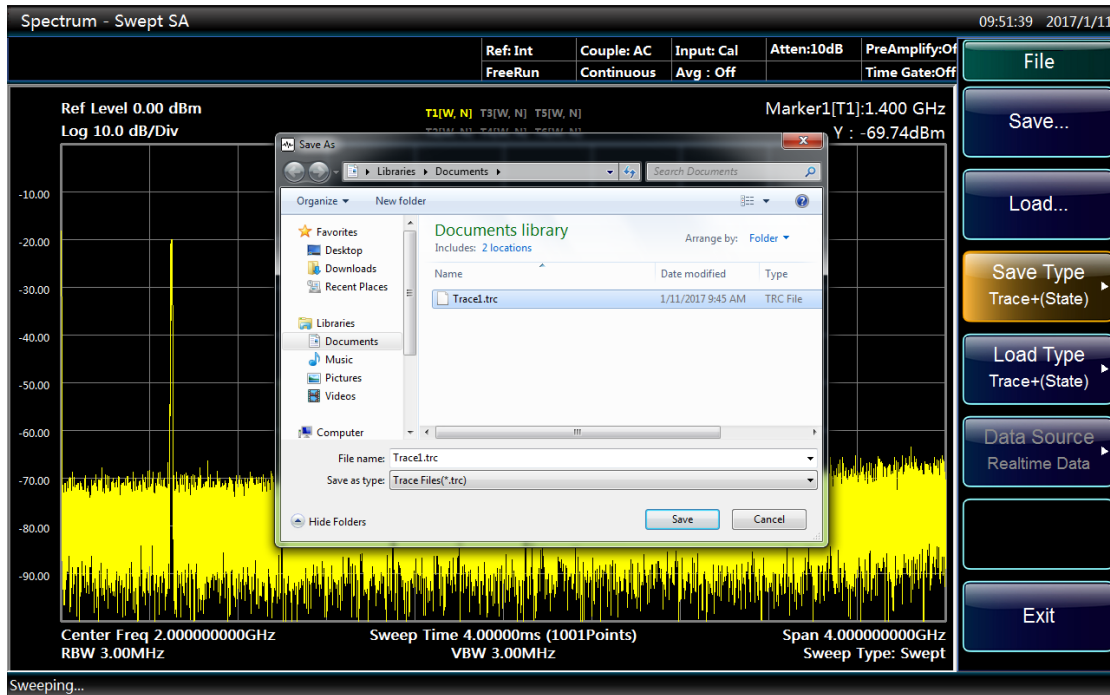


Fig. 3.7 File saving interface

2) File calling method

Step 1. Set file calling type:

- Press **【File】** key on the front panel;
- Press [Load Type] soft menu to select file type.

If it is required to calling measurement state file, press [State] soft menu to change current call type as “State”. If it is required to call trace data, change the call type to “Trace (+ state)”; at such time, call the trace data in the file to current trace and change current trace display mode to “Static Status Display”.

Step 2. Calling file:

- Press [Calling...] key to pop up Open File dialog, select the file named to be called and click Call as shown in Fig. 3.8.

3 Typical applications

3.6 Screenshot printing/saving

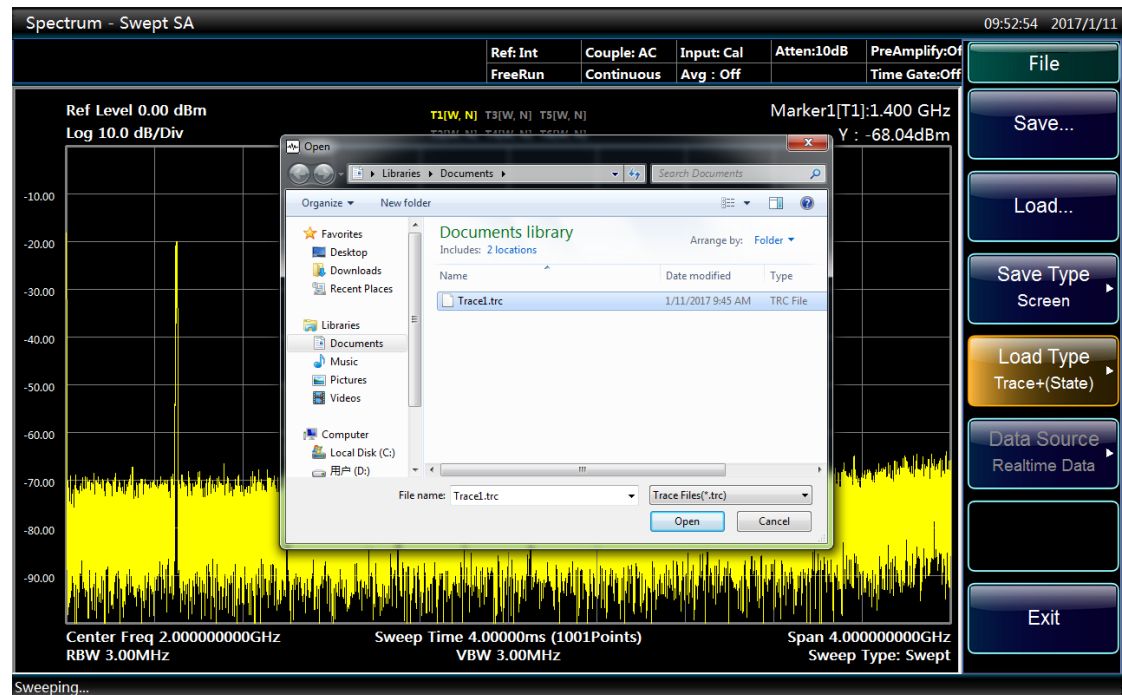


Fig. 3.8 File calling interface

3.6 Screenshot printing/saving

The 4051 series signal/spectrum analyzer is capable of saving screenshots to graphic files (bmp format) and printing screenshots.

1) Save screen (to files)

Step 1. set file save type:

- Press **【File】** key on the front panel;
- Press [Save Type] soft menu;
- Press [Bitmap] soft menu to use image as the type of the currently saved file.

Step 2. Save screen:

- Press [Save...] soft menu to pop up File Save As dialog to select the path and file name to be saved and click Save.

2) Print screen

Prompt

Install printer drive program

Before printing, a matching printer drive program should be installed firstly for the 4051 series signal/spectrum analyzer.

Step 1. Open Print Setting dialog:

- Press **【Printer】** on the front panel to pop up Print Setting dialog as shown in Fig. 3.9.

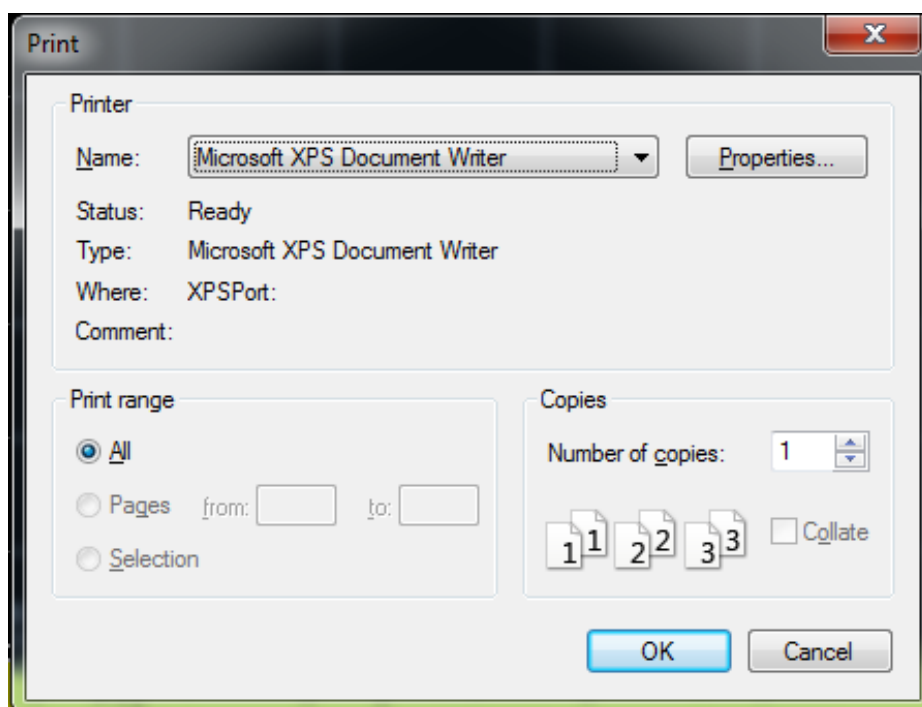


Fig. 3.9 Print dialog

Step 2. Configure printer:

- Select the printer and click Properties to configure the printer if special configurations are required.

Step 3. Click OK to print current screen image.

4 Access to Help

Generally, problems are caused by hardware, software or improper use. In case of any problem, check and save error message, analyze possible causes, and perform preliminary troubleshooting with reference to the method prescribed in “4.1 Basic inspections”. You can also contact our customer service center and provide the collected error message. We will assist you to solve the problem as soon as possible. Please refer to the contact information provided in this Guide or visit website: www.ei41.com, to query the contact information of the nearby technical support center.

- [Basic inspections](#)34
- [Help Information](#).....35
- [Repair](#) 35

4.1 Basic inspections

- ◇ Check whether the power socket is connected to the power supply.
- ◇ Is the instrument turned on? Check whether the green LED beside the power switch is ON. Pay attention to the internal fan noise and check whether the cooling fan of the analyzer works.
- ◇ If any, check whether the other instruments, cables and connectors used together with the instrument are connected properly and work normally.
- ◇ If the communication of the instrument through LAN fails, check the yellow LED beside the LAN interface of the rear panel. If this indicator does not flash, check the LAN cable and connection.

If the operating system cannot be fully loaded or run or the application program of the instrument is not successfully started, the hard disc may be damaged. If the system recovery is run for a long time in the start-up process, refer to the “[Windows 7 system restoration](#)” in “[2.2.2.2 System maintenance](#)”.

- ◇ If the problem occurs again, check all measurement steps. Check whether all settings are correct.
- ◇ If the analyzer does not work normally, press [Preset] to go back to a known status of the analyzer.
- ◇ Check whether the measurement and results comply with the requirements of the performance indicators and features of the analyzer. Refer to the relevant performance

indicators in “8 Technical indicators and test methods” of the user manual of the analyzer.

- ✧ The analyzer should be calibrated to meet above indicators. Select Auto Calibration (On) (press [System], [Calibrate], [[Auto Align On/Off]) or calibrate manually.
- ✧ Does the instrument display error messages? Please refer to “7.3 Error messages” of the Manual for information of error messages.

4.2 Help information

Error information will be generated in case of any problem. In most cases, error causes and countermeasures can be found according to the information. Chapter “7 Fault diagnosis and troubleshooting” in the User Manual describes the error information.

Moreover, our customer support center can provide help to users at any time and help users solve any problem they encounter in the process of using 4051 Series Signal/Spectrum Analyzer. We can offer you with quick and efficient solutions if you would kindly provide the following information:

- **Configuration Information:** “Configuration Information” dialog box (in “System” menu) provides information related to the followings:
 - Hardware information: Hardware composition;
 - Options: Status of all the software and hardware options installed in your instrument;

4.3 Repair

You can contact us by telephone or fax if you have encountered a difficult problem in the Signal/Spectrum Analyzer. If it is confirmed that the Signal/Spectrum Analyzer needs to be returned for repair, please pack the Signal/Spectrum Analyzer with original packing material and packing case and pack the device by following steps:

- 1) Place a detailed description of faults of the analyzer along with the instrument into the case.
- 2) Pack it with the original package to reduce possible damage.
- 3) Place pads properly in the four corners of the external packaging before the instrument is put into the external packaging.
- 4) Seal the external packaging with adhesive tape and secure it with nylon tape.
- 5) Mark “Fragile! No touch! Handle with Care” on the packing case.
- 6) Deliver it as per the requirements of precision instrument;

4.3 Repair

- 7) Keep copies of all transport documents.

Contact Information:

Service consultation: **0532-86889847 800-868-7041**

Technical support: **0532-86888026 0532-86880165**

E-mail: eiqd@ceyear.com

Zip code: **266555**

Address: **98 Xiangjiang Rd, Qingdao Economy and Technology Development Zone, Shandong, China**

Attention

Notes of packing

Packing the Signal/Spectrum Analyzer with other materials may result in damage to the device. It is prohibited to use the polystyrene spheres as the packaging materials, because they cannot protect the instrument effectively and may be sucked into the instrument fans due to static electricity produced, which will consequentially damage the instrument.

Prompt

Instrument packing and transportation

When transporting or handling this device (for example, due to damage during shipping), please strictly follow the precautions provided in “[2.1.1 Unpacking](#)” of this Guide.
