Signal Generator

User manual

Version A.1

(Firmware version: V1.0.0.1)

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Preface

The content in the manual is provided according to the current situation and it could be changed without prior notice in future.

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Security identifier agreement

The following security identifiers may appear in the manual. Before operating the instrument, please familiarize yourself with the identifiers and the meanings of the identifiers:

WARNING: It represents that dangers may occur. It notices the user to pay attention to certain operation process, practice or similar aspects. Casualties could be caused if the user does not operate rightly or obey the rules. Do not perform further operation before completely understanding or satisfying the conditions pointed by the warning identifier.

CAUTION: It represents that dangers may occur. It notices the user to pay attention to certain operation processes, practice or similar aspects. Damage of the product or data loss could be caused if the user does not operate rightly or obey the rules. Do not perform further operation before completely understanding or satisfying the condition pointed by the warning identifier.

Note: It represents information that the user especially should pay attention to. It provides operation information or additional information that the user should pay attention to.

Brief introduction of signal generator

The signal generator is a desk type electronic instrument. It has a keyboard distribution that is easy to operate and a 7.0-inch TFT color liquid crystal display screen with high definition; a display interface comprises proper settings and prompt messages; USB, LAN and GPIB communication interfaces are provided; and a virtual terminal can be used for display, control and remote network access. The signal generator can be widely applied to various fields such as science of education, enterprise research and development and industrial production, etc.

Main performance characteristics:

- Excellent phase noise: <-115dBc/Hz@20kHz
- Large dynamic power output: -127dBm ~ +13dBm (available from -136dBm)
- Rich Modulation mode: AM, FM, ΦM in diameter and pulse modulation
- Multiple RF scan output combining frequency and amplitude.
- Low frequency signal output, namely sine, triangle, square, sawtooth wave,etc.

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Document Summary

The manual comprises the following contents:

1. Quick Start

The chapter introduces front and back panels, user interface, menu operation method, parameter input way and first-use announcements of the signal generator.

2. Basic Operation

The chapter introduces the application method of radio-frequency signals of the signal generator..

3. Analog Modulation Operation

The chapter introduces the analog modulation function and application method of the signal generator by examples.

4. Remote Control

The chapter introduces a method for remotely controlling the signal generator.

5. Menu Mapping Image

The chapter introduces the menu mapping images corresponding to all function keys of the front panel of the signal generator according to alphabetic sequence.

6. Performance Index

The chapter lists the technical indexes and general technical specifications of the signal generator.

7. Appendix

The chapter provides accessory details of the signal generator.

Related user's documents of the product:

The user's documents of the product include: user's manual and programming manual.

1 Quick Start

Signal Generator

The chapter introduces the front and rear panels, the user interface and first-use announcements of the signal generator.

The contents of the chapter are as follows:

- Preparation before use
- Characteristics of the front panel
- Characteristics of the rear panel
- Menu operation
- Parameter input
- On-line help system

1 Quick Start

1-1 Preparation before use

1-1-1 Understand safety matters in use

Make sure to know the following safety attentions before use so as to avoid personal injury and equipment damage.

- **Use right power cord**

  Only use special power cord recognized by residential country of the product.

- **Ground the product.**

  The product is grounded by a protective ground wire of a power cable. In order to prevent electric shock, please make sure that the ground terminal and the power cable of the product is reliably connected with the protective ground wire before connecting any input or output terminal of the product.

- **Check the rated values of all terminals**

  In order to prevent a fire and impact of overlarge current, please check all rated values and mark descriptions on the product, and please read the product manual before connecting product so as to know detailed information of the rated values.

- **Use suitable overvoltage protection**

  Make sure that no overvoltage (such as voltage caused by thunderbolt) reaches the product, otherwise, the operator may have a risk of suffering electric shock.

- **Please do not operate the product when the cover is open**

  Please do not operate the product when the chassis of the instrument is open.

- **Use suitable fuse wire**

  Only use fuse wire with specified specification of the product.

- **Prevent exposure of circuit**

  Please do not contact exposed joints and elements after the power is on.

- **Please do not operate when the product is suspected to have fault**

  Please contact the servicemen authorized by the company if you suspect any failure of the product. Any maintenance, adjustment or component replacement should be executed by servicemen authorized by the company .

- **Keep proper ventilation**

  Bad ventilation will cause temperature rise of the instrument and then will cause damage to the instrument. Keep good ventilation during use and periodically check the vents and fans.

- **Please do not operate in wet environment**

  In order to prevent short circuit of the internal circuit of the instrument or danger of electric shock, please do not operate the instrument in wet environment.

- **Please do not operate in flammable and combustible environment**

  In order to prevent instrument damage or personal injury, please do not operate in flammable and combustible environment.

- **Please keep the surface of the product clean and dry**

  In order to prevent dust and moisture in air from influencing the performance of the instrument, please keep the surface of the product clean and dry.

- **Antistatic protection**

  Electrostatic will cause damage to the instrument, so please do the test in an antistatic region as far as possible. Temporarily ground the internal and external conductors of the instrument before the cable is

connected to the instrument so as to release the electrostatic.

- **Know the application condition of the technical index of the signal generator**

  In order to ensure that all the performances of the instrument reach the standard, please use the instrument at specified condition.

- **Pay attention to transportation safety**

  In order to prevent the instrument from sliding down during transportation to cause damages to components of keys, knobs or interfaces and the like on the instrument panel, please pay attention to transportation safety.

1-1-2 Ordinary examination

Check the signal generator before use according to the following steps:

1. Check whether there is damage caused by transportation:

Please keep the damaged freight packages or vibration-proof materials until the goods are completely checked and the instrument passes electrical property and mechanical tests. The shipper and carrier are responsible for indemnity if the damage of the instrument is caused by transportation. the company would not provide any free maintenance or replacement.

2. Check the overall machine

If there is mechanical damage or loss or the instrument does not pass the electrical property and mechanical tests, please contact your the company agency.

3. Check random accessories

According to the randomly provided accessory details, please refer to the chapter ‘‘Appendix A: optional components or accessories ’’ in the manual. Please contact your the company agency if the goods in the package are partially lost or damaged.

1-1-3 Connect the power source

The signal generator can use an AC power source.

Please use the power cord provided in the accessories to connect the signal generator to the AC power source. Related to the requirement on the AC power voltage and frequency, please check the introduction in the chapter of *"Characteristics of back panel".*

Caution

In order to avoid electric shock, please make sure that the instrument is grounded rightly.

1-1-4 Booting check

Turn on the main switch on the back panel, and then press a power key on the front panel to run the signal generator. A booting picture will be displayed when the signal generator is booted, and a default interface will appear on the screen after tens of seconds. After initialization, the signal generator is in the normal working mode.

1-2 Characteristics of front panel

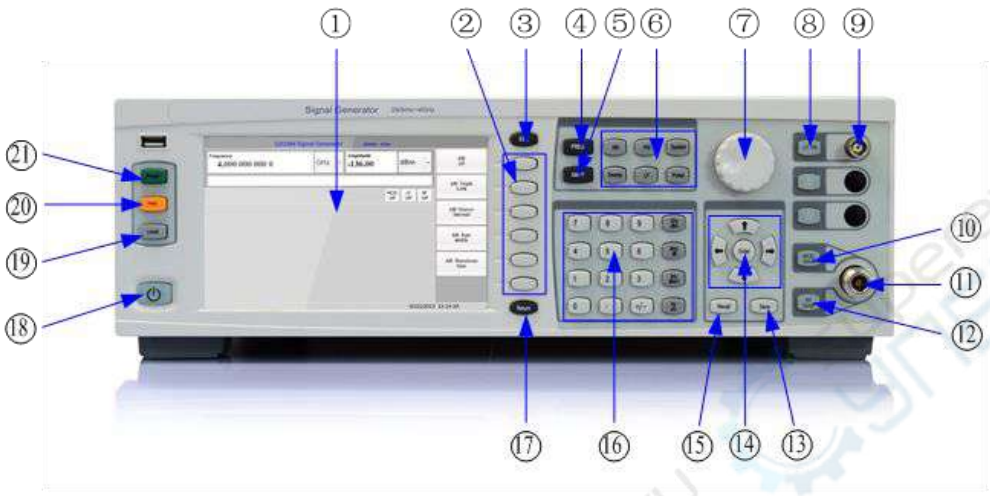

Chart 1 Front panel structure chart

Table 1 Description of front panel

Item		Description
No.	**Name**	
1	**LCD display screen**	The LCD screen displays information related to the current function. The information may include status indicator, frequency and amplitude settings and error information. The detailed information of the interface is introduced in the next section.
2	**Soft function key**	The soft function key triggers the function indicated by a label displayed at the left of each key.
3	**ESC key**	Exit the currently selected function without changing its value.
4	**FREQ (Frequency) key**	By pressing the key, the frequency function is available. The user can set the frequency of the RF signal or use the menu to configure the frequency attributes, such as frequency multiplication,

		frequency offset and reference frequency.
5	**AMPT (Amplitude) key**	By pressing the key, the amplitude function is available. The user can set the output amplitude of the RF signal or use the menu to configure the amplitude attributes, such as power search and electric level adjustment mode.
6	**Function key region**	The hard function keys access the soft function key menu so that the user can configure list and step sweep, LF output and various analog modulation types.
7	**Knob**	Progressively increase or decrease the current parameters according to certain stepping by rotating the knob. The parameters are progressively increased clockwise and decreased anticlockwise.
8	**Audio (LF) output switch key**	Audio (LF) signal output on-off control key
9	**Audio (LF) output interface**	The BNC joint is an audio signal output interface.
10	**Modulation (MOD) main switch key**	Control the modulation main switch. The modulation functions (amplitude modulation (AM), frequency modulation (FM), pulse modulation (ΦM) and pulse modulation) are available only when the modulation main switch is at on status.
11	**Radio-frequency signal (RF) interface**	The N-type connector for RF signal output.
12	**Radio-frequency signal (RF) on-off key**	The N type container is used for outputting RF signals.
13	**Save key**	The hard function key accesses the soft function key menu and can enable the user to save the data in a file. As long as the instrument status is saved, all frequency, amplitude and modulation settings can be recalled by using the hard function key Recall.
14	**Direction keys,**	Upper and lower direction keys are used for

	enter key	progressively increasing or decreasing the data according to certain stepping, or moving the cursor that selects a file or a parameter in an information display region to the last line or the next line. Left and right keys are used for moving the data in an input box from a selected position to a high position or low position. The enter key is used for inputting the parameters according to default unit.
15	**Recall key**	The hard function key can restore any instrument status saved in files previously.
16	**Numeric keypad**	The numeric keypad comprises numeric keys 0-9, namely ten hard function keys in total, one decimal point key, one symbol key and four unit keys. The symbol keys are numerical value symbol and delete reuse key.
17	**Return key**	Return to the menu by using the hard function key.
18	**Power standby key**	Run the frequency spectrograph. Red backlight represents that the instrument is at standby status and green backlight represents that the instrument is booted. **Attention:** the standby key is not an alternating-current power switch (for disconnecting the equipment).
19	**Local key**	The hard function key is used for stopping remote operation and returning to the front panel of the signal generator for control.
20	**Help key**	Short description of all the hard function keys or soft function keys can be checked by pressing this hard function key.
21	**Preset key**	The hard function key is used for setting the signal generator at a known status, a delivered status or a user-defined status.

1-3 LCD User interface

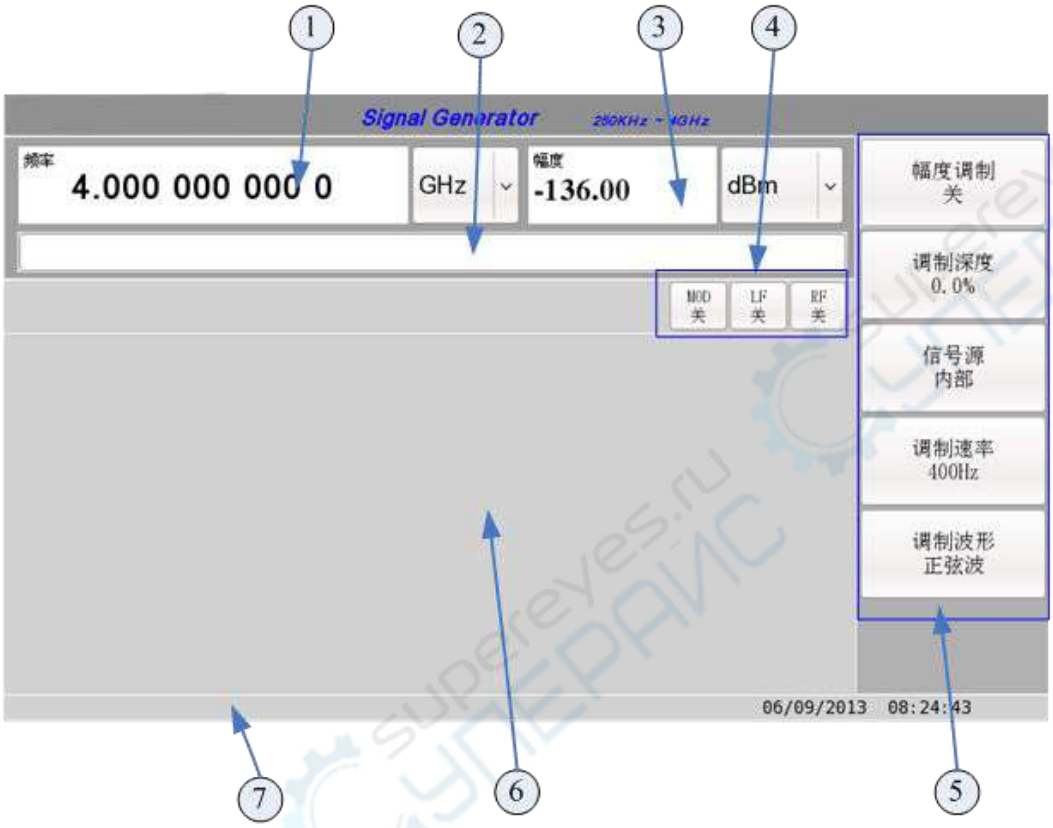

Chart 2 Interface structure chart

Table 2 User interface description

No.	Name	Description
1	**Frequency region**	The current frequency setting will be displayed in this part of the display screen. When the frequency reference is run by using frequency offset or frequency multiplication, the value will be also displayed in the display region in this area.
2	**Action function region**	The current action function will be displayed in this region. For instance, if the frequency is the action function, the current frequency setting will be

		displayed in the region. If the current action function has a related incremental value, the value will be also displayed.
3	**Amplitude region**	The current output power electric level setting will be displayed in this part of the display screen, and the indicator will be also displayed in this region when amplitude offset is used, amplitude reference mode and external electric level adjustment mode are run.
4	**Indicator**	The indicator on the display screen displays the function status of some signal generators and indicates the error condition. The detailed status flag is shown in format 3.
5	**Soft function key label region**	The label in the region defines the function of the soft function key close to the right of the label, and the soft function key label could be changed according to the selected function.
6	**Message display region**	The region of the display screen is used for displaying the status message related to the signal generator, such as modulation status, sweep list and file catalog, and the region may also enable you to execute functions such as message management, message input, file display or delete and the like.
7	**Error message region**	Brief error message will be reported in this region. Only the latest messages is kept displayed when a plurality of error messages appear.

Table 3 Status identifier description

Name	Description
AM ON/OFF	”AM ON” is displayed only when amplitude modulation is run; and the identifier is hidden when amplitude modulation is stopped.
ERR	The indicator will appear if an error message appears in an error

	queue.
FM ON/OFF	”FM ON” is displayed only when frequency modulation is run, and it is hidden when frequency modulation is stopped.
LF ON/OFF	The identifier indicates that the low-frequency signal appears in an LF OUT connector (LF ON) or the low-frequency signal does not appear in the LF OUT connector (LF OFF). One status of the identifier will be displayed on the display screen all the time.
MOD ON/OFF	The identifier shows that the RF carrier wave is modulated (MOD ON) or the modulation is stopped (MOD OFF). One status of the identifier will be displayed on the display screen all the time.
PM ON/OFF	”PM ON” is displayed only when phase modulation is run, and it is hidden when phase modulation is stopped.
PULSE ON/OFF	”PULSE ON” is displayed only when pulse modulation is run, and it is hidden when pulse modulation is stopped.
RF ON/OFF	The identifier indicates that an RF signal appears in the RF OUTPUT connector (RF ON) or RF does not appear in the RF OUTPUT connector (RF OFF). One status of the identifier will be displayed on the display screen all the time.

1-4 Characteristics of back panel

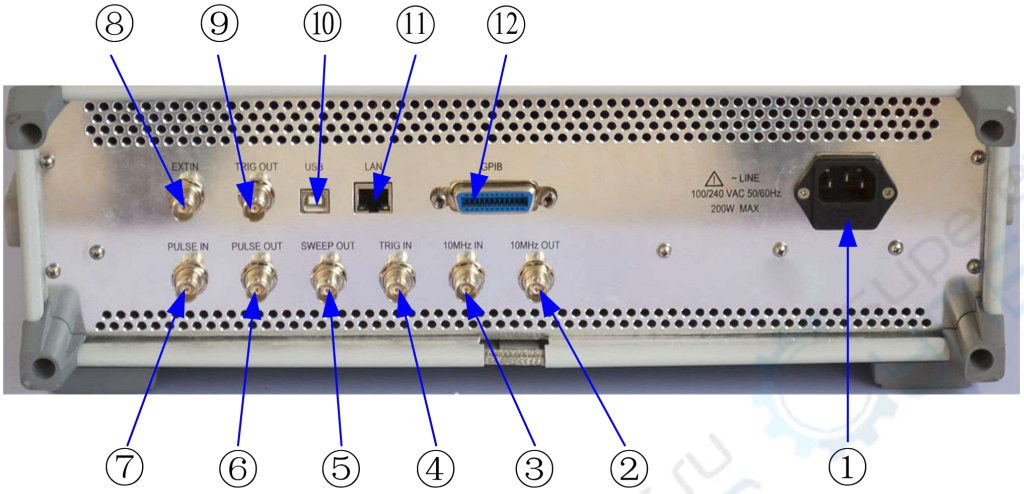

Chart 3 Back panel structure chart

Table 4 Back interface description

No.	Interface	Description
1	**AC power connector (provided with fuse wire box)**	Connectable AC power source type: AC: 100 V - 240 V, 47 Hz - 420 Hz Specification of the fuse wire: 5×20mm, rated value: 1A, 250V
2	**10MHz OUT**	Reference clock output is implemented by connection of a BNC cable.
3	**10MHz IN**	Reference clock input is implemented by connection of the BNC cable.
4	**TRIGGER IN**	An external trigger signal is input to a signal by the BNC cable.
5	**SWEEP OUT**	Output of scanning signals
6	**PULSE IN**	BNC Connector accepts

		External pulse modulation signals into the signal generator .
7	**PULSE OUT**	Pulse modulation signals OUT through BNC cable.
8	**EXT IN**	BNC connector to accept External modulation signals into the signal generator
9	**TRIGGER OUT**	BNC connector. to provide Trigger signal
10	**USB Device interface**	The signal generator can be connected with an external USB device as “Driven Device”.
11	**LAN connector**	The signal generator supports communication based on LAN by an LAN (Local Area Network) connector. By using the LAN connector, the computer connected by LAN can remotely programme the signal generator.
12	**GPIB interface**	The GPIB connector is used for communicating with a compatible device, such as an external controller. It is equivalent to an LAN interface connector in function.

1-5 Keys and menu operations

1-5-1 Key type summary

- The keys on the front panel are divided into three types, including hard function keys, soft function keys and numerical value input/adjust keys. The numerical value input keys are not introduced in this section.
- English words for prompting functions are marked on the hard function keys. The soft function keys are at the right side of the LCD display screen, and no words are on the keys.
- The function menus displayed at the right side of the display screen can be accessed by pressing most of the hard function keys on the front panel.
- The soft function keys list the functions that are lastly accessed via the keys on the front panel, which also depend on the currently selected menu.
- If the function value of the soft function key can be changed, the function is named as current function. After the soft function key is selected, the function menu of the current function will be highlighted, and related information also will be displayed in the action function region in the left upper corner.

1-5-2 Menu structure

One menu bar consists of a title and six menu items, and the menu items are selected by a menu software key at the right side of the screen. If you select any item that corresponding to a submenu, it will switch to the next menu bar.

1-5-3 Menu type and operation method

The menu items include six types, and the execution and operation modes are variant, as shown in the format below:

Table 5 Menu execution and operation mode

Type	Operation method
Parameter input	Select the corresponding menu item, and change the parameter value by inputting digit via the keyboard.
Enter next submenu	Select the corresponding menu item, and enter the corresponding next submenu.
Function switch	Select the corresponding menu item to switch sub options of the menu item. For instance, the sub option is “ON/OFF”.
Function switch+parameter input	Select the corresponding menu item to switch sub options of the menu item. Change the parameter value by inputting digit via the keyboard after switching to a specific sub option. For instance, the sub option is “AUTO/MANUAL”, and generally the parameters can be changed when the sub option is set as “MANUAL”.
Option	The menu item is one of a group of attributes, and the corresponding menu item is selected and provided with corresponding specific attribute. For instance, when “SINE” menu item in the amplitude modulation waveform menu bar is selected, the current modulation waveform is sine.

1-5-4 Hard function keys and soft function keys description symbols and mode agreement

The manual describes two kinds of keys by the following formats:

Hard function key	**Format:** key character+text box, corresponding to hard keys on the front panel, such as AM which represents an amplitude modulation function key.
Soft function key	**Format:** menu character+character background, corresponding to the menu soft keys, such as AM Depth which represents a modulation depth soft function key.

The manual describes the key operation sequence by the following mode:

AM \ AM Depth	It represents that the user should press the "AM" hard function key on the front panel at first and the press the "AM Depth" soft function key. Please use "\" for separation if the menu has a plurality of levels.

1-6 Parameter input

Direct input of parameters can be implemented by a numeric keyboard.
Parameter regulation can be implemented by direction keys and knobs.

1-6-1 Numeric keyboard

The numeric keyboard consists of several parts as follows:

- **Numeric keys**

  The numeric keys 0 ~ 9 are used for directly inputting digits.

- **Decimal point key**

  It is used for inputting a decimal point.

- **Symbolic key**

  The symbolic key is a numerical value symbol and delete reuse key, which is used for changing positive and negative of the parameters when no numerical value character appears while the cursor is positioned at right and deleting the numerical value character at right.

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1-6-2 Direction keys

- **Left and right arrow keys**

  The left and right arrow keys are used for selecting a certain numerical value in the parameter.

  The left arrow key represents movement towards a high position, and the right arrow key represents movement towards a low position.

- **Up and down arrow keys**

  The up and down arrow keys are used for progressively increasing or decreasing the parameters according to certain stepping when inputting the parameters.

  The up arrow represents progressive increment, and the down arrow represents progressive decrement.

- **Enter key**

  The enter key is used for ending parameter input and adding a default unit for the parameter.

1-6-3 Knob

The knob is used for progressively increasing or decreasing the parameters according to certain stepping when inputting the parameters.

Clockwise rotation represents progressive increment, and anticlockwise rotation represents progressive decrement.

1-7 On-line help system

The on-line help system provides help messages for each hard function key and soft function key on the front panel. The user can check related help at any time when operating the instrument.

1. Open the help system:

Press down the key **Help** on the front panel and then there will be the help system interface appearing in the center of the screen.

2. Close the help system:

Press the **Help** key again to close the help system at the condition that the help system is already open.

3.Get help:

Press any hard function key or soft function key on the front panel when the help system is already open, and then the help messages of the corresponding function or menu item will be displayed in the help system.

Attention: Digital input function is unavailable when the help system is open, and no response is provided when pressing related digital input keys on the front panel.

2 Basic Operation

Signal Generator

The chapter introduces the basic operation of the signal generator. in detail.

The contents of the chapter are as follows:

- Use table editor
- Configure RF output
- Configure remote control

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2 Basic Operation

2-1 Use table editor

The table editor of the signal generator can be used for simplifying a configuration task like setting of list sweep. This section detailedly introduces the basic function of the table editor by taking a list mode value table editor as an example.

The operation steps are as follows:

1. Press the **PRESET** key to make sure that the system is restored to a preset status.
2. Press the **SWEEP** key to enter the sweep menu.
3. Press **More** (Next Page) to enter the next page of the menu, and press the **Configure List Sweep**, wherein the interface is as follows:

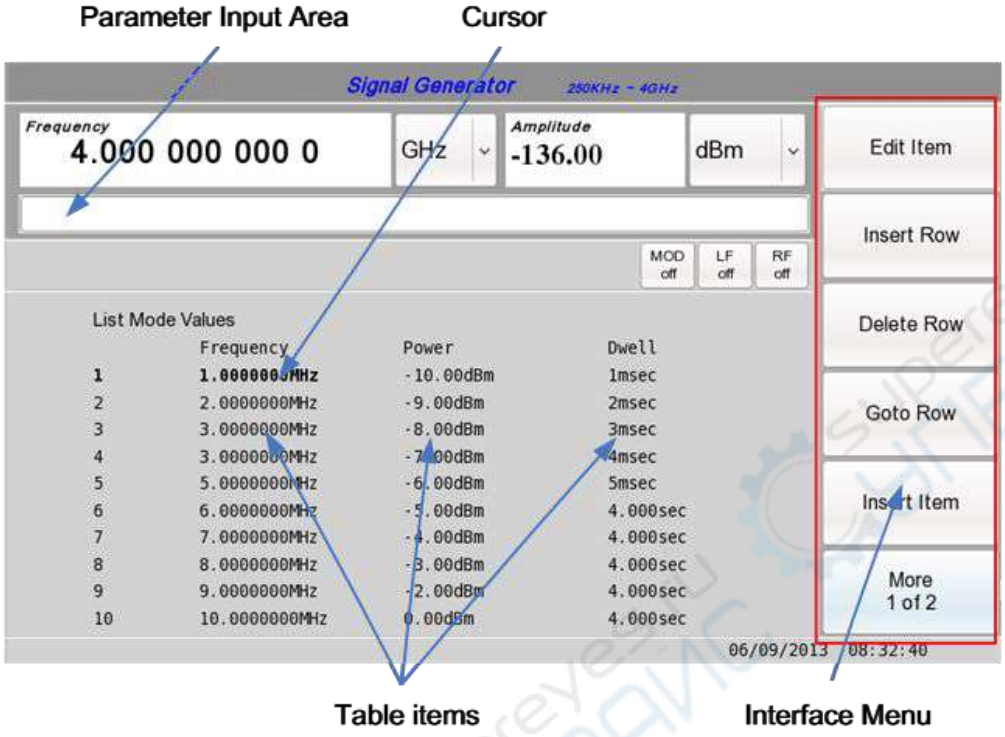

Chart 4 Configure list interface

Table 6 Table editor structure description

Name	Description
Parameter Input Area	Display the parameters which is being edited at present.
Cursor	It is used to highlight specific table item so as to conveniently perform selection and editor operation.
Interface Menu	Menu system used for selecting table items, presetting tabular value and changing the table structure.
Table items	The table items represent values arranged according to numbered lines and title bars. (The title bars are also named as data fields. For instance, the line below Freq (frequency) tile is also named as Freq data field) .

2-1-1 Soft function key of table editor

The following soft function keys of the table editor are used for inputting, locating, changing and saving the table item values. The **More(1of2) key**(Next Page)(1/2) can be pressed to access **Load/Store** and related soft function keys. The detailed function of the soft function key is shown in the format as follows:

Table 7 Soft function description

Soft function key name	Description
Edit Item	It is used for displaying the selected item in the action function region of the display screen that can change the value of the selected item.
Insert Row	It is used for inserting a same table item row above the current selected row.
Delete Row	It is used for deleting the current selected row.
Goto Row	It is used for opening the soft function key menu used for quickly browsing the table items: Enter(input), Goto Top Row(go to the top row), Goto Middle Row (go to the middle tow), Goto Bottom Row (go to the bottom row), Page Up(the last page) and Page Down (the next page).
Insert Item	It is used for inserting a same item in a new row below the current selected item.
Delete Item	It is used for deleting the item in the last row of the current selected line.
Page Up and Page Down	It is used for displaying the table items in rows that are not included in a table display region range which only displays ten rows.
Load/Store	It is used for opening a soft function key meme (Load

	From Selected File, Store To File, Delete File, Goto Row, Page Upand Page Down) for loading the table items from a file of the memory catalog or storing the current table items in the memory catalog as files.

2-1-2 Modify table items in data field

The existing table items can be modified by performing the following detailed steps:

1. Use the arrow keys or knobs to move the cursor to the needed items. As shown in figure 4, the first item in the Frequency data field is selected.
2. Press **Edit Item**. The selected item is displayed in the action function region of the display screen.
3. Use the numeric keypad to change the value.
4. Press **Enter**, and at the moment, the table displays the amended item.

2-2 Configure RF output

This section will introduce how to build RF output of continuous wave and frequency sweep to you.

2-2-1 Configure RF output of continuous wave

Use these procedures to learn how to set the following parameters:

1. RF output frequency
2. RF reference and frequency offset
3. RF output amplitude
4. Amplitude reference and amplitude offset

2-2-1-1 Set RF output frequency

1. Press **PRESET** .

   It makes the signal generator return to the status defined when the signal generator leaves factory.

2. Observe the FREQUENCY region (it is in the left upper corner of the display screen) in the display screen. The value displayed is the specified highest frequency of the signal generator.

3. Press **RF On/Off** .

   RF signals can be acquired in the RF OUTPUT connector by pressing the **RF On/Off** hard function key only. The status of the indicator on the display screen will be changed from RF OFF(RF OFF) into RF ON(RFON), and at the moment, the highest specified frequency will be output to the RF OUTPUT connector (it is at the lowest power electric level of the signal generator).

4. Press the **FREQ** hard function key, and input 700 MHz.

   At the moment, 700 MHz of RF frequency will appear in the FREQUENCY

region and action entry region of the display screen.

5. Press the up arrow key.

   The frequency is progressively increased by an increment value of 1MHz according to constant stepping after the up arrow is pressed once. The increment value is displayed in the action function region.

6. Press the down arrow key.

   The frequency is progressively decreased by an decreasing value of 1MHz according to constant stepping after the down arrow is pressed once.

   The RF output frequency can be adjusted by using the knob. As long as the frequency is action function (the frequency is displayed in the action function region), the RF output frequency can be increased or decreased by using the knob.

7. Use the knob to adjust the frequency back to 700MHz.

2-2-1-2 Set reference frequency and frequency offset

By the following procedure, the RF output frequency is set as reference frequency. All the other frequency parameters are relative to the reference frequency. The frequency originally displayed on the display screen will be 0.0 Hz (the value formed by using the frequency output by the hard function key to subtract the reference frequency). Although the display content is changed, the frequency output will not be changed. All the subsequent frequency changes will be displayed as increment value or decrement value relative to 0 Hz. The detailed operation steps are as follows:

1. Press the **PRESET** key.
2. Press the **FREQ** hard function key, and input 700 MHz.
3. Press **Freq Ref Set** .

   It will activate the frequency reference mode and set the current output frequency (700MHz) as a reference value. The FREQUENCY region displays

0.0 Hz that is a result formed by using the frequency (700MHz) output by the hard function key to subtract the reference value (700MHz). The REF reference indicator is at an activated status and the **Freq Ref Off\On** soft function key is switched to ON (on).

4. Press the **RF ON/OFF** .

   The indicator on the display screen will be changed from RF OFF into RF ON, and the RF frequency of the RF OUTPUT connector is 700MHz.

5. Press the up arrow key.

   It will increase the output frequency by a constant increment value of 1MHz. The display in the FREQUENCY region is changed into 1.000 000 0MHz that is a value formed by using the frequency (700MHz+1MHz) output by the hard function key to subtract the reference frequency (700MHz), and at the moment, the frequency of the RF OUTPUT is changed into 701MHz.

6. Pres the **Freq Offset** soft function key, and input 1MHz.

   It will input 1MHz of offset. The FREQUENCY region displays 2.000 000 0MHz. The value is a value formed by using the frequency (701MHz) output by the hard function key to subtract the reference frequency (700MHz) and then adding the offset (1MHz). OFFS (offset) indicator is at activated status. The frequency of the RF OUTPUT is still 701MHz.

2-2-1-3 Set RF output amplitude

1. Press **PRESET** .
2. Observe the AMPLITUDE (amplitude) region on the display screen.

   The display screen displays the lowest power electric level of the signal generator. It is a general preset RF output amplitude.

3. Press **RF On/Off** .

   The status of the indicator on the display screen will be changed from RF

OFF(RF (off) into RF ON (RF on), and at the moment, the RF signal will be output at the lowest power electric level of the RF OUTPUT connector.

4. Press the **AMPT** hard function key, and input −20 dBm.

   It will change the amplitude into -20dBm. At the moment, new −20dBmRF output power will appear in the AMPLITUDE region and the action entry region of the display screen.

   You can use the up and down arrow keys and the knobs to change the amplitude before you press another function key on the front panel.

2-2-1-4 Set amplitude reference and amplitude offset

By the following procedures, the RF output power is set as amplitude reference, and all the other amplitude parameters are relative to the amplitude reference. The amplitude originally displayed on the display screen will be 0dB, namely the value formed by using the power output by the hard function key to subtract the reference power. Although the display content will be changed, the output power will not be changed. All the subsequent frequency changes will be displayed as an increment value or a decrement value relative to 0dB. The detailed operation steps are as follows:

1. Press **PRESET** .
2. Press the **AMPT** hard function key, and input −20 dBm.
3. Press the **More(1of2)** soft function key to enter the next page, and press the **Ampl Ref Set** soft function key.

   It will activate the amplitude reference mode and set the current output power (−20dBm) as a reference value. The AMPLITUDE region displays 0.00dB that is a result formed by using the power (20dBm) output by the hard function key to subtract the reference value (−20dBm). The REF indicator is at an activated status, and the **Ampl Ref Off On** soft function key is switched to On.

4. Press the **RF On/Off** hard function key.

The indicator on the display screen will be changed from RF OFF into RF ON, and the power of the RF OUTPUT connector is −20dBm.

5. Use the up arrow key to progressively increase the output power by 1dB every time.

   The AMPLITUDE region displays 1.00dB, and the value is a value formed by adding 1 dBm to the power −20dBm output by the hard function key and then subtracting the reference power (−20dBm). At the moment, the power of the RF OUTPUT connector is changed into −1dBm.

6. Press the **Ampl Offset** soft function key, and input 10 dB.

   It will input 10 dB of offset. The AMPLITUDE region displays 20.00dB, and the value is a result formed by using the power (−10dBm) output by the hard function key to subtract the reference power (−20dBm) and then adding the offset (10dB). At the moment, the OFFS indicator is at an activated status, and the power of the RF OUTPUT connector is still -1dBm.

2-2-2 Configure sweep RF output

The signal generator includes two sweep types: step sweep and list sweep.
This section explains the difference between step sweep and list sweep and learns to use two methods to configure the RF output of the signal generator to sweep one group of defined frequency and amplitude points. A step sweep will be built, and then these points are used as basis for new list sweep.

2-2-2-1 Step sweep

After step sweep is activated, the signal generator will sweep RF output based on RF output start and stop frequency and amplitude input values, equally stepped sweep points, and dwell time quantity of each point. The RF output frequency, amplitude or frequency and amplitude will be swept from the start amplitude/frequency to the stop amplitude/frequency.

Step sweep provides a linear stage that runs through the start frequency to the stop frequency and/or amplitude value. You can switch between upward sweep direction

and downward sweep direction. If the **Sweep Direction Down Up** soft function key is set as Up (UP), the values will be swept from the start frequency/amplitude to the stop frequency/amplitude. When the Sweep Direction Down Up soft function key is set as Down (Down), the values will be swept from the stop frequency/amplitude to the start frequency/amplitude.

2-2-2-2 Configure and activate single step sweep

During the process, a step sweep with nine sweep points and the following parameters will be built:

- Frequency range is from 500MHz to 600MHz.
- Amplitude range is from -20dBm to 0dBm.
- Dwell time of each point is 500ms.

Detailed operation steps are as follows:

1. Press **PRESET** .
2. Press **SWEEP** .

   It will open a sweep soft function key menu.
3. Press **Sweep Repeat Single Cont** .

   It will switch the sweep repeat mode from Continuous to Single.
4. Press **Configure Step Sweep** .
5. Press the **Freq Start** soft function key, and input 500MHz.

   It will change the start frequency of the step sweep into 500MHz.
6. Press the **Freq Stop** soft function key, and input 600MHz.

   It will change the stop frequency of the step sweep into 600MHz.
7. Press the **Ampl Start** soft function key, and input −20dBm.

   It will change the start amplitude electric level of the step sweep.

8. Press the **Ampl Stop** soft function key, and input 0dBm.

   It will change the stop amplitude electric level of the step sweep.

9. Press the **Points** soft function key, and input 9.

   It will set the sweep points as 9.

10. Press the **Step Dwell** soft function key, and input 500mse.

11. It will set the dwell time of each point as 500 ms.

12. Press the **Return** to return to the last operation menu, press the **Sweep** soft function key, and press the **Freq & Ampl** soft function key.

    It will set the step sweep as frequency data sweep as well as amplitude data sweep. This soft function key can be selected to return to the last menu and run the sweep function.

13. Press **RF On/Off**.

    The status of the indicator on the display screen will be changed from RF OFF into RF ON.

14. Press **Single Sweep**.

    It will execute single sweep of frequency and amplitude configured in step sweep, and the result is output to the RF OUTPUT connector.

2-2-2-3 Activate continuous step sweep

Press **Sweep Repeat Single Cont**.

It will switch sweep from single sweep to continuous sweep. At the moment, continuous repeated frequency and amplitude configured in step sweep can be obtained from the RF OUTPUT connector.

List sweep is used for building a list of ant frequency, amplitude and dwell time values, and sweeping RF output based on the entries in the List Mode Values table.

Different from the step sweep which entirely contains equidistant linear rise/descend frequency and amplitude values, the frequency and amplitude of list sweep can rise/descend non-isometrically and non-linearly or be orderly input randomly.

For convenience, the List Mode Values table can be copied from the previously configured step sweep. Associated frequency, amplitude and dwell time values of each step sweep point are input to one row of the List Mode Values table, as shown in the example below.

2-2-2-4 Use step sweep data to configure list sweep

During the process, the step sweep points are utilized and the sweep information is changed by editing a plurality of points in the List Mode Values table editor. The detailed content related to use of the table editor refers to the “Use Table Editor” in the content of the last section.

Detailed operation steps are as follows:

1. Press **Sweep Repeat Single Cont** .

   It will switch the sweep repeat mode from Continuous to Single.

2. Press **Sweep Type List Step** .

   It will switch the sweep type from step sweep to list sweep.

3. Press **More (1 of 3)** .

4. Press **Configure List Sweep** .

   It will open another menu to display the soft function key for building sweep points. The display screen will display the current list data.

5. Press **More (1 of 2)** **Load List From Step Sweep** \ **Confirm Load From Step Sweep** .

At the moment, the points defined in step sweep will be automatically loaded into the list.

2-2-2-5 Edit sweep points in list

1. Press **RETURN** to return to the last menu, press **Sweep** and select **Off**.

   Stopping the sweep can prevent appearance of errors when you edit the list sweep points.

2. Press **Configure List Sweep**.

   It will make you return to the table of the sweep list.

3. Use the arrow keys to highlight the dwell time in the first row.

4. Press **Edit Item**.

   Dwell time of point 1 will become action function.

5. Input 100msec.

   It will use the input 100 ms as a new dwell time of the first row. Please note that the next item in the table (namely the frequency value of point 2 at this condition) becomes a highlighted item after you press the end mark soft function key.

6. Use the arrow keys to highlighted the frequency value in the fourth row.

7. Press the **Edit Item** soft function key, and input 545MHz.

   It will change the frequency value in the fourth row into 545MHz.

8. Highlight any line in the row where point 7 is, and press **Insert Row**.

   It will insert a new point between point 7 and point 8. The copy of the row of point 7 is placed between point 7 and point 8, thereby building a new point 8 and renumbering the subsequent points.

9. Highlight the frequency item of point 8 and then press **Insert Item** .

   Press Insert Item to move point 8 to the next row. Please note that the original frequency values of point 8 and point 9 are both moved to the next row so as to

build an entry of point 10, and at the moment, this point only has one frequency value (the power and dwell time items are not moved downwards yet).

The frequency of point 8 is still at editable status.

10. Input 590 MHz.
11. Press the **Insert Item** soft function key, and input −2.5 dBm.

    It will insert a new power value at point 8 and move the original power values of point 8 and point 9 to the next row.

12. Highlight the dwell time of point 9, and then press **Insert Item** .

    Thus, the highlighted dwell time copy is inserted for point 9, and the existing value is moved to the next row so as to completely fill in the entry of point 10.

3 Analog Modulation Operation

The chapter introduces the analog modulation operation of the signal generator in detail.

The contents of the chapter are as follows:

- Configure analog modulation
- Configure AM (Amplitude Modulation)
- Configure FM (Frequency Modulation)
- Configure PM (Phase Modulation)
- Configure pulse modulation
- Configure LF (Low Frequency) output

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3 Analog Modulation Operation

3-1 Configure analog modulation

The signal generator can modulate RF carrier wave by adopting four types of analog modulation: internal waveforms capable of being used by amplitude, frequency, phase and pulse are shown in the table as follows:

Table 8 Analogue modulation waveform

Waveform	Description
Sine wave	It has adjustable amplitude and frequency.
Dual-sine wave	It has respectively-adjustable frequency and peak value amplitude percentage setting for the second audio frequency.
Sweep sine	It has adjustable start frequency, sweep time and sweep trigger settings.
Triangular wave	It has adjustable amplitude and frequency.
Sawtooth wave	It has adjustable amplitude and frequency.
Square wave	It has adjustable amplitude and frequency.

3-2 Configure AM

During the following procedures, you can learn how to generate amplitude modulation RF carrier wave with the following characteristics:

- The carrier wave frequency is set as 1340kHz.
- The power electric level is set as 0dBm.
- AM depth is set as 90%.
- AM rate is set as 10kHz.

3-2-1 Set carrier wave frequency

1. Press **PRESET**.
2. Press the **FREQ** hard function key, and input 1340kHz.

   At the moment, the FREQUENCY (Frequency) region of the display screen will display 1.340 000 0MHz.

3-2-2 Set RF output amplitude

Press the **AMPT** hard function key and input 0dBm.
At the moment, the AMPLITUDE region of the display screen will display 0.00dBm.

3-2-3 Set AM modulation depth and modulation rate

1. Press the **AM** hard function key.

   At the moment, the first-level menu of the soft function key will be displayed.
2. Press the **AM Depth** soft function key, and input 90%.

   90.0% will appear below the **AM Depth** soft function key.
3. Press the **AM Rate** soft function key, and input 10kHz.

10.0000 kHz will appear below the **AM Rate** soft function key.

3-2-4 Run amplitude modulation

The signal generator is now configured as a carrier wave that outputs 0dBm and performs amplitude modulation at 1340 kHz; the AM modulation depth is set as 90%, and the AM modulation rate is set as 10 kHz. The waveform is sine wave (please note that the sine is a default value of the **AM waveform** soft function key. The amplitude modulation signal is output according to the following steps:

1. Press the **MOD Off On** key.

   At the moment, the MOD ON indicator is activated to show that the modulation on-off is run.

2. Press **AM Off On** soft function key.

   AM will be switched from Off to On . Please note that AM display indicator will be opened to point out that you have already run amplitude modulation.

3. Press the **RF On Off** key on the front panel.

   At the moment, the RF ON indicator is activated, which proves that the signal can be acquired from the RF OUTPUT connector.

3-3 Configure FM

During the following procedures, you can learn how to generate frequency modulation RF carrier wave with the following characteristics:

- The carrier wave frequency is set as 1GHz.
- The power electric level is set as 0dBm.
- The frequency modulation offset is set as 75kHz.
- The modulation rate is set as 10kHz.

3-3-1 Set carrier wave frequency

1. Press **PRESET**.
2. Press the **FREQ** hard function key, and input 1 GHz.

At the moment, the FREQUENCY (Frequency) region of the display screen will display 1.000 000 0GHz.

3-3-2 Set RF output amplitude

Press the **AMPT** hard function key, and input 0 dBm.

At the moment, the AMPLITUDE (Amplitude) region of the display screen will display 0.00dBm.

3-3-3 Set FM Dev and FM rate

1. Press the **FM** hard function key.

   At the moment, the first-level menu of the FM soft function key will be displayed.

2. Press the **FM Dev** soft function key, and input 75kHz.

75.000kHz will appear below the FM Dev soft function key.

3. Press the **FM Rate** soft function key, and input 10kHz.

   10.0000 kHz will appear below the FM Rate soft function key.

The signal generator is now already configured as a carrier wave that outputs 0dBm and performs frequency modulation at 1GHz, the frequency modulation offset is 75 kHz, the modulation rate is 10 kHz, and the carrier wave is a sine wave in waveform.

3-3-4 Run frequency modulation

Output the frequency modulation signal according to the following steps:

1. Press the **MOD OFF ON** key.

   At the moment, the MOD ON indicator is activated to show that the modulation on-off is run.

2. Press the **FM Off On** soft function key.

   FM will be switched from Off to On. Please note that FM display indicator will be opened to point out that you have already run frequency modulation.

3. Press the **RF On Off** key on the front panel.

   At the moment, the RF ON indicator is activated, which proves that the signal can be acquired from the RF OUTPUT connector.

3-4 Configure ΦM

During the following procedures, you can learn how to generate phase modulation RF carrier wave with the following characteristics:

- The carrier wave frequency is set as 3.0GHz.
- The power electric level is set as 0dBm.
- Phase offset is set as 0.25 radian.
- Modulation rate is set as 30kHz.

3-4-1 Set carrier wave frequency

1. Press **PRESET**.
2. Press the **FREQ** hard function key, and input 3 GHz.

   At the moment, the FREQUENCY region of the display screen will display 3.000 000 0GHz.

3-4-2 Set RF output amplitude

Press the **AMPT** hard function key, and input 0dBm.
At the moment, the AMPLITUDE region of the display screen will display 0.00dBm.

3-4-3 Set ΦM Dev and ΦM Rate

1. Press the **FM** hard function key.
2. Press the **FM/ΦM** soft function key.

   At the moment, the first-level menu of the PM soft function key will be displayed.
3. Press the **ΦM/ Dev** soft function key, and input 0.25 rad (Radian).

   Thus, the PM Dev is changed into 0.25 rad.

4. Press the **ΦM/ Rate** soft function key, and input10kHz.

   Thus, the modulation rate is set as 10kHz.

The signal generator is now already configured as a carrier wave that outputs 0dBm and performs phase modulation at 3GHz, the phase offset of the carrier wave is 0.25 rad, the modulation rate is 10 kHz, and the carrier wave is a sine wave in waveform.

3-4-4 Run phase modulation

1. Press **MOD Off On** .

   MOD display indicator will be opened to point out that you have already run MOD Off On.

2. Press **ΦM Off On** .

   ΦM display indicator will be opened to point out that you have already run phase modulation.

3. Press the **RF On Off** key on the front panel.

   At the moment, the RF ON indicator is activated, which proves that the signal can be acquired from the RF OUTPUT connector.

3-5 Configure pulse modulation

During the following procedures, you can learn how to generate pulse modulation RF carrier wave with the following characteristics:

- The carrier wave frequency is set as 2GHz.
- The power electric level is set as 0dBm.
- The pulse period is set as 100.0us.
- The pulse period is set as 24.0us.
- The pulse source is set as internal self excitation.

3-5-1 Set carrier wave frequency

1. Press the **PRESET**.
2. Press the **FREQ** hard function key, and input 2 GHz.

   At the moment, the FREQUENCY (Frequency) region of the display screen will display 2.000 000 0GHz.

3-5-2 Set RF output amplitude

Press the **AMPT** hard function key, and input 0dBm.
At the moment, the AMPLITUDE (Amplitude) region of the display screen will display 0.00dBm.

3-5-3 Set pulse period and width

1. Press the **PULSE** \ **Pulse Period**, and input100 usec.
   Thus, the pulse period is set as 100 us.
2. Pres the **Pulse Width** soft function key, and input 24 usec.
   Thus, the pulse period is set as 24 us.

The signal generator is now already configured as a carrier wave that outputs 0dBm and performs pulse modulation at 2GHz, the pulse period of the carrier wave is 100 us, the pulse width is 24 us, and the modulation source is set as internal self excitation. (Please note that the internal self excitation is the default value of the modulation source (Pulse Source) soft function key.)

3-5-4 Activate pulse modulation

1. Press the **Mod Off On key**.

   At the moment, the MOD ON indicator is activated to show that modulation on-off is run.

2. Press **Pulse Off On** .

   Thus, pulse modulation is activated. The Pulse display indicator will be opened to point out that you have already run pulse modulation.

3. Press the **RF On Off** key on the front panel.

   At the moment, the RF ON (RF On) indicator is activated, which proves that the signal can be acquired from the RF OUTPUT connector.

3-6 Configure LF output

During the procedures below, you can learn how to set the low-frequency signal output with the following characteristics:

- Set the frequency as 1kHz.
- Set the output amplitude as 1Vp.
- Set the LF waveform as LF sweep frequency sine.

3-6-1 Configure LF output frequency and amplitude

1. Press **PRESET** .
2. Press the **LF Out** hard function key.

   Thus, the LF output menu shall be opened.
3. Press the **LF Output Freq** soft function key, and input 1kHz.

   Thus, the LF output frequency is set as 1kHz. 1.000kHz will appear below the **LF Output Freq** soft function key.
4. Press the **LF Out Amplitude** soft function key, and input 1Vp.

   Thus, the LF output amplitude is set as 1Vp. 1.000 Vp will appear below the **LF Out Amplitude** soft function key.

3-6-2 Configure the waveform

1. Press the **LF Out Waveform** \ **Swept-Sine** .

   Thus, sweep frequency sine wave output can be built, and a menu is opened, and the weep parameters of the sweep frequency sine wave signals are configured by the sweep frequency sine wave output.
2. Press the **LF Out Start Freq** soft function key, and input 100 Hz.

Thus, the start frequency of the sweep sine wave is set as 100 Hz.

3. Press the **LF Out Stop Freq** soft function key, and input 1kHz.

   Thus, the stop frequency of the sweep sine wave is set as 1 kHz.

4. Press **RETURN** .

   Thus, return to the low-frequency output menu. The waveform will be displayed below the LF Output Waveform soft function key.

3-6-3 Run LF Output

1. Press the **MOD Off ON** key.

   At the moment, the MOD ON indicator is activated to show that the modulation on-off is run.

2. Press **LF Output Off On** .

   Thus, low-frequency output will be activated. The LF indicator is activated to show that you have already run low-frequency signal output.

4 Remote Control

Signal Generator

The chapter introduces the method for remotely controlling the signal generator.

4 Remote control

Communication mode and command

The signal generator can communicate with a PC in manners of LAN, GPIB and the like. The upper computer software of the PC terminal can use a standard SCPI (Standard Commands for Programmable Instruments) command to perform programming control on the instrument.

PC software

The user can write computer software independently and send a command to remotely control the signal generator. Besides, the user also can use “Measurement & Automation Explorer” of NI (National Instruments Corporation) corporation or “Agilent IO Libraries Suite” of Agilent (Agilent Technologies, Inc.) corporation to control the signal generator.

Programming details

Detailed description related to the command and programming refers to 《Programming Manual》of the product.

5 Menu Mapping

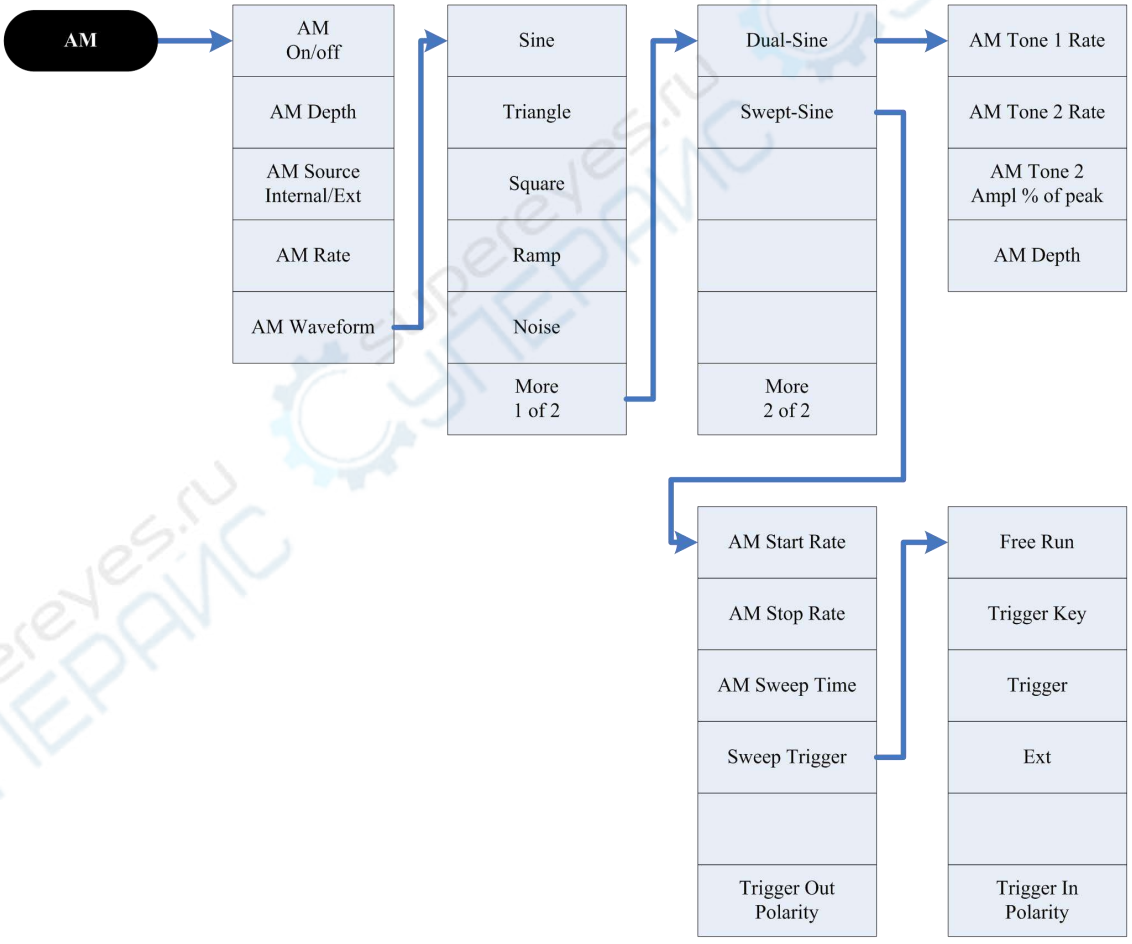
Signal Generator

The chapter introduces menu mapping corresponding to each function key on the front panel of the signal generator according to the alphabetical order.

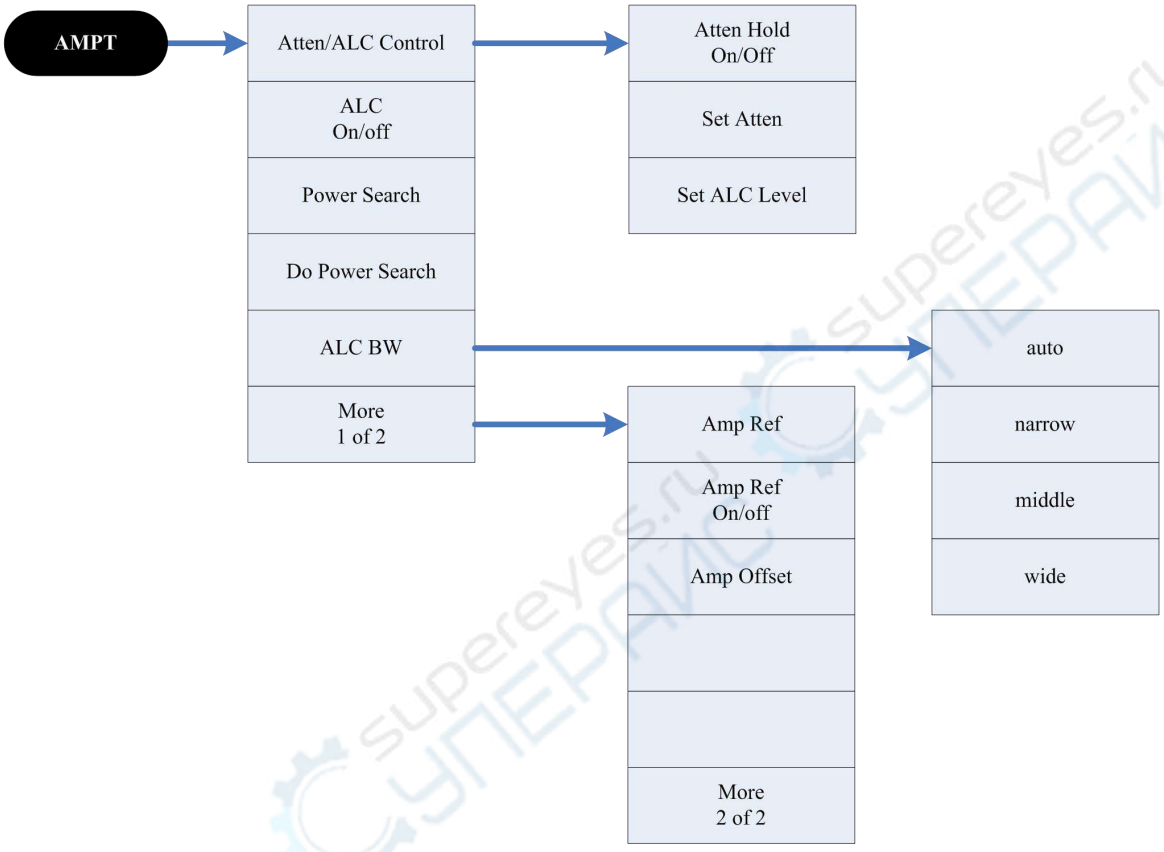
5 Menu Mapping Image

The chapter provides the function mapping image related to the menu keys on the front panel of the signal generator according to an alphabetical order A-Z, and specifically, the meaning of each menu refers to the operation descriptions of chapter 2 and chapter 3.

5-1 AM



5-2 AMPT



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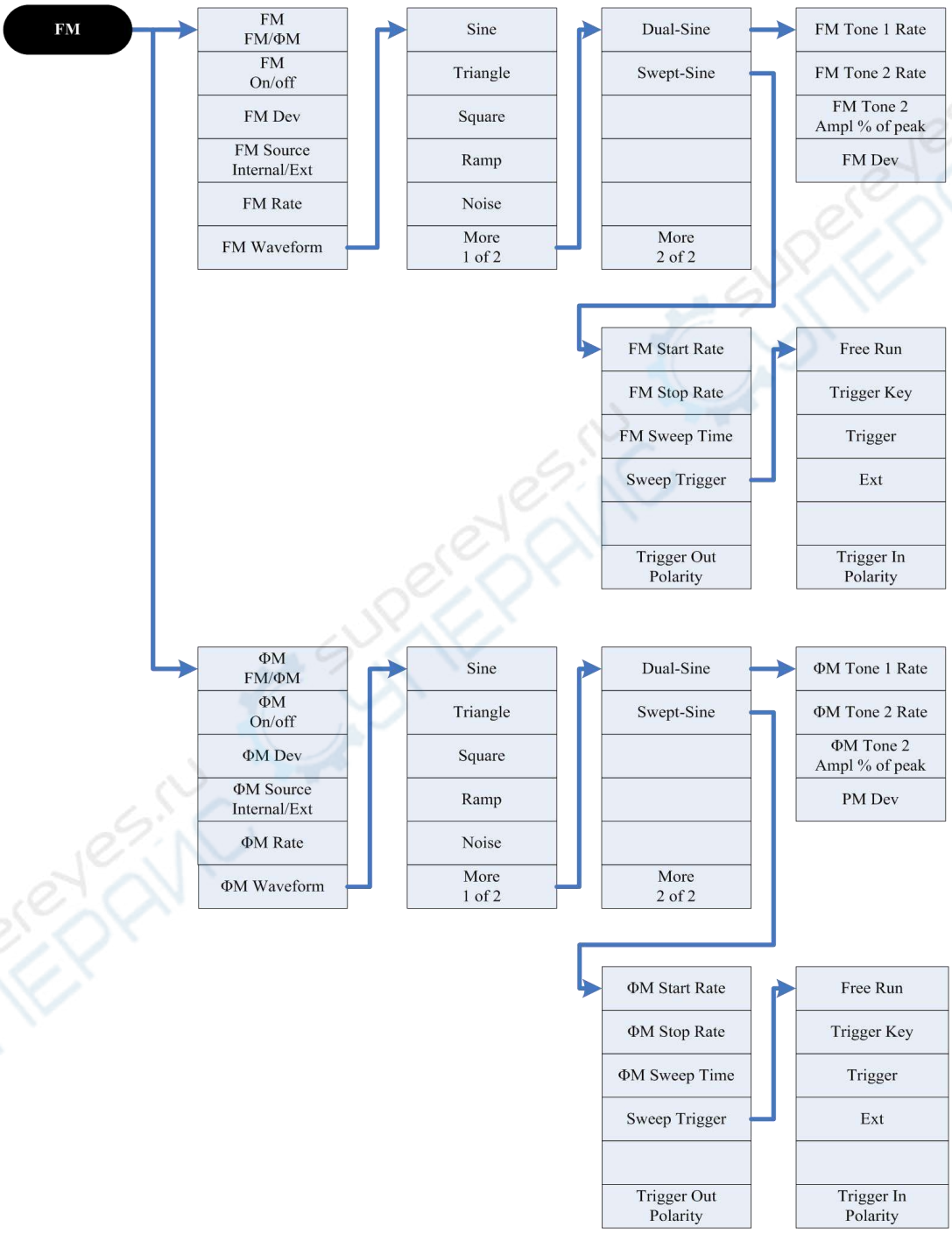
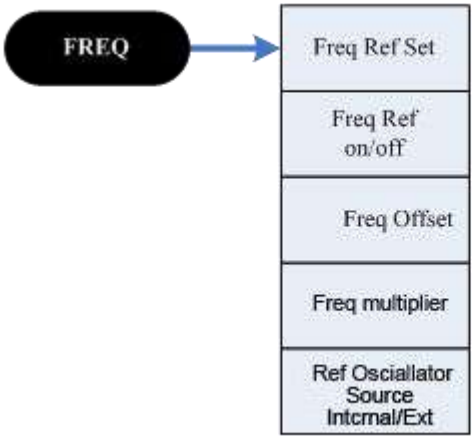
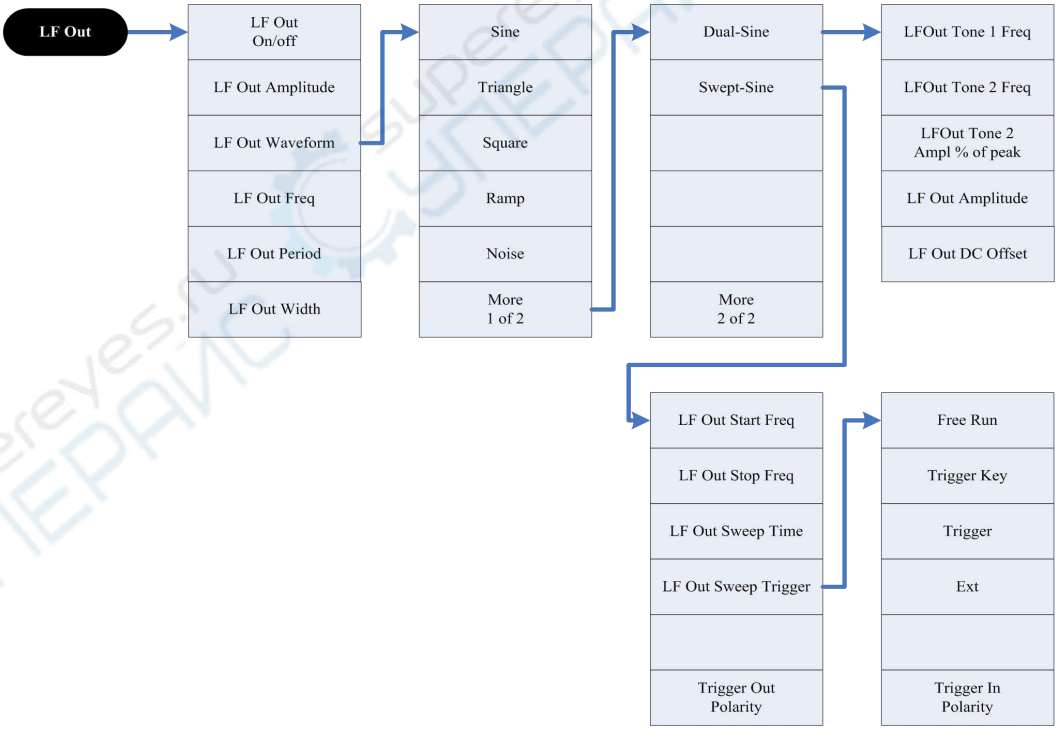
5-3 FM


FM
FM
FM/ΦM
FM
On/off
FM Dev
FM Source
Internal/Ext
FM Rate
FM Waveform
Sine
Triangle
Square
Ramp
Noise
More
1 of 2
Dual-Sine
Swept-Sine
More
2 of 2
FM Tone 1 Rate
FM Tone 2 Rate
FM Tone 2
Ampl % of peak
FM Dev
FM Start Rate
FM Stop Rate
FM Sweep Time
Sweep Trigger
Trigger Out
Polarity
Free Run
Trigger Key
Trigger
Ext
Trigger In
Polarity
ΦM
FM/ΦM
ΦM
On/off
ΦM Dev
ΦM Source
Internal/Ext
ΦM Rate
ΦM Waveform
Sine
Triangle
Square
Ramp
Noise
More
1 of 2
Dual-Sine
Swept-Sine
More
2 of 2
ΦM Tone 1 Rate
ΦM Tone 2 Rate
ΦM Tone 2
Ampl % of peak
PM Dev
ΦM Start Rate
ΦM Stop Rate
ΦM Sweep Time
Sweep Trigger
Trigger Out
Polarity
Free Run
Trigger Key
Trigger
Ext
Trigger In
Polarity

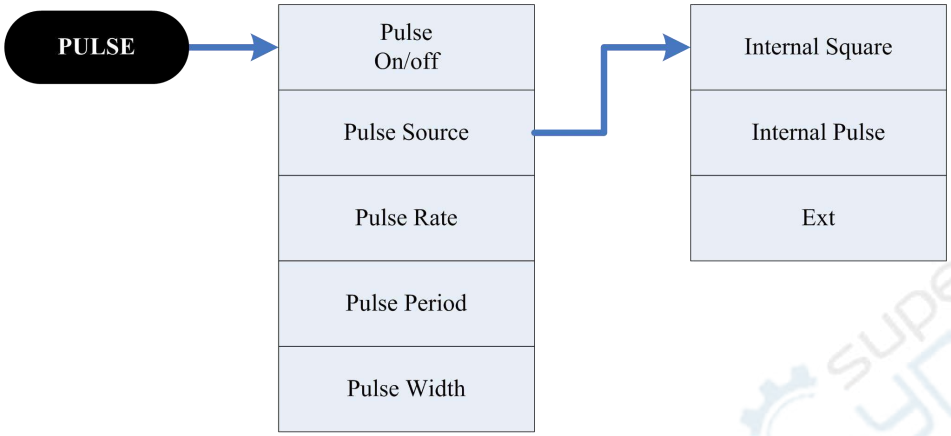
5-4 FREQ



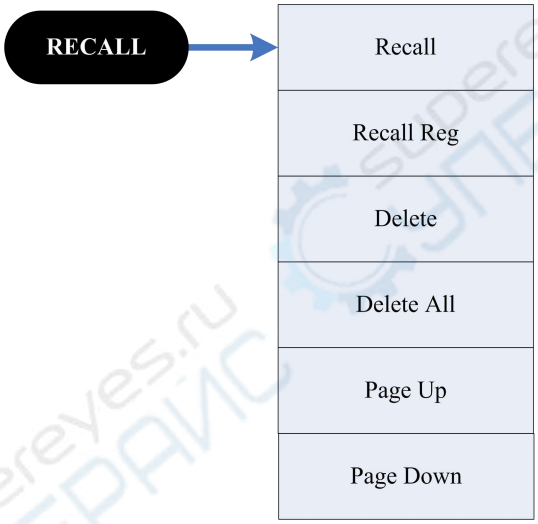
5-5 LF OUT



5-6 PULSE



5-7 RECALL



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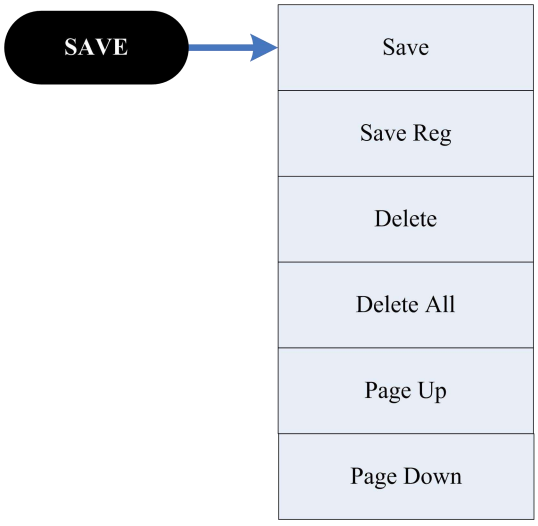
5-8 SAVE



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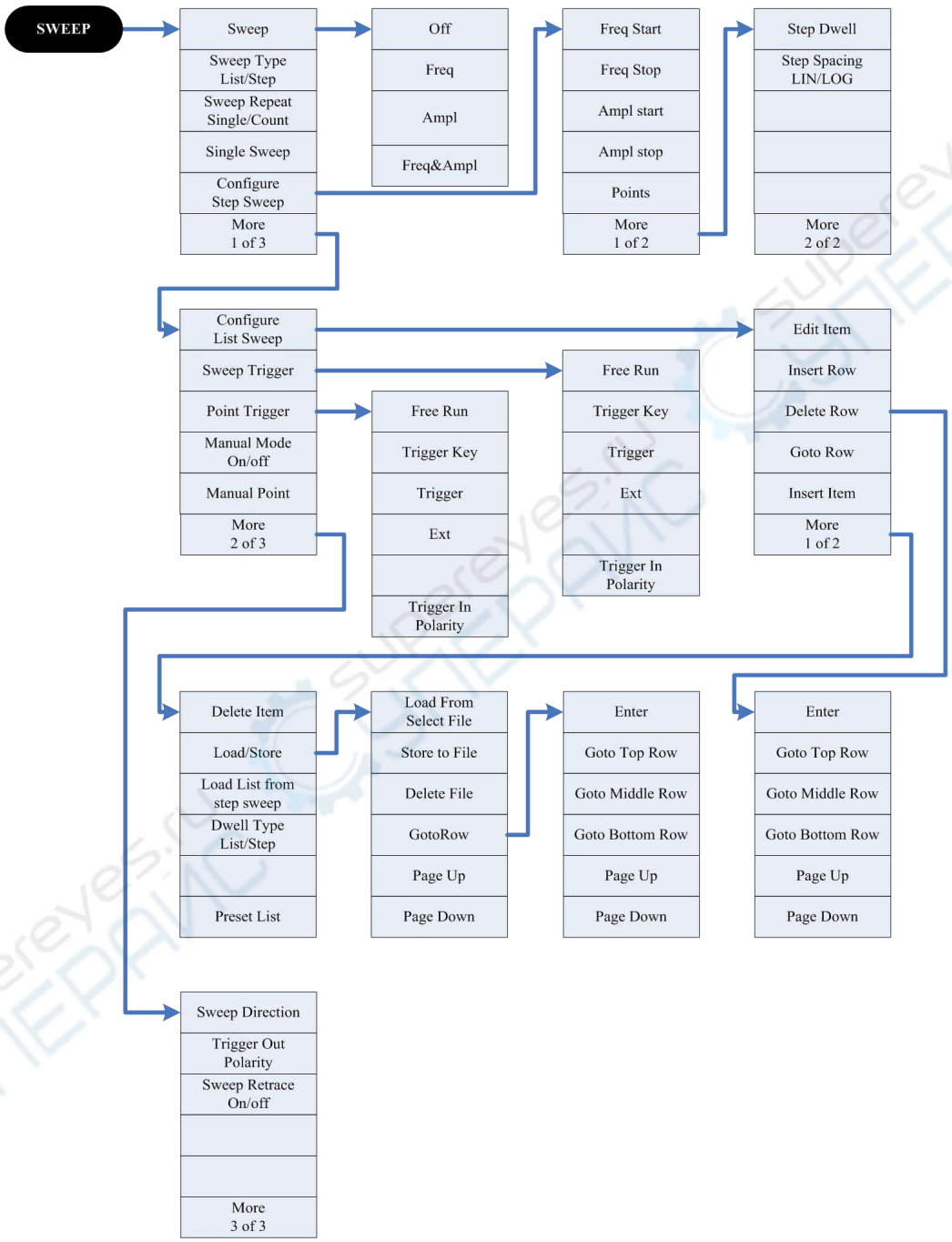
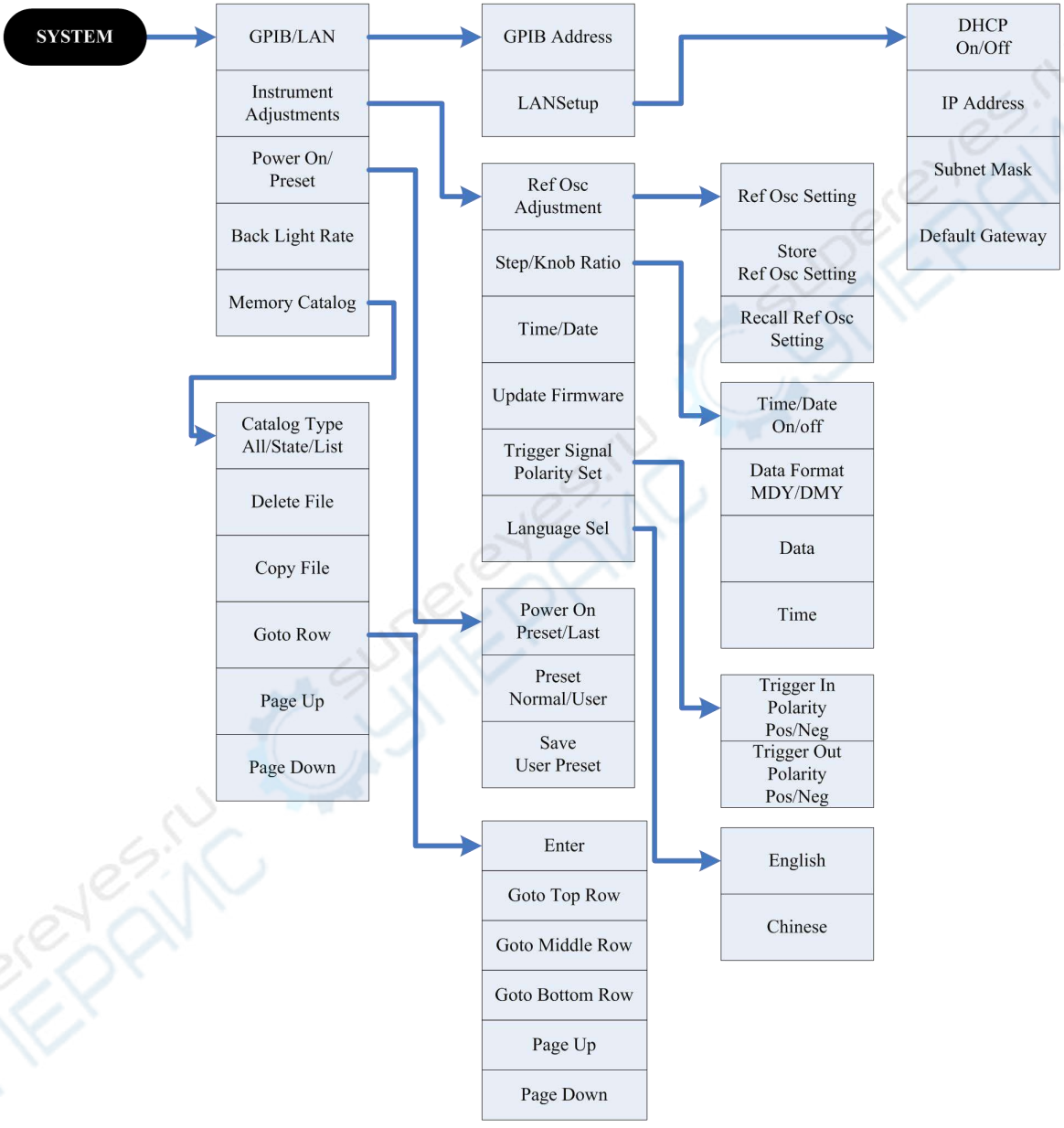
5-9 SWEEP


SWEEP
Sweep
Sweep Type List/Step
Sweep Repeat Single/Count
Single Sweep
Configure Step Sweep
More 1 of 3
Off
Freq
Ampl
Freq&Ampl
Freq Start
Freq Stop
Ampl start
Ampl stop
Points
More 1 of 2
Step Dwell
Step Spacing LIN/LOG
More 2 of 2
Configure List Sweep
Sweep Trigger
Point Trigger
Manual Mode On/off
Manual Point
More 2 of 3
Free Run
Trigger Key
Trigger
Ext
Trigger In Polarity
Free Run
Trigger Key
Trigger
Ext
Trigger In Polarity
Edit Item
Insert Row
Delete Row
Goto Row
Insert Item
More 1 of 2
Delete Item
Load/Store
Load List from step sweep
Dwell Type List/Step
Preset List
Load From Select File
Store to File
Delete File
GotoRow
Page Up
Page Down
Enter
Goto Top Row
Goto Middle Row
Goto Bottom Row
Page Up
Page Down
Enter
Goto Top Row
Goto Middle Row
Goto Bottom Row
Page Up
Page Down
Sweep Direction
Trigger Out Polarity
Sweep Retrace On/off
More 3 of 3

5-10 SYSTEM


SYSTEM
GPIB/LAN
Instrument Adjustments
Power On/ Preset
Back Light Rate
Memory Catalog
Catalog Type All/State/List
Delete File
Copy File
Goto Row
Page Up
Page Down
GPIB Address
LANSetup
DHCP On/Off
IP Address
Subnet Mask
Default Gateway
Ref Osc Adjustment
Step/Knob Ratio
Time/Date
Update Firmware
Trigger Signal Polarity Set
Language Sel
Ref Osc Setting
Store Ref Osc Setting
Recall Ref Osc Setting
Time/Date On/off
Data Format MDY/DMY
Data
Time
Trigger In Polarity Pos/Neg
Trigger Out Polarity Pos/Neg
English
Chinese
Power On Preset/Last
Preset Normal/User
Save User Preset
Enter
Goto Top Row
Goto Middle Row
Goto Bottom Row
Page Up
Page Down

6 Performance Index

Signal Generator

The chapter lists the technical indexes and general technical specifications of the signal generator.

6 Performance Index

Technical indicators are applied to the following conditions:

- After 30 minutes - preheating, in the working temperature store at least 2 hours
- not given only the data for a typical value deviation. Marked with "typical" value of data not included in the product warranty.

1 Frequency

Frequency				
Frequency range	250kHz～4GHz	250kHz～4GHz	250kHz～3GHz	
Resolution	0.1Hz			
Internal Reference				
Frequency	10MHz			Temp. 0 to 45°C
Accuracy	≤±0.1ppm ≤	≤±1ppm ≤	≤±0.1ppm	
Aging	≤±1ppm/year			
Output amplitude	≥0.35Vrms			
EXT Input Reference				
Frequency	10MHz			
Input amplitude	0.5～2Vrms			
Connector	BNC female, 50Ω			
RF Output				
Power Range	-127~+13dBm (Available to -136dBm)	- 110~+13dBm	-- 127~+13dBm (Available to -136dBm)	
Resolution	0.01dB			
Accuracy	≤±1dB (≥-120 dBm) ≤±1.8dB (≥-127 dBm)	≤±1dB (≥-110 dBm)	≤±1dB (≥-120 dBm) ≤±1.8dB (≥-127 dBm)	Temp. from 20°C to 30°C; ALC ON

VSWR	≤1.8			
Connector	N type female, 50Ω			nominal value
Spectral purity				
SSB Phase Noise	≤-115dBc/Hz	≤-105dBc/Hz	≤-115dBc/Hz	Typical value: Carrier Frequency 1GHz; Offset 20 kHz
Residual FM(CW mode)	≤ 10Hz peak	≤ 30Hz peak	≤ 10Hz peak	Carrier frequency 1GHz; Bandwidth from 0.3 to 3 kHz
Harmonics	≤-30dBc			
Non-harmonics	≤-50dBc			
Modulation characteristics				
Amplitude Modulation				
Modulation Depth	0 ～100%			Temp. 0 to 45°C
Resolution	0.1%			
Modulation freq	20 Hz～20 kHz			
Accuracy	≤± (set value × 5% +0.2%)			
Distortion	<2%			1kHz modulation rate
Modulation characteristics				
Frequency Modulation				
Freq Deviation	20 Hz~100 kHz			
Modulation freq	20Hz~80kHz			
Accuracy	≤±(set value × 5%+0.2%)			1kHz modulation rate
Distortion	<0.1%	<1%	<0.1%	1 kHz frequency rate 50kHz offset
Carrier Frequency offset	≤200Hz			Reference to carrier frequency, external model

Frequency offset accuracy	<(Set 5% + 200Hz)			1 kHz frequency rate 50kHz offset,
Phase Modulation				
Phase Deviation	0~10rad			modulation rate, ≤ 10 kHz
Resolution	<1%			
Modulation freq	300 Hz~20 kHz			
Accuracy	±(set value×5%+ 0.2rad)			1kHz modulation rate
Distortion	<0.1%	<1.5%	<0.1%	1kHz modulation rate, 5rad offset
Pulse Modulation				
On/off ratio	≥80 dB ≥	60 dB ≥	80 dB	
Rise/Fall time	≤ 50ns ≤	60ns ≤	50ns	
Pulse Width	400ns ~1s			
Pulse Period	1us ~2s			
Time resolution	100ns			
LF Function source				
Waveform Type	Sine, Square, Triangle, Sawtooth			
Frequency	20Hz ~ 100kHz			
Freq resolution	1Hz			
Amplitude range	0～$2V_{P-P}$			
Amplitude resolution	1mV			
General				
Display Size	7.0 inch TFT			
Display Resolution	800 x 480			
Power voltage	100V~240V			
Power frequency	47.5~52.5Hz			
Power consumption	≤ 50W			
Weight	≤10kg			Net weight

Size	426 × 133 × 450 mm	H x W x D
Working temperature	0°C ~ +40°C	
Storage Temperature	-40°C ~ +70°C	
Date Storage (Internal)	2M	
Date Storage (External)	Support USB 2.0 Compatible memory devices	

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7

Appendix

Signal Generator

The chapter provides the relevant information of accessory details, services and support of the signal generator.

7 Appendix

Appendix A: Accessories

Category	Name	Description
Standard accessories	Power cord	One piece
	User's manual	One copy
	Programming manual	One copy

Postscript: to know more selectable components or accessories, please contact salesmen or local agencies of the company.

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