

# ***VOLTCRAFT***®

## **Dual-Channel Arbitrary Waveform Generator Quick Guide**

- **FG-30802T**
- **FG-31602T**
- **FG-32502T**

# Table of Contents

1.General Safety Requirement .....	1
2.Safety Terms and Symbols.....	2
3.Quick Start .....	3
Front panel overview .....	3
Rear Panel Overview.....	5
Power on .....	6
User Interface.....	7
Use build-in Help.....	8
Set the channel .....	8
Set basic waveform .....	8
Output the build-in waveform (including AC) .....	10
Edit the arbitrary waveform.....	10
Output Mod Waveforms .....	11
Output Sweep Waveform .....	12
Output Burst Waveform.....	12
Counter.....	13
File Store System.....	14
Save Current Arbitrary Wave .....	14
Bring up arbitrary wave files in internal/external memory.....	15
Clear waveform from memory .....	16
Save/recall instrument preset .....	16
Utility Setting.....	16
4.Communicate with PC.....	18
Using USB Port .....	18
Using LAN Port .....	18
Connect Directly.....	18
Connect through a Router .....	19
5.Appendix.....	21
Appendix A: Accessories.....	21
Appendix B: General Care and Cleaning.....	21

# 1. General Safety Requirement

**Before use, please read the following safety precautions to avoid any possible bodily injury and to prevent this product or any other connected products from damage. In order to avoid any contingent danger, ensure this product is only used within the range specified.**

**Only the qualified technicians can implement the maintenance.**

**To avoid Fire or Personal Injury:**

- **Use Proper Power Cord.** Use only the power cord supplied with the product and certified to use in your country.
- **Product Grounded.** This instrument is grounded through the power cord grounding conductor. To avoid electric shock, the grounding conductor must be grounded. The product must be grounded properly before any connection with its input or output terminal.
- **Check all Terminal Ratings.** To avoid fire or shock hazard, check all ratings and markers of this product. Refer to the user's manual for more information about ratings before connecting to the instrument.
- **Do not operate without covers.** Do not operate the instrument with covers or panels removed.
- **Use Proper Fuse.** Use only the specified type and rating fuse for this instrument.
- **Avoid exposed circuit.** Do not touch exposed junctions and components when the instrument is powered.
- **Do not operate if in any doubt.** If you suspect damage occurs to the instrument, have it inspected by qualified service personnel before further operations.
- **In well-ventilated area.** Make sure the instrument installed with proper ventilation, refer to the user manual for more details.
- **Do not operate in wet conditions.**
- **Do not operate in an explosive atmosphere.**
- **Keep product surfaces clean and dry.**

## 2. Safety Terms and Symbols

### Safety Terms

**Terms in this manual.** The following terms may appear in this manual:



**Warning:** Warning indicates the conditions or practices that could result in injury or loss of life.



**Caution:** Caution indicates the conditions or practices that could result in damage to this product or other property.

**Terms on the product.** The following terms may appear on this product:

**Danger:** It indicates an injury or hazard may immediately happen.

**Warning:** It indicates an injury or hazard may be accessible potentially.

**Caution:** It indicates a potential damage to the instrument or other property might occur.

### Safety Symbols

**Symbols on the product.** The following symbol may appear on the product:



Hazardous Voltage



Refer to Manual



Protective Earth Terminal



Chassis Ground



Test Ground

## 3. Quick Start

### Front panel overview

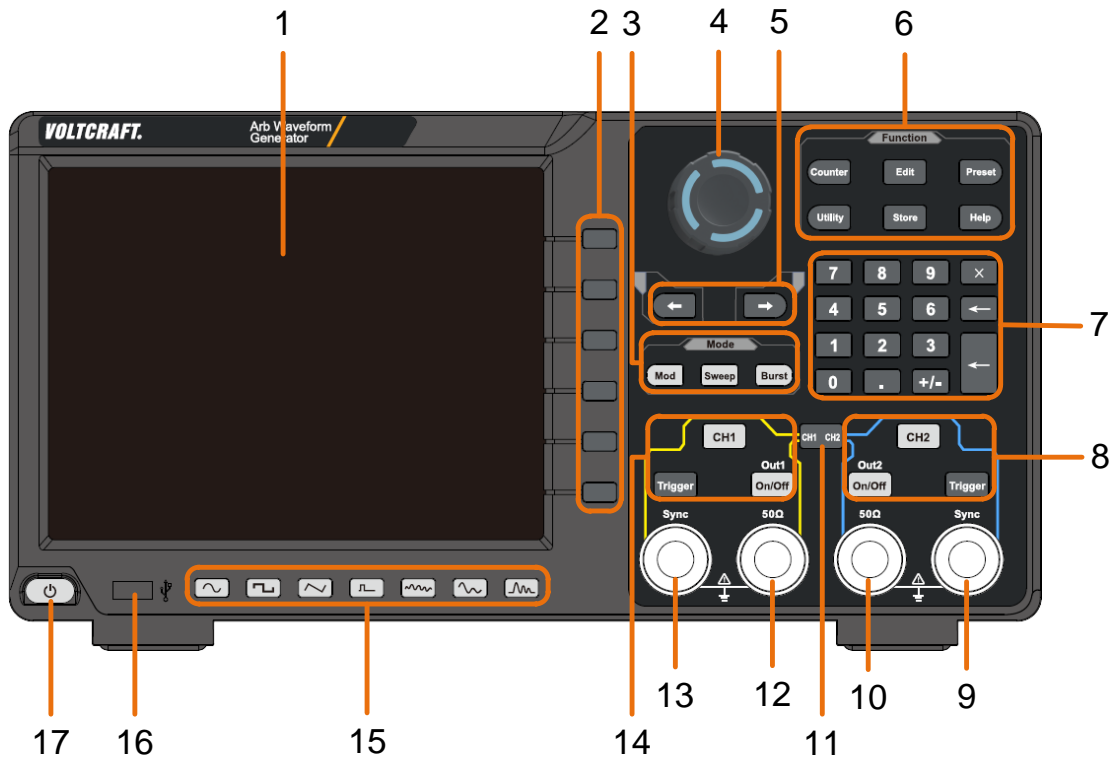


Figure 3-1 Front Panel overview

1	<b>Display Area</b>	Display user interface
2	<b>Menu Selection Button</b>	Includes 6 buttons to select the corresponding menu softkey
3	<b>Mode Button Area</b>	<p><b>Modulation (Mod):</b> Output modulation waveform</p> <p><b>Sweep:</b> Scan a sine wave, square wave, ramp wave or arbitrary wave</p> <p><b>Burst:</b> A burst that produces a sine wave, square wave, ramp wave, pulse wave, or arbitrary wave.</p>
4	<b>Knob</b>	Change the currently selected value, also used to select the character in the soft keyboard when the file location or file name is entered.
5	<b>Direction Button</b>	Move the cursor of the selected parameter
6	<b>Function Button Area</b>	<p><b>Counter:</b> Enter the frequency meter interface</p> <p><b>Wave Edit (Edit):</b> enter the waveform editing interface</p>

### 3.Quick Start

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**Preset:** Enter the preset menu, set the reset parameters or power-on parameters; save or read the settings file.

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**Utility:** Set the auxiliary system function

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**Store:** Save/recall arbitrary waveform data

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**Help:** To get context help for any front panel button or menu softkey, press the button and then press the button for which you need help.

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7 **Numerical Keypad** Input the parameter

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8 **CH2 Button Area** **CH2 key:** Enter the waveform interface and select the CH2 channel (the backlight of the button lights up). After selecting, the waveform and parameters of CH2 can be set.

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**Blue Trigger button:** CH2 manual trigger button. In sweep or burst mode, when the trigger source is selected as “Manual”, each press of this button will initiate a trigger.

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**On/Off key:** Turns the output of the CH2 channel on or off. When the output is turned on, the backlight of the button lights up.

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9 **CH2 Sync Output Terminal** When **Utility** → **CH1/2 Set** → **CH2 Sync** turned on, this terminal outputs a sync signal that matches the current configuration of CH2.

---

10 **CH2 Output Terminal** Output CH2 signal

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11 **CH1⇌CH2 Button** Display channel copy menu and menu of frequency synchronization, amplitude synchronization, phase alignment, etc.

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12 **CH1 Output Terminal** Output CH1 signal

---

13 **CH1 Sync Output Terminal** When **Utility** → **CH1/2 Set** → **CH1 Sync** turned on, this terminal outputs a sync signal that matches the current configuration of CH1.








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14 **CH1 Button Area** **CH1 key:** Enter the waveform interface and select the CH1 channel (the backlight of the button lights up). After selecting, the waveform and parameters of CH1 can be set.

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**Yellow Trigger button:** CH1 manual trigger button. In sweep or burst mode, when the trigger source is selected as “Manual”, each press of this button will initiate a trigger.

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	<b>On/Off key:</b> Turns the output of the CH1 channel on or off. When the output is turned on, the backlight of the button lights up.
15 <b>Waveform Selection Area</b>	Including: sine  , square  , ramp  , pulse  , noise  , arbitrary wave  , harmonic waves  . When one waveform is selected, the corresponding backlight will be lit.
16 <b>USB Interface</b>	Connect to an external USB Host device, such as a USB flash drive.
17 <b>Power Button</b>	Turn on/off the waveform generator

## Rear Panel Overview

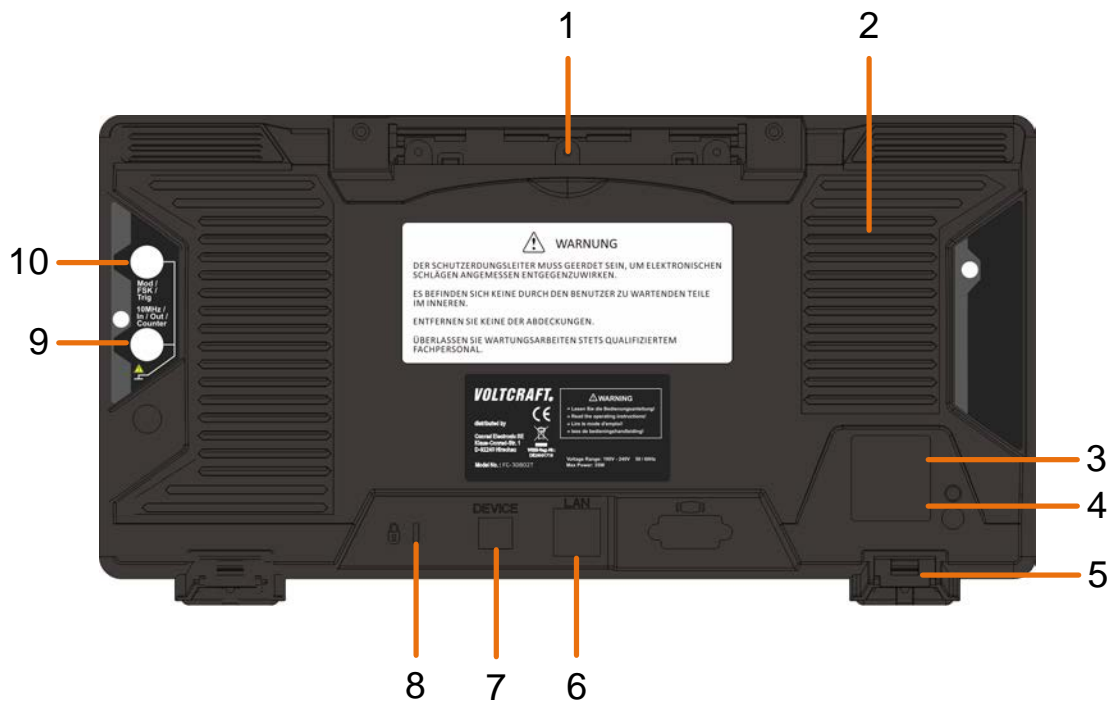


Figure 3-2 Rear Panel Overview

1 <b>Retractable Handle</b>	
2 <b>Vents</b>	
3 <b>Power Input Socket</b>	AC power input interface.
4 <b>Fuse Box</b>	The place to install the fuse.
5 <b>Stool</b>	Tilting the signal generator for easy operation.

6	<b>LAN Interface</b>	The signal generator is connected to the local area network through this interface for remote control.
7	<b>USB Device Interface</b>	Used to connect a USB type B controller. The PC can be connected to communicate with the signal generator through the host computer software.
8	<b>Keyhole</b>	A safety lock (please buy it yourself) can be used to lock the instrument in a fixed position to secure the instrument.
9	<b>10MHz In/Out/Counter(Reference clock input / output / frequency meter input) connector</b>	The default is to receive the frequency meter input signal. Used to receive a 10MHz clock signal when the instrument is set to an internal clock source and <b>Utility</b> → <b>System</b> → <b>CLK output</b> is On; it is used to receive an external 10MHz clock signal when the instrument is set to an external clock source.
10	<b>Mod/FSK/Trig (modulation/trigger input) connector</b>	When modulating the waveform, outputting the sweep frequency, and the burst, the signal accessed here can be used as an external source. Note: If one channel turns on AM, FM, PM, PWM or OSK, and the other channel turns on ASK, FSK, PSK, sweep or burst, and both channels are set to external trigger, then the channel that sets the trigger source can be set later. With an external trigger, the other channel automatically cancels the external trigger because of the different external modulation signal types.

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## Power on

- (1) Connect the instrument to an AC power source using the power cord supplied with the accessory



**Warning:**

To prevent electric shock, make sure the instrument is properly grounded.

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- (2) Press the **power button** on the front panel and the screen will display the booting screen.



## User Interface

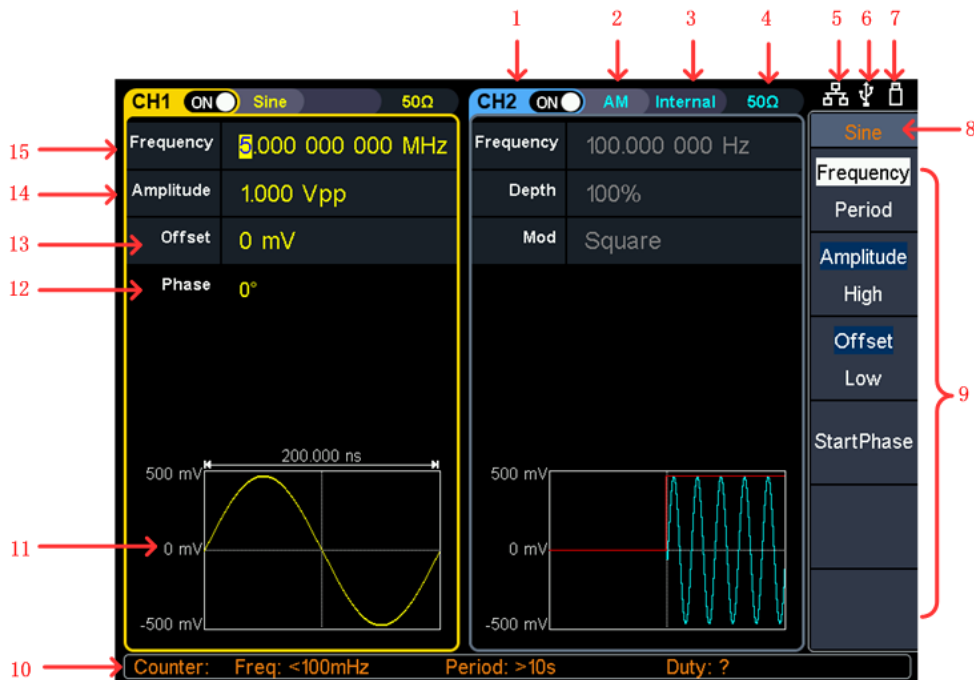


Figure 3-3 User Interface

- |    |  |
|----|--|
| 1  | Display channel name and channel status  |
| 2  | Current waveform or current mode   |
| 3  | Trigger source.<br>Internal: internal modulation or internal trigger source<br>External: external modulation or external trigger source<br>Manual: manual trigger source |
| 4  | Load, High Z indicates high resistance   |
| 5  | This icon is lit when the network is connected through the LAN   |
| 6  | This icon is lit when connected to the USB Host via the USB DEVICE interface.  |
| 7  | When the instrument detects the USB flash drive, the icon lights.  |
| 8  | Current menu name  |
| 9  | Current waveform or mode setting menu  |
| 10 | Frequency meter brief information, displays the frequency value, period and the duty value   |
| 11 | Display a schematic of the current waveform  |
| 12 | Display the current starting phase   |
| 13 | Offset / low level, depending on the right highlighted menu item   |

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14 Amplitude / high level, depending on the right highlighted menu item

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15 Frequency/cycle, depending on the right highlighted menu item

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## Use build-in Help

- (1) To get help on any front panel button or menu softkey, press the front panel **Help** function button first, then press the button you need help.
- (2) Press the **Help** function key again to exit the help interface.

## Set the channel

- **Select the channel for configuration**

Before configuring waveform parameters, you must select the channel you want to configure. Press **CH1** or **CH2** to select the corresponding channel, and the corresponding channel area in the user interface will light up








- **Turn on/off channel output**


Press the front panel CH1 **On/Off** or CH2 **On/Off** button to turn the output of the corresponding channel on/off. When the output is turned on, the backlight of the button lights up.

- **Channel copy**

- (1) Press **CH1⇌CH2** on front panel to display copy menu.
- (2) Select **CH2 to CH1** softkey or **CH1 to CH2** softkey to copy the channel.

## Set basic waveform

Can set and output the Sine, Square, Ramp, Pulse, Noise, Arbitrary or Harmonic waveform. Press the waveform selection button on the front panel of the instrument: sine , square , ramp , pulse , noise , arbitrary , harmonic , and enter the corresponding waveform setting interface. The waveform is different and the parameters that can be set are different.

Example: Press the  key and press the **frequency/period** soft key. The selected

menu item is highlighted on white, and the cursor will display on corresponding parameter item in the user interface. Press the **frequency/period** softkey to switch the frequency/period.

**There are two ways to change the selected parameter value:**

- Turn the **knob** to increase or decrease the value at the cursor. Press the **←/→** arrow key to move the cursor left or right.
- Press a number key on the **numeric keypad** directly, the screen will pop out the data input box, input the desired value. Press the **X** soft key to delete the last digit, press the **←** soft key to cancel the input, and press the **Enter** soft key to indicate the default unit input. Press the **MHz, kHz, Hz, mHz, uHz** soft keys to select the unit of the parameter. Press the **Cancel** softkey to cancel the current input parameter value.

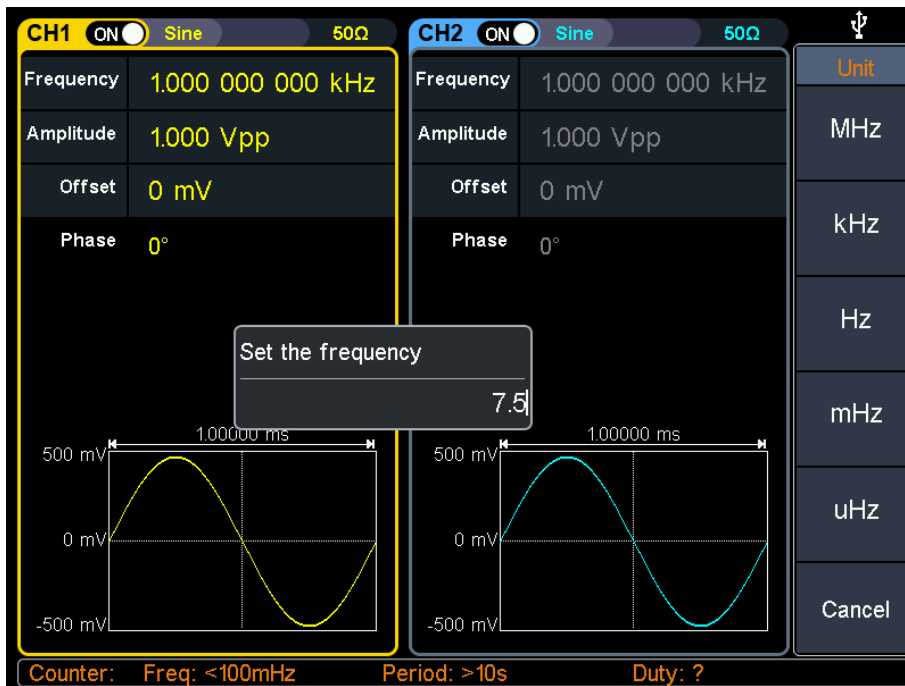



Figure 3-4: Use numeric keypad to set the frequency

Available parameter for each kinds of waveform:

Waveform	Waveform menu
Sine	Frequency/Period, Amplitude/High, Offset/Low, StartPhase
Square	Frequency/Period, Amplitude/High, Offset/Low, StartPhase
Ramp	Frequency/Period, Amplitude/High, Offset/Low, StartPhase, Symmetry
Pulse	Frequency/Period, Amplitude/High, Offset/Low, StartPhase, Width/DutyCyc, Rising/Falling
Noise	Amplitude/High, Offset/Low

Arbitrary	Frequency/Period, Amplitude/High, Offset/Low, StartPhase, Bult-in
Harmonic	Frequency/Period, Amplitude/High, Offset/Low, StartPhase, Type/Sequential, Order, SN, Amplitude, Phase

## Output the build-in waveform (including AC)

- (1) Press the  Arbitrary Wave button to enter the Arbitrary Wave menu and configure the waveform parameters.
- (2) Press the **Built-in** softkey, the build-in waveform type menu will pop out.
- (3) Press the **Common**, **Seg Mod**, **Medical Treatment**, **Standard**, **Maths**, **Trigonometric**, **Window Function**, and **Engineering** softkeys to enter a detailed list of categories.
- (4) Rotate the **Knob** 在 and select the file in the list, and press the **OK** software.

Note: DC is a type of built-in waveform, located in the "Common" category of "DC".

## Edit the arbitrary waveform

Press the front panel **Edit** function key to enter the arbitrary wave editing interface.

- (1) **Set the number of waveform points:** Press the **number of waveform points** softkey, use the **knob** to change the value directly or use the **numeric keypad** to input and select the unit softkey. The number of points ranges from 2 to 100,000.
- (2) **Set interpolation:** Press the **Interpolate** softkey to toggle the interpolation **on/off**. Select **On** to connect each waveform point with a straight line; select **Off**, the voltage level between each waveform point remains the same, creating a waveform similar to the step.
- (3) **Select a template:** Press the **Template** softkey to select blank, sine, square, ramp, and noise.
- (4) **Edit Waveform Point:** Press to **edit the waveform point** to enter the Edit Waveform Point menu.
  - Select the **number of points** and enter the number of the point you want to set.
  - Select the **voltage** and enter the voltage value to be set at this point.
  - Repeat this step to set all the points you want to set.
  - Press **Store** to enter the file system interface.
  - If you want to save the waveform to the built-in memory, check **INTER** and press

to **enter** the softkey. Turn the knob to select one of the USER files (EditMemory cannot be selected) and press the **Save** softkey. (The file size is displayed on the right side of the USER file. If 0B is displayed, it means the file is empty.)

- ◆ **Description:** EditMemory is a temporary data space created, saved, edited or recalled by any arbitrary wave. Saving the waveform is to save the data of this space to the user-specified location (EditMemory is in the memory and never empty). The data in this space is changed after an arbitrary waveform is called, a new waveform is created, or a related programming command is received.

If you want to save to a USB storage device, you need to plug the USB storage device into the front panel USB interface. Turn the knob to select USBDEVICE. Press to **enter** the softkey and the instrument will list the directories of the folders and files in the USB storage device. You can turn the knob to select a folder or file. Press to **enter** the softkey to enter the currently selected folder. To return to the parent directory, press the **Back** soft key.

After selecting the storage path, press the **Save As** softkey and the input keyboard appears on the screen. Turn the knob to select a character. Press the **uppercase/lowercase** softkey to toggle the case of keyboard characters. Press the **Select** soft key to enter the current character. Press the **Delete** soft key to delete the last character that has been entered. Press the **Finish** soft key to finish editing, and the waveform will be saved in the current path with the file suffixed by bin.

## Output Mod Waveforms

Supported modulation types include: AM (amplitude modulation), FM (frequency modulation), PM (phase modulation), PWM (pulse width modulation), ASK (amplitude shift keying), PSK (phase shift keying), FSK (frequency shift keying), 3FSK (ternary frequency shift keying), 4FSK (quadrature frequency shift keying), BPSK (biphase phase shift keying), OSK (oscillating keying).

Press the **Mod** function key, press the **Type** softkey, turn the **Knob** to select the modulation type, and press the **OK** soft key to enter the setup menu. To turn off modulation, press the **Mod** function button again.

The parameters can be set for each modulation type:

Modulation	Parameter can be set	
AM	Internal source	waveform modulation, frequency modulation, depth modulation
	External source	
FM	Internal source	waveform modulation, frequency modulation, frequency offset
	External source	Frequency offset

PM	Internal source	waveform modulation, frequency modulation, phase deviation
	External source	Phase deviation
PWM	Internal source	waveform modulation, frequency modulation, duty cycle deviation
	External source	Duty cycle deviation
ASK	Internal source	Waveform modulation, ASK rate, amplitude
	External source	Slope, amplitude
PSK	Internal source	Waveform modulation, PSK rate, phase deviation
	External source	Slope, phase deviation
FSK	Internal source	FSK rate、 frequency hopping
	External source	Slope, frequency hopping
3FSK	FSK rate, frequency hopping 1, frequency hopping 2	
4FSK	FSK rate, frequency hopping 1, frequency hopping 2, frequency hopping 3	
BPSK	Code rate, phase deviation, data source	
OSK	Internal source	Key frequency, vibration time

## Output Sweep Waveform

In the sweep mode, the output changes from the start frequency to the end frequency within the specified scan time. Sweep waveforms can only be generated using sine, square, ramp or arbitrary waves.

In the sine, square, ramp or arbitrary wave interface, press the front panel **Sweep** key to enter the sweep mode (the backlight of the button lights up). The parameters that can be set are: scan time, linear scan/log scan, start frequency/center frequency, stop frequency/frequency range, trigger source.

## Output Burst Waveform

Press the **Burst** key on the front panel to generate a burst waveform output for a variety of waveform functions. The burst can last for a specific number of waveform cycles (N-cycle bursts) or be controlled by an external gate signal (gated burst). The sine, square, ramp, pulse, or arbitrary wave function can be used (this function cannot be used for noise).

Pulse cycle, cycle number/infinite, trigger source can be set in N cycle mode.

Polarity can be set in gate mode.

## Counter

The frequency meter measures signals in the frequency range from 100 mHz to 200 MHz. The [10MHz In/Out/Counter] connector on the rear panel is used by default to receive the frequency meter input signal. The frequency meter works from the start, unless the connector is set to an external clock input or clock output.


- (1) Press the front panel **Counter** function key to enter the frequency meter interface.
- (2) Connect the signal to be tested to the [10MHz In/Out/Counter] connector on the rear panel.
- (3) Set the counter:
  - Press the **Coupling** soft key to switch AC or DC to set the coupling mode of the input signal.
  - Press the **Sensitivity** softkey to toggle low, medium or high.  
For small amplitude signals, the sensitivity is selected to be medium or high. For low frequency large signals or signals with slow rising edges, low sensitivity is selected and the measurement results are more accurate.
  - Press the **HF Suppression** softkey to toggle ON or OFF high frequency rejection.  
High-frequency rejection can be used to filter high-frequency components when measuring low-frequency signals, improving measurement accuracy. When measuring low frequency signals with a frequency less than 1 kHz, turn on high frequency rejection to filter out high frequency noise interference; turn off high frequency rejection when measuring high frequency signals with frequencies greater than 1 kHz.
  - Press the **Trigger Level** softkey. Turn the **knob** to change the current cursor position value, press the arrow keys to move the cursor left or right; or use the **numeric keypad** to enter a value and then select the desired unit from the right menu. The trigger level ranges from -2.5 V to 2.5 V.  
After the setting is completed, the frequency meter will measure the signal to be tested at the current setting. If the reading is unstable, repeat the above adjustment until the display is stable.
- (4) The frequency, period, duty cycle, positive pulse width, and negative pulse width can be viewed on the frequency meter interface.

## File Store System

File system memory is divided into internal memory (INTER) and removable memory (USBDEVICE). When a USB device is connected, the main interface displays INTER and USBDEVICE. If no USB device is connected, only the internal memory INTER is displayed. The internal memory can store 32 arbitrary waveform data.

Press the front panel **Store** function key to enter the file system.

### Save Current Arbitrary Wave

- (1) Press the  button to enter the Arbitrary Wave menu and configure the waveform parameters.
- (2) Press the front panel **Store** function key to enter the file system.
  - If you want to save the current arbitrary waveform to the built-in memory, select INTER and press to **enter** the soft key. Turn the knob to select one of the USER files (EditMemory cannot be selected) and press the **Save** softkey. (The file size is displayed on the right side of the USER file. If 0B is displayed, it means the file is empty.)

**Description:** EditMemory is a temporary data space created, saved, edited or recalled by any arbitrary wave. Saving the waveform is to save the data of this space to the user-specified location (EditMemory is in the memory and never empty). The data in this space is changed after an arbitrary waveform is called, a new waveform is created, or a related programming command is received.

- If you want to save to a USB storage device, you need to plug the USB storage device into the front panel USB interface. Turn the knob to select USBDEVICE. Press to **enter** the softkey and the instrument will list the directories of the folders and files in the USB storage device. You can turn the knob to select a folder or file. Press to **enter** the softkey to enter the currently selected folder. To return to the parent directory, press the **Back** soft key.

After selecting the storage path, press the Save As softkey and the input keyboard appears on the screen. Turn the knob to select a character. Press the uppercase/lowercase softkey to toggle the case of keyboard characters.



Press the Select soft key to enter the current character. Press the Delete soft key to delete the last character that has been entered. Press the Finish soft key to finish editing, and the waveform will be saved in the current path in a file format such as bin.

## Bring up arbitrary wave files in internal/external memory

Press the front panel **Store** function key to enter the file system.

- To call up the waveform file in the internal memory, select INTER under the memory selection interface and press to **enter** the soft key. Turn the knob to select a file and press to call up the softkey. If the reading is successful, the screen will prompt “File Read Successful”.

**Note:** The file size is displayed on the right side of the file. If 0B is displayed, the file is empty.

- To recall the waveform file in the USB storage device, turn the knob to select USBDEVICE in the memory selection interface. Press to enter the softkey and the instrument will list the directories of the folders and files in the USB storage device. Turn the knob to select a folder or file. Select the file with the suffix of bin and press to call up the softkey. If the reading is successful, the screen will prompt “File Read Successful”. Press the Save As soft key, a soft keyboard will appear on the screen interface. We can use the front panel knob to rotate left or right or the right menu soft key to create and name files.

**Note:** The screen will output the waveform file <500kB, which can be directly previewed in the lower right corner of the screen. If the knob is named, press the knob once to confirm it. If you press and hold the button (greater than 2s), the button will be saved when it is popped up. The current screen interface in bmp format to the u disk specific path ((model) / IMAGE / xx.bmp).

- Copy the waveform file from the USB storage device to the internal memory: After the waveform file in the USB storage device is called up according to the previous step, press the Back soft key to return to the upper directory. After returning to the memory selection interface, turn the knob to select INTER and press to enter the soft key. Turn the knob to select a USER file and press the Save button to copy the waveform file to the internal memory.

**Note:** In the arbitrary waveform interface, Shape displays the storage location or waveform name of the current arbitrary waveform. USER indicates the internal memory, External indicates the USB storage device, and if it is a built-in waveform, the built-in waveform name is displayed.

## Clear waveform from memory

- (1) Press the front panel **Store** function key to enter the file system.
- (2) Select INTER under the memory selection interface and press to enter the soft key.  
Press the **Security** soft key, the screen pops up, and then press the **OK** soft key to clear all waveforms in the internal memory.

## Save/recall instrument preset

The instrument settings can be saved as files in internal memory or on an external USB storage device. Up to 16 instrument settings can be saved in the instrument's internal memory. To save more settings, use a USB storage device. The settings file saved to the USB storage device uses the extension CFG. The saved settings can be restored from files in the internal memory or USB storage device.

### Operation Steps:

Press the front panel **Preset** function key to enter the preset menu, and press the **Save/Read Settings** soft key to enter the memory selection interface.

- If you want to save the settings to the built-in memory, check INTER and press the **Enter** soft key. Turn the knob to select a Setup file and press the **Save** softkey. (The file size is displayed on the right side of the Setup file. If 0B is displayed, it means the file is empty.)  
Note: Press the **Security** softkey and press the **OK** soft key to clear all settings in the internal memory.
- If you want to save to a USB storage device, you need to plug the USB storage device into the front panel USB interface. Turn the knob to select USBDEVICE. Press to **enter** the softkey and the instrument will list the directories of the folders and files in the USB storage device. You can turn the knob to select a folder or file. Press to enter the softkey to **enter** the currently selected folder. To return to the parent directory, press the **Back** soft key.  
After selecting the storage path, press the **Save As** softkey and the input keyboard appears on the screen. Turn the knob to select a character. Press the **uppercase/lowercase** softkey to toggle the case of keyboard characters. Press the **Select** soft key to enter the current character. Press the **Delete** soft key to delete the last character that has been entered. Press the **Finish** soft key to complete the editing. The current instrument settings will be saved in the current path in the cfg file format.
- To recall the settings, select the desired file and press to **call up** the softkey.

## Utility Setting

Press the front panel **Utility** function key to enter the system options menu. The user

### 3.Quick Start

can set the display parameters of the signal generator, CH1/2 parameters, interface parameters and system parameters. Press **Utility** again to exit the system options menu.

#### Utility system menu

Menu	Description
<b>Display Setting</b>	
Backlight	Set the parameter value of the screen brightness
Screen saver	Screen saver time range between 1 to 999 minutes
Separator	Set the separator for the screen display data
Date	Set the current date and time of the system
<b>CH1/2 Setting</b>	
CH1 Sync	Enable/disable front panel CH1 sync output terminal to output sync signal
CH2 Sync	Enable/disable front panel CH2 sync output terminal to output sync signal
CH1 Load	It is convenient for the user to match the display voltage with the desired load. The range is from 1 $\Omega$ to 10 K $\Omega$
CH2 Load	
<b>I/O Setting</b>	
USB Device	Set the communication protocol type of the USB Device interface on the rear panel. <b>PC:</b> This is the internal communication protocol. Select this option when connecting to the Waveform Editor host computer software via the USB Device interface. <b>USBTMC:</b> Select this when you need to use the USBTMC communication protocol standard.
Network	Network parameters while communicating with a computer using a LAN interface
<b>System Setting</b>	
Language	Select instrument interface language
Beeper	If ON, it makes sounds when prompted
CLK Ref	<b>Internal</b> or <b>external</b>
CLK Output	When the instrument is set to the internal clock reference, it can be switched <b>on</b> or <b>off</b> . When the selection is turned <b>on</b> , the rear panel <b>[10MHz In/Out/Counter]</b> connector outputs a 10MHz clock signal.
Update Firmware	The instrument firmware can be updated using a USB storage device through the front panel USB interface.

## 4. Communicate with PC

Supports communication with a computer via a USB port or a LAN port. Using the Waveform Editor software installed on the computer, the signal generator can be operated on the computer to control the output of the signal generator.

Here's how to connect to a computer. First, install the Waveform Editor software on the CD-ROM on your computer. Then, there are several connection options to choose from.

### Using USB Port

- (1) **Set the USB device protocol type of the signal generator:** Press **Utility** → **I/O Setup** → **USBDEV** , switch to PC.
- (2) **Connection:** Connect the USB Device interface on the rear panel of the signal generator to the **USB interface** of the computer with a USB cable.
- (3) **Install the driver:** Run Waveform Editor software on the computer, press F1 to view the built-in help documentation. Follow the instructions to install the driver. The path of the driver is the USBDRV folder in the directory where the Waveform Editor communication software is located.
- (4) **Host computer communication port setting:** Open the Waveform Editor software, click "Communications" in the menu bar, select "Ports-Settings", in the setting dialog box, select the communication port as "USB". After the connection is successful, the connection status prompt in the lower right corner of the software interface turns green.

### Using LAN Port

#### Connect Directly

- (1) **Connection.** Plug one end of the network cable into the LAN connector on the rear panel of the signal generator; the other end is plugged into the LAN interface of the computer.
- (2) **Set the network parameters of the computer.** Since the signal generator does not support automatic IP address acquisition, you need to specify the IP yourself. Here we set the IP address to 192.168.1.71.
- (3) **Set the network parameters of the host computer.** Run Waveform Editor software on the computer. In the "Communications" menu, under "Ports-Settings", select the communication port as "LAN", the IP is set to be the same as the first three fields of the computer's network IP in step (2), and the last field has a different IP address. It is "192.168.1.99"; the port can be set to

any value from 0 to 4000. However, since ports below 2000 are often occupied, it is recommended to set it to 2000 or higher. Here, it is set to "3000".

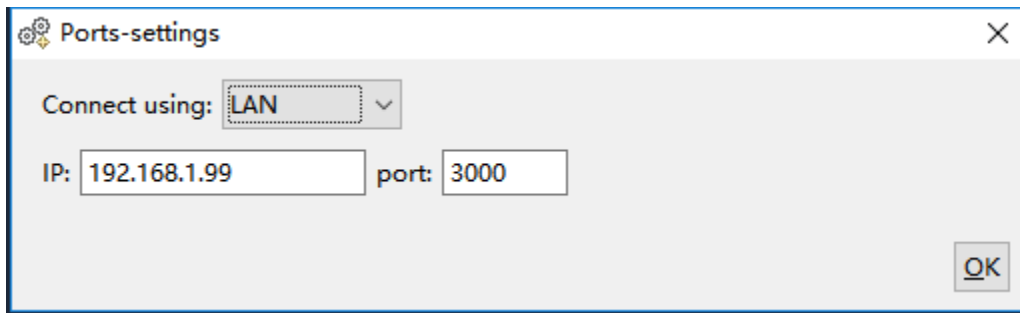


Figure 4-1 Setting the network parameters of the host computer

- (4) **Set the network parameters of the signal generator.** In the signal generator, press **Utility** → **I/O Setup** → **Network setting** to enter the submenu. Set the IP address and port to the IP and port in the PC software port settings in step (3). After the shutdown and restart, if the data can be obtained normally in the PC software, the connection is successful.

### Connect through a Router

- (1) **Connection.** Connect the LAN interface on the rear panel of the signal generator to the router with a network cable. The computer is also connected to the router.
- (2) **Set the network parameters of the computer.** Since the signal generator does not support automatic IP address acquisition, you need to specify the IP yourself. The default gateway and subnet mask settings must match the settings of the router. For example, the IP address is set to 192.168.1.71, the subnet mask is set to 255.255.255.0, and the default gateway is set to 192.168.1.1.
- (3) **Set the network parameters of the host computer.** Run Waveform Editor software on the computer. In the "Communications" menu, under "Ports-Settings", select the communication port as "LAN", the IP is set to be the same as the first three fields of the computer's network IP in step (2), and the last field has a different IP address. It is "192.168.1.99"; the port can be set to any value from 0 to 4000. However, since ports below 2000 are often occupied, it is recommended to set it to 2000 or higher. Here, it is set to "3000".

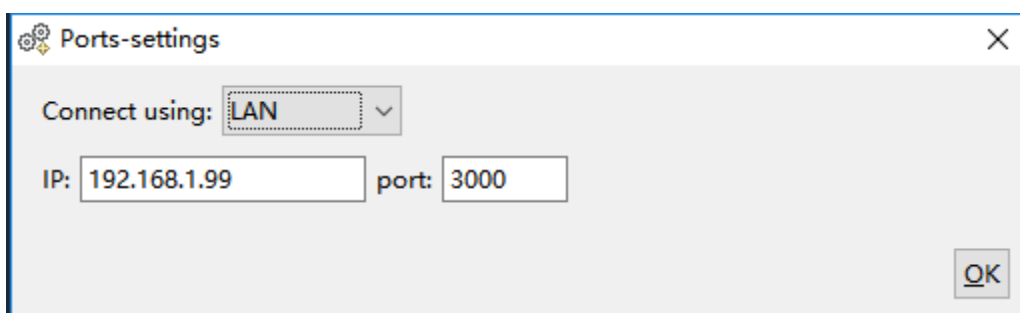


Figure 4-2 Set the network parameters of the host computer

- (4) **Set the network parameters of the signal generator.** In the signal generator, press **Utility** → **I/O Setup** → **Network setting** to enter the submenu. Set the IP address and port to the IP and port in the PC software port settings in step (3). The gateway settings need to be the same as the gateway settings of the router. After the shutdown and restart, if the data can be obtained normally in the PC software, the connection is successful.

For the specific operation method of Waveform Editor software, please press F1 to view the built-in help documentation.

## 5. Appendix

### Appendix A: Accessories

- A power cord that meets the standards of the country where you are located
- A USB communication cable
- A CD
- A Safety hintsheet
- Two BNC/Q9 lines

### Appendix B: General Care and Cleaning

#### General maintenance

Do not store or place the instrument where the LCD monitor will be exposed to direct sunlight for long periods of time.

**Cautious:** Do not allow sprays, liquids, and solvents to get on the instrument to avoid damaging the instrument.

#### Cleaning

The instrument is often checked for usage. Follow the steps below to clean the outer surface of the instrument:

1. Wipe the dust on the outside of the instrument with a soft cloth. When cleaning the LCD screen, be careful not to scratch the transparent LCD screen.
2. Wipe the instrument with a soft cloth that is damp but not dripping. Please pay attention to disconnect the power supply. It can be scrubbed with a mild detergent or water. Do not use any abrasive chemical cleaners to avoid damaging the instrument.



**Warning:** Before re-energizing, please confirm that the instrument has dried out to avoid electrical short circuit or even personal injury due to moisture.

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