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UTG4000X Series

Function/Arbitrary Waveform Generators

Quick Start Guide

This document applies to the following models:

UTG4000X Series

V1.0

December , 2025

Limited Warranty and Liability

UNI-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination, or improper handling. If you need a warranty service within the warranty period, please contact your seller directly. UNI-T will not be responsible for any special, indirect, incidental, or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.

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Chapter 1 Panel Overview

1.1 Front Panel

The product has a front panel of simple, intuitive, and easy to use, as shown in the following figure.

1. Display Screen

   The 10.1-inch capacitive touch screen clearly distinguishes function menus, control statuses, and other important information using distinct color tones. Parameter adjustments and output controls are accessible through the touch screen, and the user-friendly system interface enhances human-computer interaction, improving work efficiency.

2. Function Button

   The function buttons are Default, Utility, CW, Mod, Sweep, and Burst. The CW key opens the continuous wave setting menu. The Mod key enables modulation functions and related parameter settings. The Sweep key activates the sweep function. The Burst key opens the burst mode and its parameter settings. The Default key restores the instrument to factory settings. The Utility key provides access to auxiliary system settings.

3. Waveform Types (Quick Selection)

   Quickly select the desired waveform type using the dedicated waveform keys to generate commonly used waveforms as needed.

4. Multifunction Rotary Knob / Arrow Keys

The multifunction rotary knob is used to change values (rotate clockwise to increase the number) or function as an arrow key. Press the knob to select a function or confirm a setting. When using the multifunction rotary knob and arrow key to set parameters, they can be used to switch between digit positions, clear the previous digit, or move the cursor left or right.

5. Numeric keypad

   The numeric keypad includes digit keys 0–9, a decimal point (“.”), a sign key (+/–), and unit keys for parameter input. The left arrow key functions as a backspace to delete the previous digit in the current entry.

6. Output Interface

   CH1, CH2, CH3, and CH4 output interfaces.

7. USB Port

   This port is used to connect to an external USB storage device. It allows the instrument to read or import arbitrary waveform data files stored on the USB flash drive. It can also be used to upgrade the instrument system, ensuring that the firmware and function/arbitrary waveform generator software are kept up to date.

8. Power Supply Switch

   Press the power switch to turn on the instrument; press it again to turn it off.

9. Channel Output Control Button

   Channel control terminals, also known as channel output switches, are used to enable or disable signal output.

   Method 1: Quick toggle via current channel selection

   Identify the currently active channel displayed on the screen (for example, if the CH1 label at the bottom of the screen is highlighted, CH1 is active). The parameter list shows settings relevant to this active channel, allowing waveform configuration. To quickly enable or disable the output, press the corresponding channel key (e.g., CH1) when it is active.

   Method 2: Enable via Utility menu

   Press the Utility key→ Channel Settings to set the output to On.

   Method 3: Direct touchscreen operation

   On touchscreen models, locate the Channel Settings menu on the right side of the screen and tap to set the output to On.

   Output status indicators: When Enabled: The backlight of the corresponding channel key (e.g., CH1) illuminates. The channel information label at the bottom of the screen displays the current output mode (such as Continuous or AM), and the channel’s output port transmits the configured signal.

   When Disabled: The backlight of the channel key (e.g., CH1) turns off. The channel information

label is greyed out, and the signal from the channel's output port stops.

Note

The channel output interface includes an overvoltage protection function, which is triggered when any of the following conditions are met.

- When the output amplitude exceeds 4 Vpp, the protection will activate if the input voltage is greater than ±12.5 V and the frequency is below 10 kHz.
- When the output amplitude is 4 Vpp or lower, the protection will activate if the input voltage is greater than ±3 V and the frequency is below 10 kHz.

When the overvoltage protection function is triggered, the channel automatically disables the output.

1.2 Rear Panel

1. External Analog Modulation Input

   When performing amplitude modulation (AM), frequency modulation (FM), or phase modulation (PM) , and the modulation source is set to External or Internal + External, the modulation signal must be applied through the external analog modulation input.

   The corresponding modulation depth, frequency deviation, phase deviation, or duty cycle deviation is determined by a 4 Vpp high-impedance signal applied to the external analog modulation input.

2. External Analog Modulation and Trigger Input

   When performing modulation for Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), or Oscillation Shift Keying (OSK) signals, selecting an external modulation source allows the modulation signal (TTL level) to be input via the external digital modulation interface. The corresponding output amplitude, frequency, and phase are determined by the signal level of this interface.

   When an external trigger source is selected for frequency sweep, a TTL pulse with the specified polarity can be received through the external digital modulation interface to initiate the sweep. When the pulse train mode is set to gated mode, or when the trigger source for N-cycle or infinite-cycle pulse trains is set to external, a gating signal can be input via the external digital modulation interface. This signal triggers the output of a pulse train with the specified number of cycles.

3. HDMI Port

   Connect to an HDMI port for video signal output.

4. USB Port

   Connect the waveform generator to a PC, allowing instrument control via PC software.

5. Local Area Network (LAN)

   Connect to a local area network via this port for remote control.

6. Main Power Switch

   When the power switch is set to **I**, the instrument is powered on. When the power switch is set to **O**, the instrument is powered off.

   Note: The power switch on the front panel is non-functional.

7. AC Power Input Port

   For the AC power specifications, refer to the *Connecting Power Supply* section.

8. Safety Lock

   The safety lock (sold separately) is used to secure the instrument in a fixed position.

9. External 10MHz Input Port

   Establish synchronization between multiple generators or with an external 10 MHz clock signal. If the instrument detects an external 10 MHz clock signal at the 10MHz IN connector (input requirements: frequency of 10MHz, amplitude ≥ 0 dBm/50 Ω), it will automatically switch to this signal as the external clock source, indicated by the first icon 

in the status bar. In Auto mode, when the external clock source is lost, exceeds limits, or disconnected, the instrument clock source will automatically switch to the internal clock, and the icon 

will update to 

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10. Internal 10MHz Output Port

Establish synchronization between multiple waveform generators or the output of a 10 MHz reference clock signal to an external source.

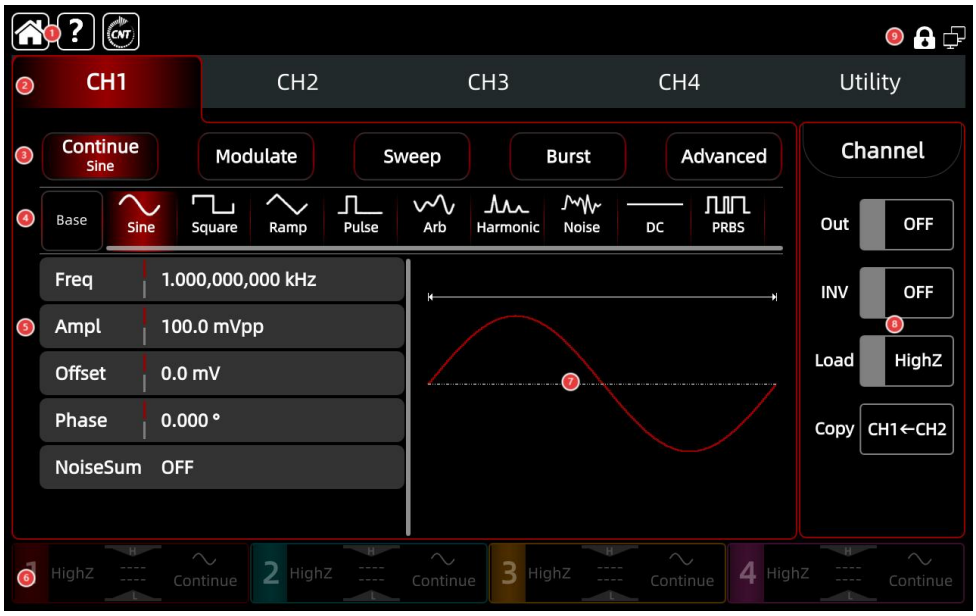
11. Frequency Counter Interface

In frequency counter mode, this interface is used to input the signal.

12. Cooling Hole

Ensure proper heat dissipation by keeping these openings unobstructed.

1.3 Function Interface



1. Function Setting: Screenshot, file system, setup system, and help system.

Hom page : Tap this key to return to the home page.

Frequency counter : Indicates the frequency counter. Tap this icon to activate the frequency counter function and view measurement results.

Help system : Open the help navigation.

2. Menu Bar

Tap CH1, CH2, CH3, CH4, or Utility to configure parameters for each channel and auxiliary functions.

3. Output Mode

Continue, modulate, sweep, burst, and advanced waveforms.

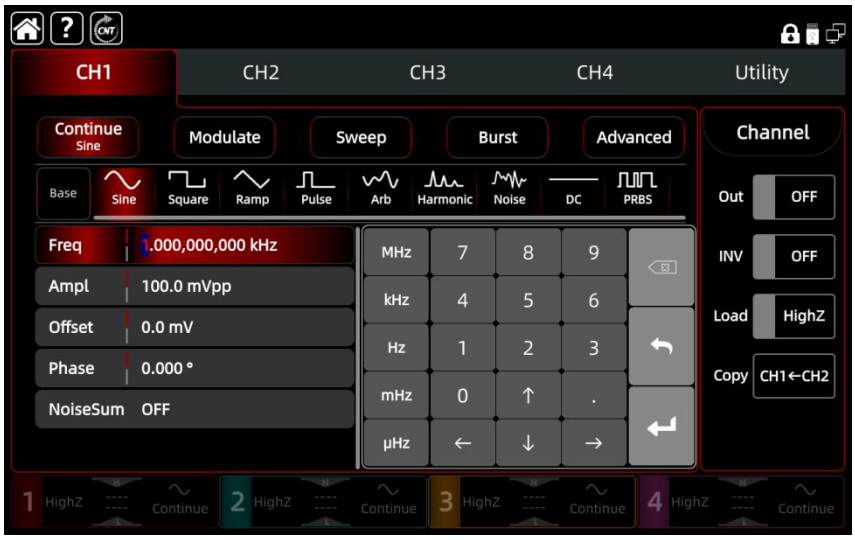
4. Fundamental Wave

9 wave types: Sine, square, ramp, pulse, arbitrary, harmonic, noise, DC, and PRBS (Pseudo-Random Bit Sequence).

5. Waveform List

Displays waveform parameters in list mode. Tap a parameter field to set its value.

For example, tap the Ampl or Freq field to open the virtual keypad for entry, as shown in the figure below.



6. Channel Info Bar: When a channel is enabled, its label is highlighted.

   HighZ: Indicates that the load is set to high impedance; the load can also be configured to 50 Ω.

   : Indicates that the output fundamental wave is a sine wave.

   Continue: Indicates that the output waveform is continuous (i.e., only the fundamental wave is output). Depending on the operating mode, this label may also display Continue, AM, Line, NCycle, etc.

7. Waveform Display Area: This area shows the waveform shape currently configured for the channel. The waveform of a specific channel can be distinguished by its color or by the highlight on the channel info label. The parameter list on the left displays the waveform parameters.

   Note: The waveform display area is unavailable when the menu bar is set to Utility.

8. Current Channel Setting Status: Provides quick access to common settings for the current channel.

   Tap the corresponding box to toggle each setting:

   Out: Tap the Out On/Off box to enable or disable the output of the corresponding channel.

   INV: Tap the INV On/Off box to invert the output waveform.

   Load: Tap HighZ or 50 Ω to set the output impedance.

   Copy: Tap the icon CH1←CH2 to copy the settings from CH2 to CH1.

9. System Setting Status: This area displays the connection status of USB flash drive, LAN indicators, external clock status, and other system-related information.

Chapter 2 Instructions Manual

This chapter introduces the safety requirements and the basic operation of the UTG4000X series function/arbitrary waveform generator.

2.1 Inspecting Packaging and List

Upon receiving the instrument, please check the packaging and list as follows.

1. Check whether the shipping box and cushioning materials show any signs of compression or damage from external impact. Also, inspect the instrument's exterior for visible damage. If you have any concerns about the product or require assistance, please contact your distributor or local service office.
2. Carefully remove the instrument from the package and compare the items received against the packing list.

2.2 Environmental Requirements

This instrument is designed for use under the following conditions.

- Indoor use only
- Pollution degree 2
- Overvoltage Category II: Connect this product only to a power supply that complies with Overvoltage Category II. This typically applies to equipment connected to the mains via power cords and plugs.
- Operating altitude: up to 2000 meters (about 1.24 mi); non-operating altitude: up to 15,000 meters (about 9.32 mi)
- Unless otherwise specified, the operating temperature range is +10 °C to +40 °C; storage temperature range is –20 °C to +60 °C.
- Operating relative humidity: ≤90% RH at temperatures up to +35 °C; non-operating relative humidity: ≤60% RH at +35 °C to +40 °C

Ventilation openings are on the instrument's rear and side panels. Ensure that airflow through these vents remains unobstructed. To prevent excessive dust accumulation, clean the instrument housing regularly. The housing is not waterproof, always disconnect the power supply before cleaning. Use a dry cloth or a soft cloth slightly moistened with water.

2.3 Connecting Power Supply

The AC power supply specifications are shown in the following table.

Voltage Range	Frequency
100 V-240 V AC (Fluctuations ±10%)	50/60 Hz
100-120 V AC (Fluctuations ±10%)	400 Hz

Notes:

- The maximum power consumption of the instrument does not exceed 75 W.
- Use only the supplied power cord to connect to the power inlet.

Connecting the Power Cable

This instrument is a Class I safety product. The supplied power cables have reliable performance in terms of case grounding. This instrument is equipped with a three-prong power cable that meets international safety standards. It provides good grounding performance for the specifications of your country or region.

To install the AC power cable:

- Ensure the power cable is in good condition.
- Leave enough space to connect to the power cord.
- Plug the attached three-prong power cable into a well-grounded power socket.

2.4 Electrostatic Discharge Protection

Electrostatic discharge (ESD) can cause permanent damage to components. Such damage may not be immediately visible and can occur during transportation, storage, or operation.

To minimize the risk of ESD damage:

- Perform testing in an ESD-protected area whenever possible.
- Before connecting the power cord to the instrument, briefly ground both the inner and outer conductors to discharge any static electricity.
- Ensure all instruments are properly grounded to prevent the buildup of static charges.

2.5 Preparation Work

1. Connect the power cord. Insert the plug into a properly grounded AC outlet, then adjust the alignment jig as required.
2. Press the software switch  on the front panel to turn on the instrument.

2.6 Firmware Upgrade

After downloading the firmware upgrade package from the official UNI-T website, follow these steps to perform the upgrade:

1. Extract the upgrade package to the root directory of a USB flash drive. The package should contain two files: “update.md5” and “update.usa.”
2. Insert the USB flash drive to the USB port on the front panel. The system will automatically detect the upgrade file. When detected, a prompt will appear: “The upgrade file is detected, upgrade now?”, as shown in the figure below.

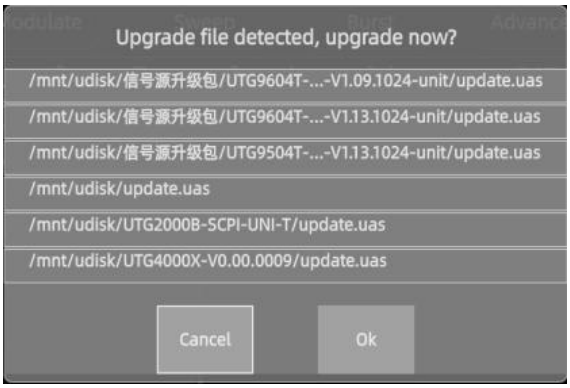


Figure 1-1 Upgrade Interface

3. Select the corresponding UTG4000X upgrade file “/mnt/udisk/UTG4000X-V0.00.0009/update.uas” in the dialog. Press the OK key to start the upgrade process.
4. Once the installation is complete, the instrument will restart again.

Note

- Use a USB drive formatted in FAT32.
- Do not power off or remove the USB flash drive during the upgrade process.
- Avoid performing other operations during the upgrade to prevent failure, which may cause the device to malfunction.

2.7 Remote Control

UTG4000X series function/arbitrary waveform generator supports communication with a computer via USB and LAN interfaces. Users can send SCPI (Standard Commands for Programmable Instruments) commands over USB or LAN, using programming languages or NI-VISA, to remotely control the instrument as well as other SCPI-compliant instruments.

For detailed information about installation, remote control modes, and programming, please refer to the *UTG4000X Series Function/Arbitrary Waveform Generator-Programming Manual* on the

official website: http://www.uni-trend.com.

2.8 Help Information

UTG4000X series has a built-in help system for each function key and menu control key. From the main interface, press the Help icon  to open the help system and navigate to the relevant page for detailed information.

Chapter 3 Quick Start Guide

3.1 Output Basic Waveform

3.1.1 Output Frequency

Default waveform configuration: A sine wave with a frequency of 1 kHz and an amplitude of 100 mVpp (high resistance).

To change the frequency to 2.5 MHz, follow these steps:

1. Press the Sine key to enter the sine wave setting menu.
2. On the screen, tap the Freq key and use the numeric keypad to enter 2.5.
3. Select MHz as the unit.

3.1.2 Output Amplitude

Default waveform configuration: A sine wave with an amplitude of 100 mVpp (high resistance).

To change the amplitude to 300 mVpp, follow these steps:

1. Press the Sine key to enter the sine wave setting menu.
2. On the screen, tap the Ampl key and use the numeric keypad to enter 300.
3. Select mVpp as the unit.

3.1.3 DC Offset Voltage

Default waveform configuration: A sine wave (high resistance) with DC offset voltage of 0 V.

To change the DC offset voltage to -150 mV, follow these steps:

1. Press the Sine key to enter the sine wave setting menu.
2. On the screen, tap the Offset key and use the numeric keypad to enter -150.
3. Select mVpp as the unit.

Note: The multifunction knob and arrow keys can also be used together to set this parameter.

3.1.4 Phase Setting

Default waveform configuration: The phase is set to 0°.

To change the phase offset to 90°, follow these steps:

1. Press the Sine key to enter the sine wave setting menu.
2. On the screen, tap the Phase key and use the numeric keypad to enter 90.
3. Select deg as the unit.

3.1.5 Duty Cycle of Square Wave

Default square waveform configuration: The frequency is set to 1 kHz with the duty cycle 50%.

To change the duty cycle to 25%, follow these steps:

1. Press the Square key to enter the square wave setting menu.
2. On the screen, tap the Duty and use the numeric keypad to enter 25.
3. Select % as the unit.

3.1.6 Symmetry of Ramp Wave

Default ramp waveform configuration: The frequency is set to 1 kHz with the symmetry 50%.

To change the symmetry to 75%, follow these steps:

1. Press the Ramp key to enter the ramp wave setting menu.
2. On the screen, tap the Symmetry key and use the numeric keypad to enter 75.
3. Select % as the unit.

3.1.7 Arbitrary Wave Setting

Default arbitrary waveform configuration: The frequency is set to 1 kHz. The arbitrary waveform file is “ACos.bsv.”

To change the arbitrary waveform file to “SineH.bsv,” follow these steps:

1. Press the Arb key to enter the arbitrary wave setting menu.
2. On the screen, tap the WaveFile key to access the file window and single-click the Trigonome folder, then select the “SineH.bsv” file.
3. Tap the Load key to load the arbitrary waveform.

3.1.8 DC Voltage

Default: The DC voltage is set to 0 V.

To change the symmetry to 3 V, follow these steps:

1. Press the DC key to enter the DC setting menu.
2. On the screen, tap the Offset key and use the numeric keypad to enter 3.
3. Select V as the unit.

3.1.9 Noise Setting

Default: Gaussian noise with an amplitude of 100 mVpp and a DC offset of 0 V.

To set the amplitude to 300 mVpp and the DC offset to 1 V, follow these steps:

1. Press the Noise key to enter the noise setting menu.

2. On the screen, tap the Ampl key and use the numeric keypad to enter 300.
3. Select mVpp as the unit.
4. Tap the Offset key and use the numeric keypad to enter 1.
5. Select V as the unit.

3.1.10 Harmonic Wave

Default harmonic waveform configuration: The frequency is set to 1 kHz.

To change the total harmonic order to 10, follow these steps:

1. Press the Harmonic key to enter the harmonic wave setting menu.
2. On the screen, tap the Order key and use the numeric keypad to enter 10.
3. Tap the Type key to select All.

3.1.11 PRBS Setting

Default: The frequency is set to 1 kbps.

To set symbol to PN7 and the edge time to 20 ns as an example, follow these steps:

1. Press the PRBS key to enter the PRBS setting menu.
2. On the screen, tap the PN Code key to select PN7.
3. Tap the EdgeTime key and use the numeric keypad to enter 20.
4. Select ns as the unit.

3.1.12 Noise Superposition

The UTG4000X series supports noise superposition function, allowing the signal-to-noise ratio (SNR) to be adjusted as needed.

Set the output frequency to 10 kHz, amplitude to 2 Vpp, 0 V DC offset, and SNR to 0 dB, follow these steps:

1. On the screen, tap the Continue→Sine→Freq keys to open the virtual keyboard and enter 10 kHz.
2. Tap the Ampl parameter field to open the virtual keyboard and enter 2 Vpp.
3. Tap the NoiseSum key to set it to ON.
4. Tap SNR (dB) field to open the virtual keyboard and enter 0 dB.

3.2 Auxiliary Function

The Utility (auxiliary) functions include channel settings, channel coupling, frequency counter, digital

protocols, system settings, network configuration, and Assist. The specific functions are listed in the table below.

3.2.1 Channel Settings

Table 3-1 CH1/2 Setting

Function Menu	Sub-Menu	Setting	Description
CH1/2 Setting	Channel output	OFF, ON	
	Channel invert	OFF, ON	
	Load	50Ω, high resistance	Range: 1 Ω to 1000 kΩ
	Amplitude limit	OFF, ON	
	Upper limit of amplitude		Set the upper limit for the channel amplitude output.
	Lower limit of amplitude		Set the lower limit for the channel amplitude output.
	Sync output	OFF, ON	
	Sync invert	OFF, ON	

Table 3-2 CH3/4 Setting

Function Menu	Sub-Menu	Setting	Description
CH3/4 Setting	Channel output	OFF, ON	
	Channel invert	OFF, ON	
	Load	High resistance (Default)	Range: 1 Ω to 1000 kΩ
	Amplitude limit	OFF, ON	
	Upper limit of amplitude		Set the upper limit for the channel amplitude output.
	Lower limit of amplitude		Set the lower limit for the channel amplitude output.

Tap or press Utility→Channel, or tap the corresponding field to configure the channel settings.

1. Channel Output

   Select Output, then tap OFF or ON.

   Note: Press the CH1, CH2, CH3, CH4 buttons can also quickly activate channel output.

2. Channel Invert

   Select INV, then tap OFF or ON.

3. Load

Select Load, then tap to switch between HighZ and 50Ω, or tap the numeric field to set a value in the range of 1 Ω to 1000 kΩ.

4. Amplitude Limit

   Supports amplitude limit output function to protect load.

   Select Amp Limit, then tap OFF or ON.

5. Upper Limit of Amplitude

   Select Upper to set the upper limit of amplitude. The setting method is consistent with the Amplitude.

6. Lower Limit of Amplitude

   Select Lower to set the lower limit of amplitude. The setting method is consistent with the Amplitude.

7. Sync Output

   Select Sync, then tap OFF or ON.

   The synchronous output of CH1 is mapped to CH3, and the synchronous output of CH2 is mapped to CH4.

   When the sync output of CH1 is enabled, the channel label of CH3 changes to 

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   When the sync output of CH2 is enabled, the channel label of CH4 changes to 

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8. Sync Invert

   Select SYNC-INV, then tap OFF or ON.

3.2.2 Channel Coupling

The channel coupling includes frequency coupling, amplitude coupling, and phase coupling. The specific functions are listed in the table below.

Table 3-3 Frequency Coupling Setting

Function Menu	Sub-Menu	Setting	Description
Frequency Coupling	Frequency coupling	OFF, ON	
	Channel coupling		
	Coupling mode	Ratio, offset	
	Ratio		Can only be set when the coupling mode is set to ratio.
	Offset		Can only be set when the coupling mode is set to offset.

Table 3-4 Amplitude Coupling Setting

Function Menu	Sub-Menu	Setting	Description
Amplitude Coupling	Amplitude coupling	OFF, ON	
	Channel coupling		
	Coupling mode	Ratio, offset	
	Ratio		Can only be set when the coupling mode is set to ratio.
	Offset		Can only be set when the coupling mode is set to offset.

Table 3-5 Phase Coupling Setting

Function Menu	Sub-Menu	Setting	Description
Phase Coupling	Phase coupling	OFF, ON	
	Channel coupling		
	Coupling mode	Ratio, offset	
	Ratio		Can only be set when the coupling mode is set to ratio.
	Offset		Can only be set when the coupling mode is set to offset.

Notes:

1. The settings in CH Coupling 1 are identical to those in CH Coupling 2.
2. When coupling is enabled, the channel merging and channel copying functions are unavailable.
3. When amplitude limiting is enabled, the channel coupling function becomes unavailable.

Tap or press Utility→Coupling, or tap the corresponding field to configure the channel coupling settings.

1. Frequency Coupling

   Set the frequency coupling mode to ratio or offset between channels.

   Multiple channel combinations are available for selection, including CH1&2, CH1&3, CH1&4, CH2&3, CH2&4, CH3&4, CH1&2&3, CH1&2&4, CH1&3&4, CH2&3&4, and CH1&2&3&4. The selected coupled channels serve as mutual reference sources. When the frequency of one of these channels (acting as the reference) is adjusted, the frequencies of the other coupled channels are automatically modified to maintain the specified ratio or offset relative to the reference channel.

Select Freq, then tap OFF or ON.

Select Type, then tap to switch between Ratio or Deviation.

When the coupling mode is set to ratio: Tap the ratio value to open the virtual keyboard, enter the desired ratio, and press Enter to confirm.

When the coupling mode is set to offset: Tap the offset value to open the virtual keyboard, enter the desired offset frequency, and press Enter to confirm.

2. Amplitude Coupling

Set the amplitude coupling mode to ratio or offset between channels.

Multiple channel combinations are available for selection, including CH1&2, CH1&3, CH1&4, CH2&3, CH2&4, CH3&4, CH1&2&3, CH1&2&4, CH1&3&4, CH2&3&4, and CH1&2&3&4. The selected coupled channels serve as mutual reference sources. When the amplitude of one of these channels (acting as the reference) is adjusted, the amplitudes of the other coupled channels are automatically modified to maintain the specified ratio or offset relative to the reference channel.

Select Ampl, then tap OFF or ON.

Select Type, then tap to switch between Ratio or Deviation.

When the coupling mode is set to ratio: Tap the ratio value to open the virtual keyboard, enter the desired ratio, and press Enter to confirm.

When the coupling mode is set to offset: Tap the offset value to open the virtual keyboard, enter the desired offset frequency, and press Enter to confirm.

3. Phase Coupling

Set the phase coupling mode to ratio or offset between channels.

Multiple channel combinations are available for selection, including CH1&2, CH1&3, CH1&4, CH2&3, CH2&4, CH3&4, CH1&2&3, CH1&2&4, CH1&3&4, CH2&3&4, and CH1&2&3&4. The selected coupled channels serve as mutual reference sources. When the phase of one of these channels (acting as the reference) is adjusted, the phases of the other coupled channels are automatically modified to maintain the specified ratio or offset relative to the reference channel.

Select Phase, then tap OFF or ON.

Select Type, then tap to switch between Ratio or Deviation.

When the coupling mode is set to ratio: Tap the ratio value to open the virtual keyboard, enter the desired ratio, and press Enter to confirm.

When the coupling mode is set to offset: Tap the offset value to open the virtual keyboard, enter the desired offset frequency, and press Enter to confirm.

4. Coupling Icon

After opening the coupling parameters for each channel, a coupling icon appears on the right side of the waveform parameter list on the home page, as shown in the figure below.

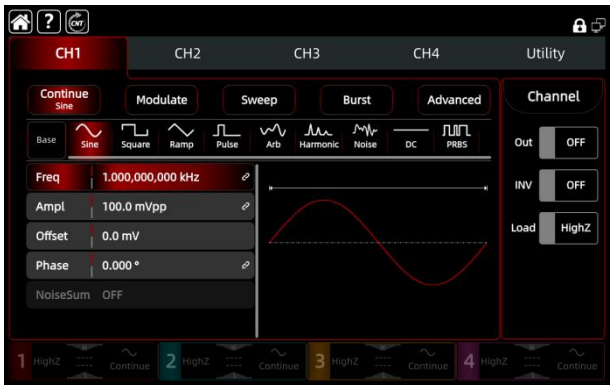


Figure 3-1 Channel Coupling

3.2.3 Channel Merge

Tap or press Utility→Merge, or tap the corresponding field to configure the channel merge settings. In normal mode, each channel output port of the signal source delivers its own independent waveform. When channel merging is enabled, the instrument outputs a combined waveform formed by multiple channels. Various channel merging combinations are available, including CH1+2, CH1+3, CH1+4, CH2+3, CH2+4, CH3+4, CH1+2+3, CH1+2+4, CH1+3+4, CH2+3+4, and CH1+2+3+4.

Select CH1 Merge, then tap OFF or CH1+2+3+4. The channel merge interface is shown in the figure below.

Figure 3-2 Channel Merge

When CH1 is set to the CH1+CH2 merging mode, a channel merging icon Merged:CH1+CH2+CH3+CH4 appears in the bottom-left corner of the waveform display on the home screen.

The merging configuration for CH2, CH3, and CH4 follows the same operation logic as CH1.

Note: When channel merging is enabled, the amplitude coupling function becomes unavailable.

3.2.4 Frequency Counter

This function/arbitrary waveform generator is equipped with an 8-digit/s frequency counter,

featuring a measurement range of 100 mHz to 800 MHz and supporting wide-range signal voltage input.

It can measure parameters of externally applied signals, including frequency, period, duty cycle, positive pulse width, and negative pulse width, and provides statistical analysis of measurement results. The instrument automatically calculates the maximum, minimum, average, and standard deviation of the measured data. Additionally, the dual-channel output can operate simultaneously with the frequency of counter measurement.

Table 3-6 Frequency Counter Setting

Function Menu	Sub-Menu	Setting	Description
Frequency Counter	Switch	OFF, ON	
	Coupling mode	AC, DC	To ensure accurate measurements, select AC coupling for high-frequency input signals and DC coupling for low-frequency signals.
	Trigger level	-2.5 V to 2.5 V	
	Sensitivity	0% to 100%	
	High-frequency reject	OFF, ON	

Tap or press Utility→Counter, or tap the corresponding field to configure the frequency counter settings.

Figure 3-3 Frequency Counter

1. Switch

   Select Switch, then tap OFF or ON.

2. Coupling Mode

   Select Coupling, then tap to switch between AC or DC. The default setting is AC.

3. Trigger Level

Select TrigLevel, then tap the trigger level field to open the virtual keyboard, enter the desired level, and press Enter to confirm. The default value is 0 V.

4. Sensitivity

   Select Sensitivity, then tap the sensitivity field to open the virtual keyboard, enter the desired level, and press Enter to confirm. The default value is 100%.

5. High-Frequency Reject

   Select HFReject, then tap OFF or ON. The default setting is OFF.

6. Zero

   Tap Zero to clear the statistical measurement results and restart statistical processing. The default setting is OFF.

3.2.5 System Setting

Tap or press Utility→System, or tap the corresponding field to configure and view the system settings.

1. Basic Information

   Product name, manufacturer, model, serial number, software version, logic version, hardware version, Web username, and password.

2. Basic Setting

   Language: Simplified Chinese, English

   Note: The setting takes effect only after the device restarts.

   Separator: Sets the delimiter used between channel parameter values. Available options: Comma, space, or none.

   Sound: Sets whether a buzzer sounds when keys are pressed. Options: Off or On.

   Backlight brightness: Sets the screen brightness to 30%, 40%, 50%, 60%, 70%, 80%, 90%, or 100%.

   Screen saver: When no operation is performed for the preset duration, the instrument enters screen-saver mode while maintaining the current keypad state. Press any key to restore the display. Options: Off, 5 minutes, 15 minutes, 30 minutes, 60 minutes.

   Clock source: Set the system clock source to internal or external.

   Internal: Provides a 10 MHz clock source.

   External: Receives an external 10 MHz clock via the [10 MHz In] connector on the rear panel (input requirements: frequency 10 MHz, TTL level).

If no valid external clock is detected, the message “Invalid external 10 MHz clock” appears, and an icon  is displayed in the upper-right corner of the screen. When a valid clock is detected, the corresponding status icon  is shown.

Clock output: Enables or disables the 10 MHz clock output. When enabled, the [10 MHz Out] connector on the rear panel outputs a 10 MHz TTL-level clock signal for synchronization with other devices.

Synchronization Between Instruments:

Connect the [10 MHz Out] connector of the first instrument (with clock output enabled) to the [10 MHz In] connector of the second instrument (set to External clock source). Then configure both instruments to output the same frequency to achieve synchronization between them.

To synchronize more than two instruments, repeat this connection method in sequence to form a multi-instrument configuration.

Image format: Sets the file format for saved screenshots. Available options: BMP, JPEG, and PNG.

Start phase: Two configuration modes are available. Independent: The initial phases of the four output channels are not correlated. Synchronization: The start phases of the four output channels are linked.

Power-on State: Sets the instrument’s configuration state at power-on. Available options: Default, Last Time, Preset 1, Preset 2, Preset 3, Preset 4, and Preset 5.

Manual trigger: When the instrument operates in sweep frequency or burst mode, the trigger source is set to Manual. When independent trigger is selected, a manual trigger applies only to the current channel. When synchronized trigger is selected, a manual trigger activates all channels set to Manual.

Switch Mode: Independent, CH1&2, CH3&4, CH1&2&3, CH2&3&4, CH1&2&3&4.

In independent mode, each channel’s on/off state is independent; switching one channel does not affect the others (except in cases involving channel synchronization).

In CH1&2 mode, the on/off states of Channels 1 and 2 are linked. Turning Channel 1 on or off automatically performs the same action on Channel 2, and vice versa. The same logic applies to the other combined-channel modes.

Channel tracking: When channel tracking is enabled, CH1, CH2, CH3, and CH4 serve as reference sources for one another. Changing a parameter on any channel (the reference source) automatically copies that parameter to the other three channels.

Save as Preset: Saves the instrument’s current configuration to a preset slot. The user can save to Preset 1, Preset 2, Preset 3, Preset 4, or Preset 5.

Restore Factory Settings: Restores all system settings to their factory defaults.

3. Network Setting

Auto acquisition: When enabled, the instrument automatically obtains network configurations. When disabled, network parameters must be configured manually.

IP address: The format of the IP address is nnn.nnn.nnn.nnn. The range of the first nnn is from 1 to 223. The range of the other three nnn is from 0 to 255. It is recommended to consult your network administrator for an available IP address.

Subnet mask: The format of the subnet mask is nnn.nnn.nnn.nnn. The range of nnn is from 0 to 255. It is recommended to consult your network administrator for a subnet mask address.

Gateway address: The format of the gateway address is nnn.nnn.nnn.nnn. The range of the first nnn is from 1 to 255. The range of the other three nnn is from 0 to 255. It is recommended to consult your network administrator for an available gateway address.

MAC address: The physical address used to identify the location of the network device, also known as the hardware address. It is 48 bits (6 bytes) in length, composed of hexadecimal numbers, and divided into two parts: the first 24 bits and the last 24 bits. The format is xx-xx-xx-xx-xx-xx. The first 24 bits are called the Organizationally Unique Identifier (OUI), while the last 24 bits are allocated by the manufacturer and called the Extended Identifier.

4. Interface Setting

Web login username: Sets the username for browser-based login. The default username is admin and cannot be changed.

Web access address: The access address uses the format http://IP, where IP is the IPv4 address configured in the network settings (e.g., http://192.168.20.117).

Web login password: Sets the password for browser-based login. The default password is 123 and cannot be changed.

Once the web login username and password have been configured, the user can use a web browser on a PC or mobile device to remotely control the instrument. This remote-control feature simulates the touchscreen and mouse operation of the physical device, allowing the instrument to function identically to local operation.

(1) LAN Access

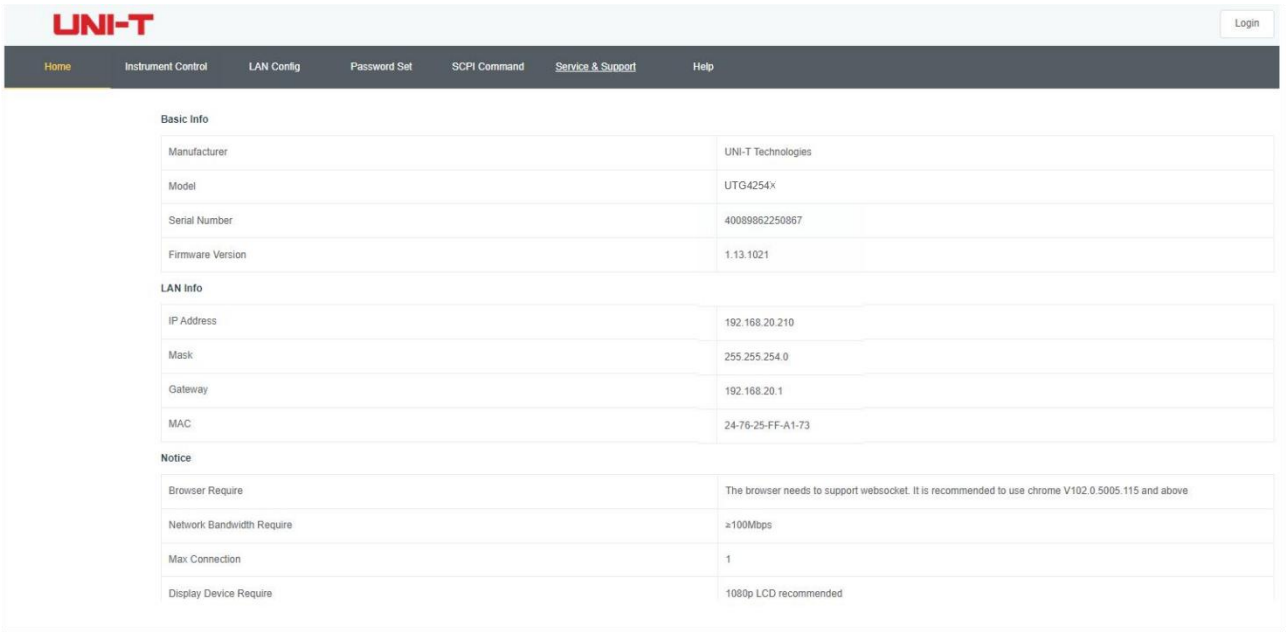
The computer and the waveform generators are required to be in the same LAN and can ping each other. View the waveform generator's local IP via the Utility menu and then access the waveform generators by accessing the http://ip: port in a browser.

Example:

Computer IP: 192.168.21.131

Waveform generator IP: 192.168.20.117

Use 192.168.20.117 to access the waveform generator in the computer browser, view the basic information, and perform operations such as instrument control, network settings, password settings, and SCPI command control, as shown in the following figure.

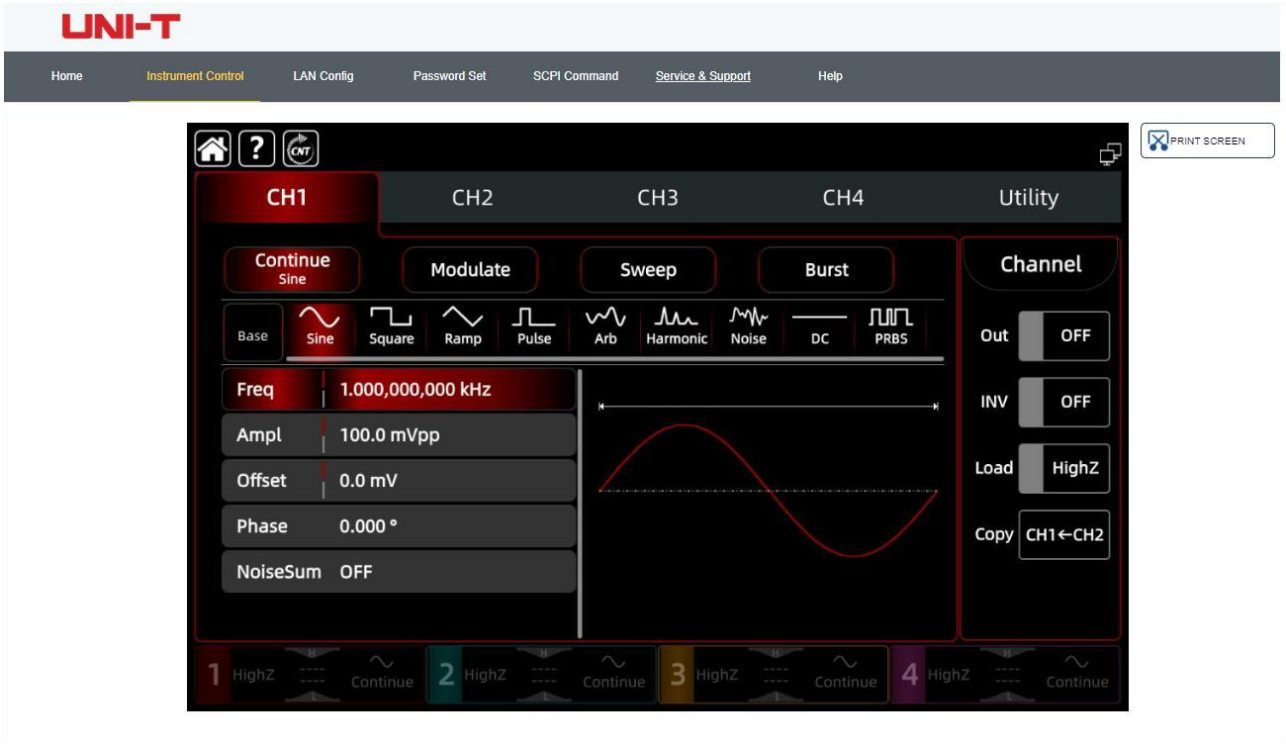


Web Basic Information

When accessing instrument control, network settings, password settings, or SCPI command control, login authentication is required.

For the username and password, refer to Web Login Username and Web Login Password in the interface setting.

After successful login, the user can view and control the waveform generator, as shown in the figure below.



Web Instrument Control

Operations that can be performed on the touch screen of a physical instrument, such as selecting a menu panel, clicking function keys, entering numbers and characters, dragging a mark, etc., can also be operated on this web page, and the screen can also be printed.

(2) External Access Network

a. Connect the waveform generator to a network cable and ensure the network has Internet access.

b. Enable the frp proxy service on the server.

c. Configure the frp proxy IP address and port number on the waveform generator.

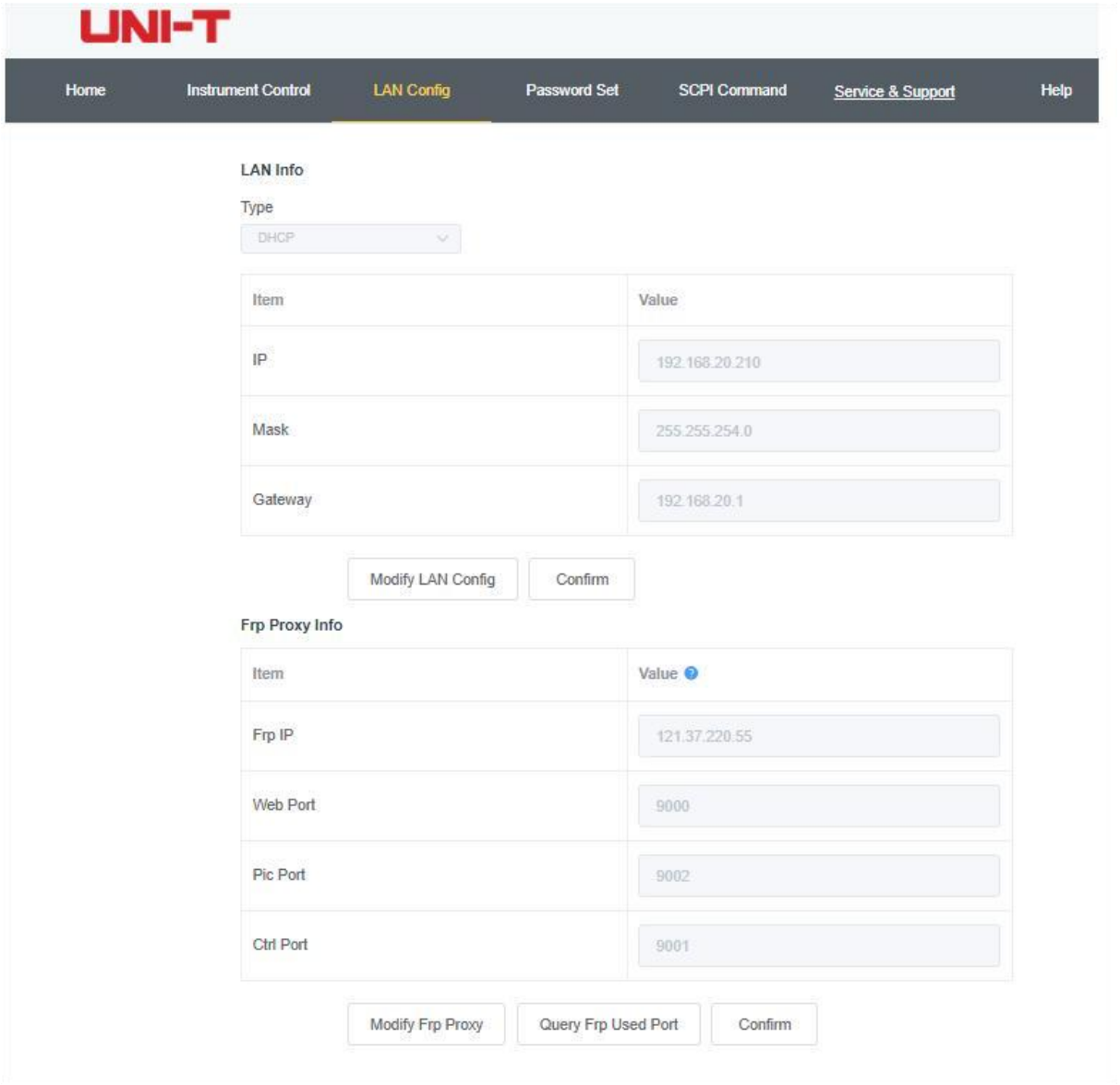
d. In the browser, enter the proxy address in the format http://IP:web_port to access the waveform generator. The access interface is identical to that of the intranet connection.

Note: The instrument uses the frp intranet penetration mode to enable external network access. The frp version is 0.34.0.

The instrument includes the frp-0.34.0 client, which must be used in conjunction with an FRP server. The server must have the FRP service enabled, and the client connects to the server through port 7000. Therefore, the server configuration must include the parameter bind_port = 7000.

(3) Network Setting

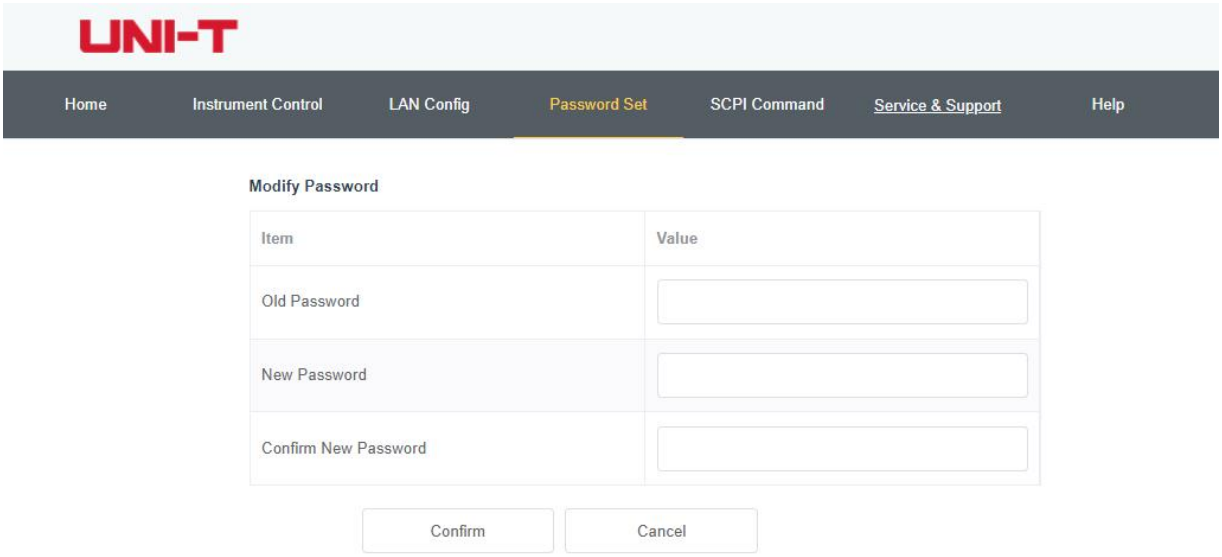
Set and modify the network information of the waveform generator and the frp agent, as shown in the following figure.



Web Network Setting

(4) Password Setting

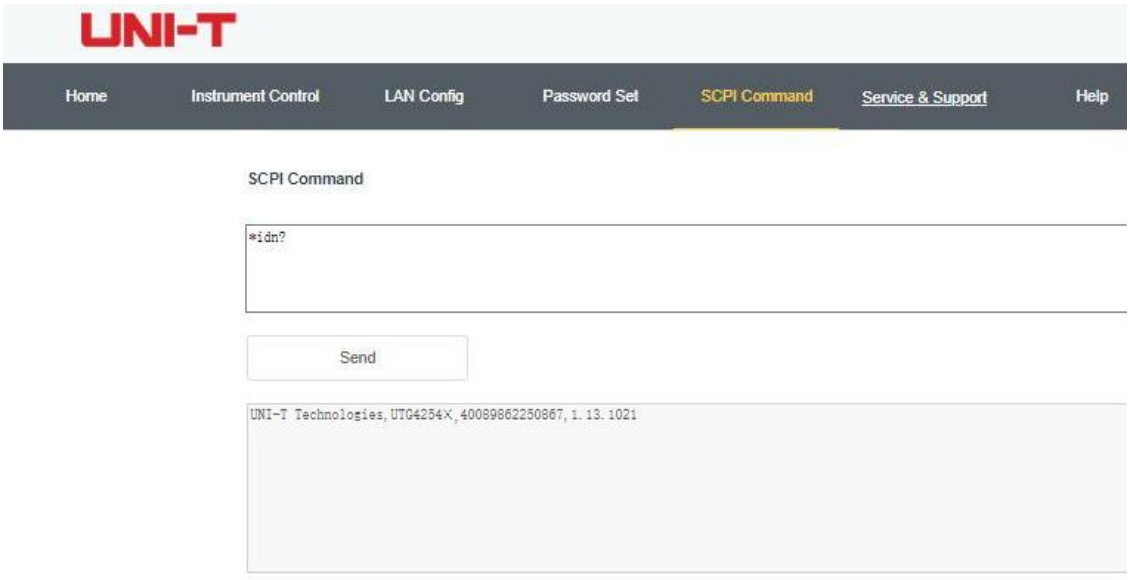
Set and modify the web login password of the waveform generator, as shown in the following figure. The original password can be viewed under the Physical Instrument ->System->Setting-> Interface Setting.



Web Password Setting

(5) SCPI Command

Execute the SCPI command, as shown in the following figure. Enter the command in the SCPI command to edit box, click the Send Command key, and print the execution result to the report column below.



SCPI Command Control

Chapter 4 Troubleshooting

The following lists faults and troubleshooting methods during the instrument's operation. Please follow the corresponding steps to resolve them. If the issue cannot be resolved, contact the distributor or local office, and provide the instrument's device information.

To obtain the device information, press the keys in sequence: Utility → System Information

4.1 No Display (Blank Screen)

If the waveform generator remains blank with no display after pressing the front-panel power switch:

1) Verify that the power supply is properly connected.
2) Ensure that the front-panel power switch has been fully pressed.
3) Restart the instrument.
4) If the instrument still does not operate normally, contact your distributor or local service center for assistance.

4.2 No Waveform Output

If the settings are correct but the instrument does not output a waveform:

1) Verify that the BNC cable and output terminal are properly connected.
2) Ensure that the Out key is enabled.
3) If the instrument still does not operate, contact your distributor or local service center for maintenance.

Chapter 5 Maintenance

5.1 Maintenance and Cleaning

(1) General Maintenance

Keep the instrument away from the direct sunlight.

Caution

Keep sprays, liquids, and solvents away from the instrument or probe to avoid damaging the instrument or probe.

(2) Cleaning

Inspect the instrument regularly according to its operating conditions. Follow these steps to clean the external surfaces:

a) Use a soft cloth to remove dust from the exterior of the instrument.

b) When cleaning the LCD screen, handle it carefully to protect the transparent display.

c) When cleaning the dust screen, remove the screws of the dust cover with a screwdriver, then take out the dust screen. After cleaning, reinstall the dust screen in the correct sequence.

d) Disconnect the power supply before cleaning. Wipe the instrument with a damp, but not dripping, soft cloth. Do not use abrasive chemical cleaners on the instrument or probes.

Warning

Please confirm that the instrument is completely dry before use, to avoid electrical shorts or even personal injury caused by moisture.

PN:110401114052X

说明书菲林做货要求：

序号	项目	内容
1	尺寸	外尺寸：（148x210）±1mm.
2	材质	封面封底 128G 双铜 内页 60g 书纸
3	颜色	黑色，双面印刷
4	外观要求	印刷完整清晰，版面整洁，无分层，残损，毛边等缺陷
5	装订方式	骑马订装
6	表面处理	无
7	其他	
版本		REV.0

DWH 设 计		MODEL 机型：（CD）UTG4000X	Part NO. 110401114052X
CHK 审 核		UNI-T®	优利德科技（中国）股份有限公司 UNI-TREND TECHNOLOGY (CHINA) CO.,LTD
APPRO 批 准			