

UNI-T

MSO8000HD Series Mixed Signal Oscilloscope

20GSa/s | 8GHz | 2Gpts | 1,000,000wfms/s



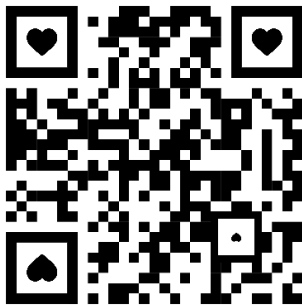
QuickStart Guide

MSO8000HD-V2.0

2025.07

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MSO8000HD

MSO8000HD series is UNI-T's latest high-end mixed signal oscilloscope, offering bandwidths up to 8GHz and a sampling rate of 20GSa/s, making it well-suited for high-speed signal analysis. It features UNI-T's proprietary UltraAcq® architecture, achieving waveform capture rates of up to 300,000wfms/s in normal mode and 1,000,000wfms/s in sequence mode. Coupled with a memory depth of 2Gpts, it enables reliable capture of rare anomalies and high-precision analysis of waveform details.

MSO8000HD supports various triggering and protocol decoding types, along with advanced analysis capabilities including sequence mode, histograms, power analysis, jitter analysis, eye diagram analysis, and mask testing. It provides 52 automatic measurement parameters, fully addressing complex debugging needs in modern electronic systems.

Running on a Win10 64-bit operating system, the platform supports flexible software integration and expansion. A 15.6-inch HD touchscreen with multi-window split display and gesture control enhances usability, delivering intuitive operation and efficient multitasking.

MSO8000HD is ideal for high-precision signal analysis across industries such as communications, aerospace, scientific research, and education.



MSO8000HD series mixed signal oscilloscope includes two models.

Model	Analog Channels	Analog Bandwidth	Logic Analyzer	AWG	Power Analysis	Jitter Analysis	Eye Diagram
MSO8804HD	4	8GHz	○	○		○	○
MSO8504HD	4	5GHz	○	○	○	○	○

○: Option

Getting Started Manual

This chapter introduces the initial setup and use of the oscilloscope, including an overview of the front and rear panels, the user interface, and the WebServer functionality.

General Inspection

It is recommended to inspect the instrument by following the steps below before using the MSO8000HD series oscilloscope for the first time.

1. Check for Damage caused by Transport

If the packing carton or the plastic foam cushions are severely damaged, please contact your local UNI-T distributor for assistance.

2. Check Accessories

Please check the included accessories against the packaging list. If any accessories are missing or damaged, please contact your local UNI-T distributor for assistance.

3. Machine Inspection

If the instrument appears damaged, malfunctions, or fails the functionality test, please contact UNI-T or the local distributor of this product.

If the equipment is damaged during shipping, please retain the packaging and notify both the shipping carrier and the UNI-T distributor. UNI-T will then arrange for repair or replacement.

Before Use

To perform a quick verification of the instrument's normal operations, please follow the steps below.

1. Connecting to the Power Supply

The oscilloscope supports an input voltage of 100 V to 240 V at a frequency of 50 Hz to 60 Hz. Use the assembled power cord or other power cord that meets the local country standards to connect the oscilloscope. When the power switch  on the rear panel is turned off, the power soft key indicator at the left bottom on the front panel is off, which indicates this soft switch is inactive. When the power switch  on the rear panel is turned on, the power soft

key indicator at the left bottom on the front panel illuminates orange, indicating standby mode. Press the power soft key to enable the oscilloscope.

2. Boot Check

Press the power soft switch  and the indicator should change from orange to blue. The oscilloscope will show a boot animation. After the oscilloscope starts, it enters the main software interface.

3. Connecting Probe

Connect the BNC of the supplied probe to the BNC of oscilloscope's CH1, and connect the probe to the "Probe Compensating Signal Connection Clip", as shown in Figure 1, and then connect the ground alligator clip of the probe to the ground terminal of the compensation signal connection clip. The output of compensating signal connection clip: amplitude is approximately 3Vpp, with a default frequency of 1kHz.

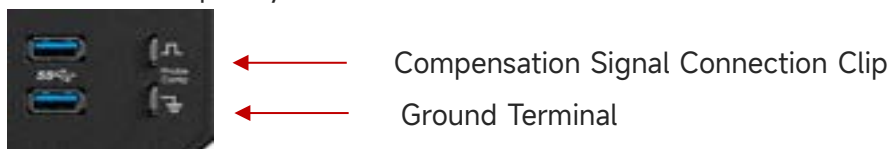


Figure 1 Compensation Signal Connection Clip and Ground Terminal

4. Function Check

Press the **Autoset** (Automatic setting) button, a square wave (amplitude 3Vpp, frequency 1kHz) should appear on the screen. Repeat **step 3** to check all channels. If the shape of the actually displayed square wave does not match the "Correct Compensation" graphic in the next section, please perform the "Probe Compensation" in the next section.

Probe Compensation

When the probe is connected to any input channel for the first time, this step might be adjusted to match the probe and the input channel. Probes that are not compensated may lead to measurement errors or mistakes. Please follow the following steps to adjust the probe compensation.

- Set the probe attenuation ratio in the oscilloscope's probe menu to 10×, and also set the probe's attenuation switch to 10×. Connect the probe to CH1. If using the probe's hook tip, ensure it makes stable contact. Connect the probe to the "Probe Compensating Signal Connection Clip" of the oscilloscope, and then connect the ground alligator clip of the probe to the ground terminal of the compensation signal connection clip. Open CH1 and press the **Autoset** button.
- View the displayed waveform, as shown in **Figure 2**.

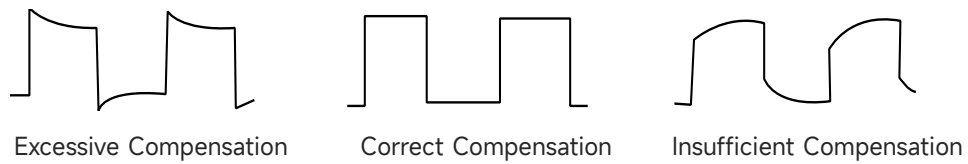


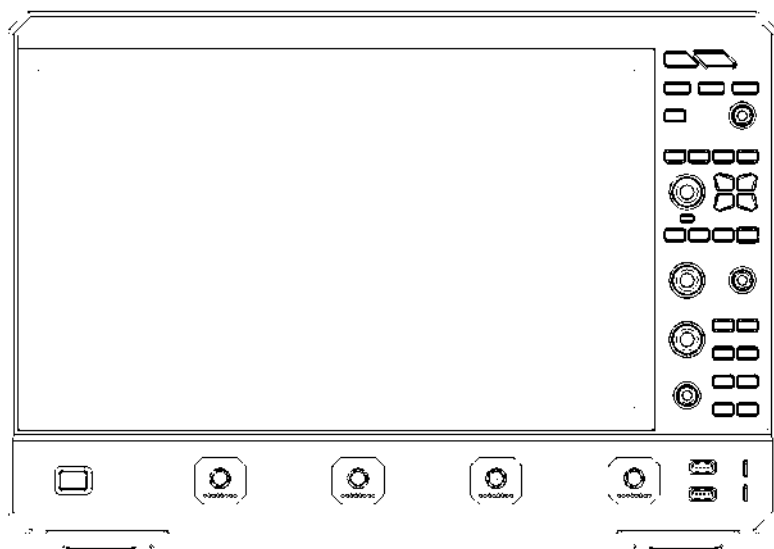
Figure 2 Probe Compensation Calibration

- If the displayed waveform resembles "Insufficient Compensation" or "Excessive Compensation" as shown above, use a non-metallic screwdriver to adjust the probe's variable capacitor until the waveform matches the "Proper Compensation" example.

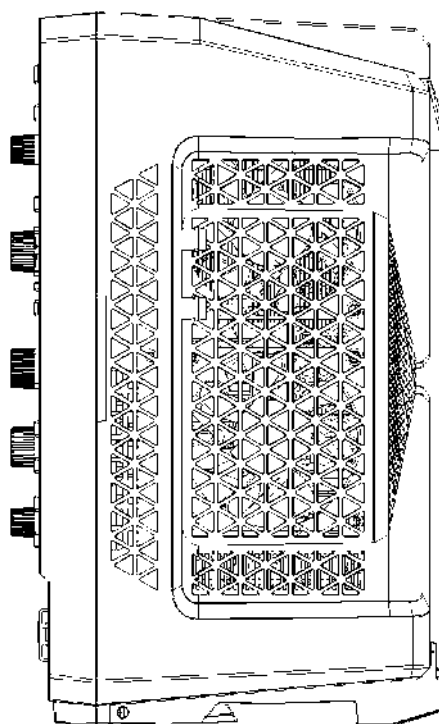
Note: The analog channels of the MSO8804HD do not support high-impedance passive probes.

Warning: To avoid electric shock when using the probe to measure high voltage, please ensure that the probe insulation is in good condition and avoid physical contact with any metallic parts of the probe.

Product View



Front View



Side View

Front Panel

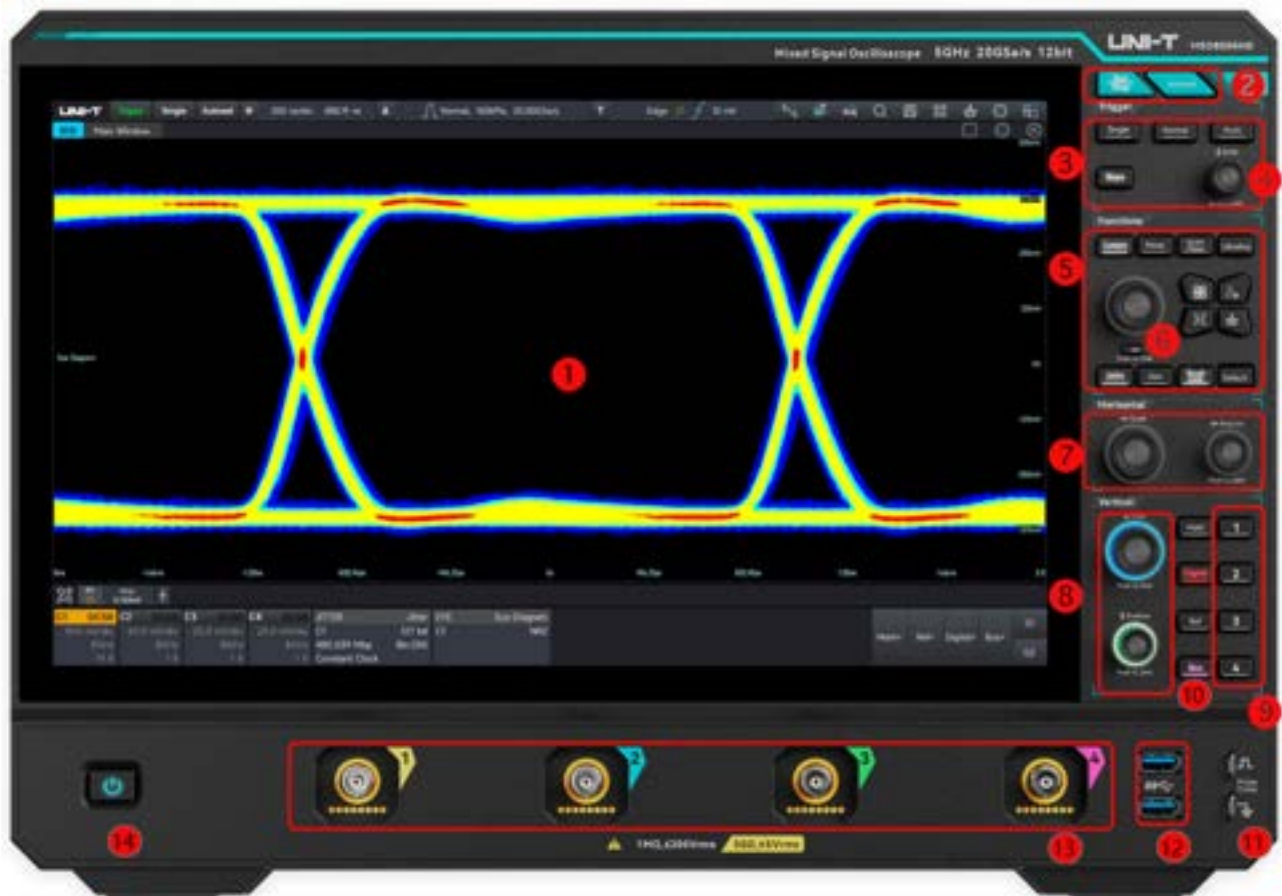


Figure 3 Front Panel

Table 1 Keys and Terminals on the Front Panel

No.	Description	No.	Description
1	Display area	8	Vertical control rotary knob
2	Run/Stop button, Auto setting button	9	Analog channel button
3	Trigger control area (Trigger)	10	Math, Ref, Digital, Bus buttons
4	Trigger level rotary knob	11	Probe compensation signal connection clip and ground terminal
5	Function control area (Function)	12	USB Host
6	Multi-function rotary knob	13	Analog channel input terminal
7	Horizontal control rotary knob	14	Power soft switch key

Rear Panel



Figure 4 Rear Panel

Table 2 Terminals on the Rear Panel

No.	Description	No.	Description
1	G1/G2 Out	9	Power switch
2	Digital channel input terminal	10	Ground terminal
3	Safety lock	11	EXT Trig
4	USB-Type C	12	AUX Out
5	HDMI	13	AUX In
6	LAN port	14	10MHz Ref Out
7	USB Host	15	10MHz Ref In
8	USB Device		

1. G1/G2 Out: The output terminal of function/arbitrary waveform generator.
2. Digital channel input terminal: Used to connect digital probes for acquiring digital signals. Supports multiple digital channels depending on the oscilloscope model.

3. Safety lock: Lock the oscilloscope at fixed position (sold separately).
4. USB-Type C: Provides a modern high-speed interface for data transmission, firmware updates, or PC connectivity, depending on the oscilloscope's capabilities.
5. HDMI: Supports to connect an external display with HDMI port.
6. LAN: Connects to LAN for remote control.
7. USB Host: This port allows connection of USB-compatible storage devices to the oscilloscope.
When connected:
 - Save or recall waveform data and setup configurations
 - Save measurement results and screen captures
 - Perform local firmware upgrades when update files are available
8. USB Device: The USB 3.0 Device port enables communication between the oscilloscope and a PC for remote control or data transfer.
9. Power switch: After connecting the AC power cord to a power outlet, use this switch to supply power to the oscilloscope. Then, press the power soft key on the front panel to start the oscilloscope. Power requirements: 100–240V AC, 50–60Hz.
10. Ground terminal: Provides a grounding point to safely discharge static electricity from the instrument.
11. External trigger input: Accepts an external trigger signal for synchronized signal acquisition.
12. Aux Out: Trigger synchronization output; pass/fail test result output; arbitrary waveform generator (AWG) trigger output
13. Aux In: Trigger synchronization input; arbitrary waveform generator (AWG) trigger input.
14. 10MHz Ref Out: A BNC connector that outputs the oscilloscope's internal 10MHz reference clock. Used for synchronizing external instruments.
15. 10MHz Ref In: Accepts a 10MHz reference clock input from an external signal source to synchronize the oscilloscope's sampling system.

User Interface

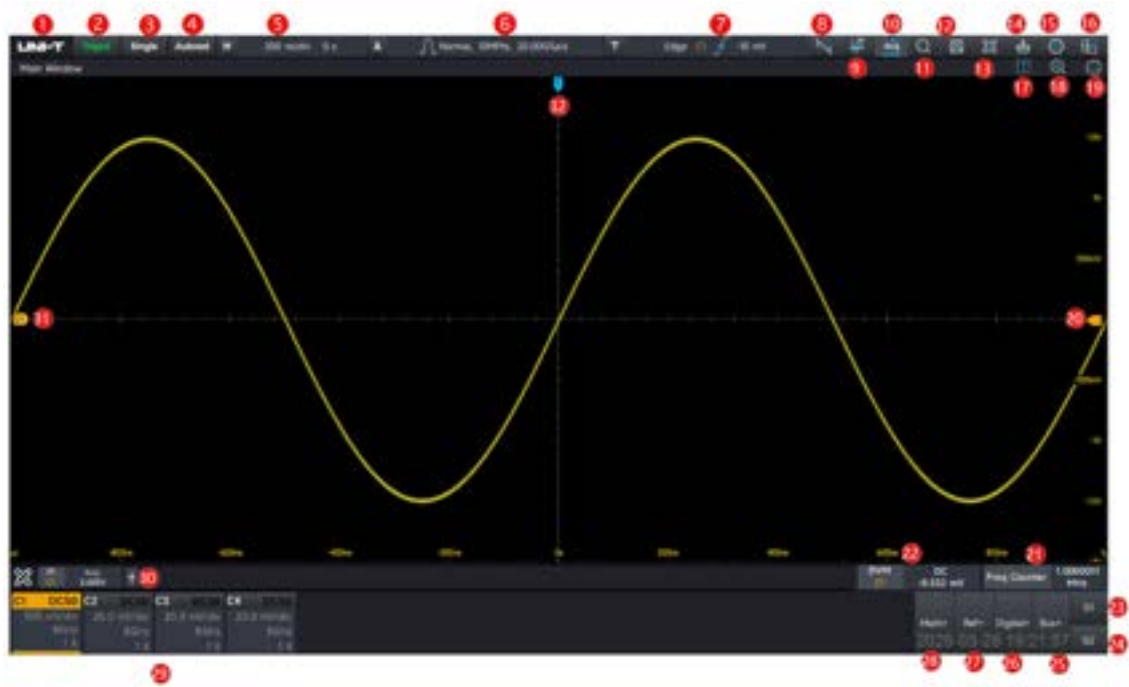


Figure 5 User Interface

Table 3 Icons on User Interface

No.	Description	No.	Description
1	UNI-T logo	17	Zone triggering
2	Trigger state icon	18	Extension window
3	Single trigger	19	Window display setting
4	Autoset	20	Trigger level cursor
5	Horizontal scale and delay	21	Frequency meter
6	Acquisition mode, memory depth, sampling rate	22	Digital voltmeter
7	Trigger Info	23	Function/arbitrary waveform generator
8	Cursor measurement	24/25	Protocol analyzer
9	FFT	26	Logic analyzer
10	UltraAcq® mode	27	Reference waveform
11	Search and navigation	28	Math operation
12	Storage	29	Channel status label
13	Quick screenshot	30	Measurement menu
14	Clear on-screen waveform	31	Analog channel cursor and waveform
15	System setting	32	Trigger position cursor
16	Start menu		

Touch Screen

- Tap
- Pinch
- Drag

MSO8000HD series provides 15.6-inch high-sensitivity capacitive touch screen, multiple point touch control and gesture control. MSO8000HD has an easy operating system with flexible and high-sensitive touch screen features for great waveform display and excellent user experience.

Touch control function includes tap, pinch, and drag.

Note: The menu displayed on the screen of the oscilloscope can all use the touch control function.

Tap

Use one finger to slightly tap on an icon or a word on the screen as shown in **Figure 6**.

Tap gestures can be used for:

- Tap the menu displayed on the screen to open the setup.
- Tap the function icon at the top-right of the screen to open the function navigation.
- Tap the pop-up numeric keypad to set the parameter.
- Tap the virtual keyboard to set the label name and file name.
- Tap a message to open a close icon at the top-right of the screen to close the pop-up window.
- Tap another window displayed on the screen, then proceed with the setup.



Figure 6 Tap Gestures

Pinch

Use two fingers together or separate. Pinch gestures can zoom out or zoom in the waveform. To zoom out the waveform, pinch two fingers together and then slide them apart; to zoom in, spread two fingers apart and then pinch them together, as shown in **Figure 7**.

Pinch gestures can be used for:

- Adjust the horizontal time base by performing a pinch or spread gesture in the horizontal direction.
- Adjust the vertical scale by performing a pinch or spread gesture in the vertical direction.



Figure 7 Pinch Gestures

Drag

Use one finger to press and drag the selected item to the aimed position as shown in **Figure 8**.

Drag gestures can be used for:

- Drag the waveform to change the waveform position.
- Drag the window to change the window position.
- Drag the cursor to change the cursor position.

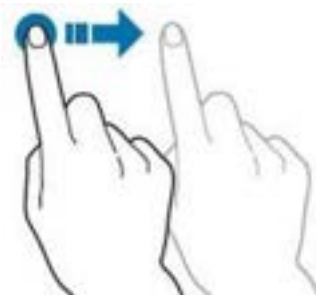


Figure 8 Drag Gestures

Start Menu

Open the start menu: Gently tap the **Start Menu** icon  at the upper right corner of the screen. The main menu interface will appear, as shown in **Figure 9**.

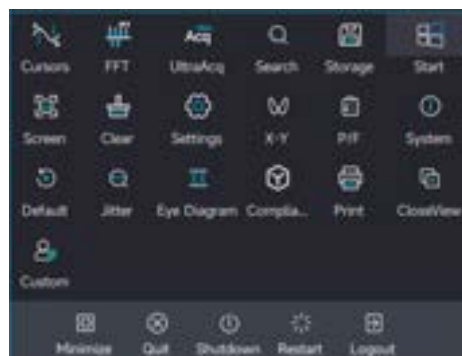


Figure 9 Start Menu

 **Cursor Measurement:** Enables the cursor measurement function.

 **FFT:** Activates the FFT (Fast Fourier Transform) function.

 **UltraAcq:** Enables the Ultra Acquisition mode.

-  **Search Navigation:** Opens the waveform search and navigation feature.
-  **Storage:** Opens the storage menu. Storable items include setup configurations, waveforms, and screenshots. Files can be saved to internal memory or an external USB flash drive.
-  **Screenshot:** Captures a screenshot of the entire display and saves it to a specified folder. A “Save Successful” message will be displayed.
-  **Clear:** Clears historical waveforms and data from the screen.
-  **Settings:** Opens the settings menu, which includes screen display settings, auto setup and calibration, communication settings, auxiliary I/O, and other configurations.
-  **Lissajous:** Activates the X-Y measurement mode.
-  **P/F (Pass/Fail) test:** Opens the pass/fail test function, including limit testing, standard mask testing, and pass/fail status display.
-  **System Information:** Displays system information for the instrument.
-  **Factory Reset:** Restores the instrument to factory default settings. Please confirm the reset by clicking the confirmation button before proceeding.
-  **Power Analysis:** Enables the power analysis function.
-  **Jitter Analysis:** Enables the jitter analysis function.
-  **Print:** Opens the print settings interface. Allows connection to a printer for printing saved images.
-  **Close Sub-Window:** Closes all sub-windows and retains only the main window view.

Measurement Menu

Open the measurement menu: Gently tap or click the measurement menu icon  at the bottom left corner of the screen. The measurement menu interface will appear, as shown in **Figure 10**.

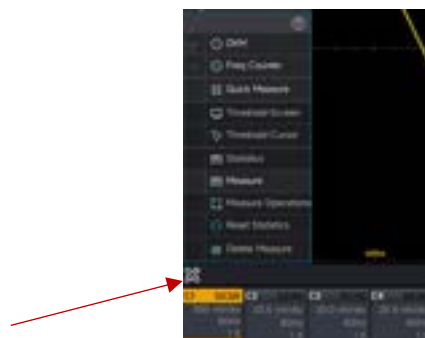


Figure 10 Measurement Menu

-  **Voltmeter:** Enables the voltmeter function, supporting 4-digit AC RMS, DC, and DC+AC RMS voltage measurements.
-  **Frequency meter:** Activates the high-precision 8-digit frequency meter.



Measurement Snapshot: Opens the measurement snapshot interface, allowing simultaneous viewing of multiple measurement parameters.



Measurement Threshold – Screen: Sets the measurement range to the entire screen.



Measurement Threshold – Cursor: Sets the measurement range based on cursor positions.



Measurement Statistics: Enables measurement statistics, including current value, maximum, minimum, average, standard deviation, and count.



Parameter Measurement: Turns parameter measurement on or off.



Measurement Operations It supports arithmetic operations of addition, subtraction, multiplication and division on measurement parameters.



Reset Statistics reset the statistics of all added measurement items.



Clear All Measurements: Closes all currently active measurement items with a single action.

Communication

MSO8000HD series mixed signal oscilloscopes support communication with a computer via USB and LAN interfaces, enabling remote control. Remote operation is implemented through the SCPI (Standard Commands for Programmable Instruments) command set.

MSO8000HD series supports three communication methods:

1. LAN: SCPI communication
2. USB: SCPI communication
3. WebServer: SCPI communication via browser, remote desktop access, data export, etc.

Tap the **Auxiliary Setting**  icon to open the auxiliary settings menu, then select **Communication** from the list.

Network

Before using the LAN interface, connect the oscilloscope to your local area network (LAN) via an Ethernet cable. The LAN port is located on the rear panel of the instrument. Access the Settings menu and open the Network Configuration interface (as shown in **Figure 11**) to view the current network status and configure network parameters.



Figure 11 Network Configuration

USB

The USB interface displays information such as the Vendor ID, Product ID, Serial Number, and the current VISA address (as shown in **Figure 12**). The oscilloscope can communicate directly with a host PC via the USB Device port on the rear panel, without requiring any additional configuration.



Figure 12 USB Communication

WebServer

The WebServer interface displays the current network status and the default network port: Port 80 (HTTP service).

Access via PC

Ensure the PC and the oscilloscope are on the same local area network (LAN) and can successfully ping each other. The users can view the oscilloscope's local IP address via the **Utility** menu or by tapping the Settings icon  on the oscilloscope.

To access the oscilloscope, enter the IP address followed by :80, as shown in **Figure 13**.

Example:

- PC IP: 192.168.137.101
- Oscilloscope IP: 192.168.137.222
- Gateway: 192.168.137.1

In a browser on the PC, navigate to 192.168.137.222:80 to access the oscilloscope. The web interface allows users to (as shown in **Figure 14**):

- View device information
- Perform remote control
- Execute SCPI commands
- Export waveform data and documentation



Figure 13 Web Server Home Page



Figure 14 Remote Control

Access via Mobile Devices

Ensure the mobile device and the oscilloscope are connected to the same local area network (LAN), typically within the same WLAN frequency band. Users can check the oscilloscope's local IP address through the oscilloscope's settings menu. Then, access the oscilloscope by entering **followed by :80** in the mobile browser (as shown in **Figure 15, Figure 16**).

The mobile interface provides the same functionality as the PC interface, with the only difference being the layout optimized for mobile devices.



Figure 15 Web Server Home Page



Figure 16 Remote Control

Troubleshooting

The following lists possible faults that may occur during oscilloscope use, along with troubleshooting methods. When you encounter these issues, please follow the corresponding steps to resolve them. If the problem persists, please contact UNI-T and provide your instrument information.

- (1) If the oscilloscope remains on a black screen without any display when pressing the power soft key.
 - ① Check if the power plug is properly connected and the power supply is functioning normally.
 - ② Check if the power switch is turned on. If the power switch is turned on, the power soft key on the front panel should be orange. When the power soft key is enabled, the power soft key should be blue, and the oscilloscope will make an active sound.
 - ③ If the relay has sound, it indicates that the oscilloscope is normal boot-up.
 - ④ If the product still does not work properly, contact the UNI-T Service Center for assistance.
- (2) After signal acquisition, the waveform of the signal does not appear on the screen.
 - ① Check whether probe and DUT are connected properly.
 - ② Check whether the signal connecting line is connected to analog channel.
 - ③ Check whether the analog input of the input signal matches the activated oscilloscope channel.
 - ④ Connect the probe tip to the oscilloscope front panel's probe compensation signal clip and check whether the probe is functioning properly.
 - ⑤ Check whether the device under test is generating a signal (connect the signal output channel together with the problematic channel to identify the issue).
 - ⑥ Press the **Autoset** button to automatically configure the oscilloscope and reacquire the signal.
- (3) The measured voltage amplitude value is 10 times larger or 10 times smaller than the actual value.
 - ① Check whether the channel probe attenuation ratio settings are consistent with the used probe attenuation ratio.
- (4) Waveform is displayed but unstable.
 - ① Check whether the trigger settings in the trigger menu correspond to the actual input signal channel.
 - ② Confirm that the trigger type is set appropriately; general signals typically use "Edge" trigger.

- ③ Try changing the trigger coupling to HF Reject or LF Reject to filter out high-frequency or low-frequency noise that may interfere with the trigger.
- (5) Touchscreen does not work.
 - ① Check if the touchscreen function is enabled. If it is not enabled, press the **Touch Lock** button on the oscilloscope's front panel to activate the touchscreen.
 - ② Check whether the oscilloscope is near a strong magnetic field. If so, move it away to eliminate magnetic interference.
 - ③ Check if there are any oil stains or dirt on the screen or your finger. If present, clean both the screen and your finger.
 - ④ If the touch screen still does not work, contact the UNI-T Service Center for assistance.
- (6) Waveform refresh is very slow.
 - ① Check whether the acquisition method is set to "Average" and if the number of averages is high.
 - ② To increase the refresh rate, reduce the number of averages or select a different acquisition mode.

Maintenance and Cleaning

(1) General Maintenance

Keep the instrument away from direct sunlight.

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

(2) Cleaning

Check the instrument and probe frequently according to the operating condition. Follow these steps to clean the external surface of the instrument:

- a. Please use a soft cloth to wipe the dust outside the instrument.
- b. When cleaning the LCD screen, please pay attention and protect the transparent LCD screen.
- c. When cleaning the dust screen, use a screwdriver to remove the screws of the dust cover and then remove the dust screen. After cleaning, install the dust screen in sequence.
- d. Please disconnect the power supply, then wipe the instrument with a damp but not dripping soft cloth. Do not use any abrasive chemical cleaning agent 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.