



MSO2000X/3000X Series Mixed Signal Oscilloscope

Quick Guide

This document applies to the following models:

MSO2000X series

MSO3000X series

V1.2

2025.05

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1. MSO2000X/3000X Series

MSO2000X/3000X series mixed signal oscilloscope has 5 models.

Model	Analog channel number	Analog bandwidth	Digital	Gen
MSO2304X	4	300 MHz	●	○
MSO2204X	4	200 MHz	●	○
MSO2104X	4	100 MHz	●	○
MSO3054X	4	500 MHz	●	○
MSO3034X	4	350 MHz	●	○

○: option ●: standard ×: not support

2. Getting Started Manual

This chapter is to introduce on using the MSO2000X/3000X series oscilloscope for the first time, the front and rear panels, the user interface, as well as touch screen function.

2.1.General Inspection

It is recommended to inspect the instrument follow the steps below before using the MSO2000X/3000X series oscilloscope for the first time.

(1) Check for Damages caused by Transport

If the packaging carton or the foam plastic cushions are severely damaged, please contact the UNI-T distributor of this product immediately.

(2) Check Attachment

The details of the supplied accessories are described in the MSO2000X/3000X series oscilloscope accessories section in this manual. Please refer to this section for the list of accessories. If any accessories are missing or damaged, contact UNI-T or the local distributors of this product.

(3) Machine Inspection

If the instrument appears to be damaged, not working properly, or has failed the functionality test, please contact UNI-T or local distributors of this product.

If the equipment is damaged due to shipping, please keep the packaging and notify both the transportation department and UNI-T distributors, UNI-T will arrange maintenance or replacement.

2.2.Before Use

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

(1) Connecting to the Power Supply

Connect the power supply according to the following table, use the assembled power line or other power line that meets the local country standards to connect the oscilloscope. When the power switch on the rear panel is not opened, the soft power indicator  in the left bottom on the rear panel is extinguished, which indicates this soft switch key is no-effect. When the power switch on the rear panel is opened, the soft power indicator  in the left bottom on the rear panel is illuminated with red, and then press the soft switch key to enable the oscilloscope.

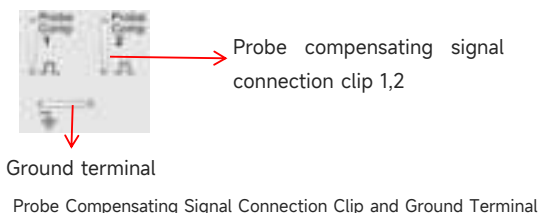
Voltage Range	Frequency
100 V-240 VAC (fluctuant: $\pm 10\%$)	50 Hz/60 Hz
100 V-120 VAC (fluctuant: $\pm 10\%$)	400 Hz

(2) Boot Check

Press the power soft switch key and the indicator  should change from red to green. The oscilloscope will show a boot animation, and then enter the normal interface.

(3) Connecting Probe

This oscilloscope provides 2 pieces of compensating signal probe. Connect the BNC of the probe to the BNC of oscilloscope's CH1, and connect the probe to the "probe compensating signal connection clip", and then connect the ground alligator clip of the probe with the ground terminal of compensating signal connection clip. The output of compensating signal connection clip: amplitude about 3 Vpp, frequency defaults to 1 kHz.



(4) Function Check

Press the **Autoset** key, a square wave (amplitude 3 Vpp, frequency 1 kHz) should appear on the screen. Repeat the step 3 to check all channels. If the square waveform display does not match the one shown above, please follow the 'Probe Compensation' procedure described in the next section.

(5) 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 mistake. Please follow the following steps to adjust the probe compensation.

- Set the attenuation coefficient in the probe menu to 10x and the switch of the probe at 10x, and connecting the probe of the oscilloscope to CH1. If use the probe's hook head, make sure it stably touch to the probe. Connecting the probe to the "probe compensation signal connection clip" of the oscilloscope and connect the ground alligator clip to the ground terminal of probe compensating signal connection clip. Open CH1 and press the AUTO key.
- View the displayed waveform, as shown in the following figure.



- If the displayed waveform is look like the above “Insufficient Compensation” or “Excessive Compensation”, use a non-metallic screwdriver to adjust the probe’s variable capacitance until the display matches the “Correct compensation” waveform.

Note: The probe type is UT-P07A and UT-P08A. When connected to the oscilloscope, the probe ratio will be automatically identified as X10.

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 part of the probe.

2.3.Front Panel



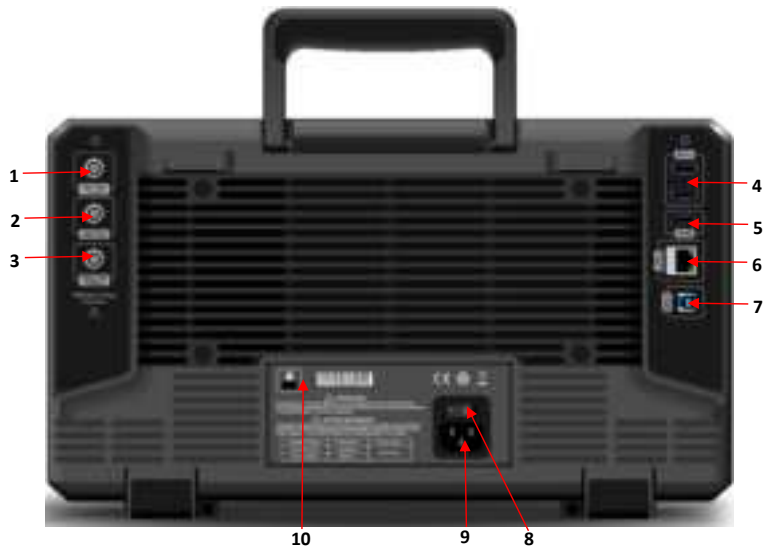
Front Panel

Table 1 Front Panel

No.	Description	No.	Description
1	Display area	10	Clear key
2	Quick screenshot key	11	Vertical control area
3	Multi-function area	12	Analog channel input terminal *
4	Touch/Lock key	13	Probe compensating signal connection clip and ground terminal
5	Common function area	14	Gen output port
6	Function menu key	15	Digital channel input port
7	Horizontal control area	16	USB HOST port
8	Trigger control area	17	Power soft switch key
9	Factory setting		

*MSO2000X have no probe power outlet board

2.4.Rear Panel



Rear Panel

Table 2 Rear Panel

No.	Description	No.	Description
1	EXT Trig	6	LAN
2	AUX Out	7	USB Device
3	10MHz REF	8	AC Power Input Socket
4	USB HOST	9	Power Switch
5	HDMI	10	Safety Lock

2.5.Operation Panel

(1) Vertical Control



- **Ref** : Loading the reference waveform from 'local or USB", so the measured waveform can compare with the reference waveform.
- **1** , **2** , **3** , **4** : Analog channel setting key respectively represents CH1, CH2, CH3 and CH4. Four channel's tab are identified by different colors and it also corresponding to the colors of waveforms on the screen and the channel input connectors. Press any keys to enter the related channel menu (activate or disable the channel).
- **Math** : Press this key to open the mathematical operation menu to perform math operation (add, subtract, multiply, divide), digital filter and advanced operation.
- **FFT**: Press this key to quickly open FFT setting.
- **Digital**: Press this key to enter Digital setting, to set basics, grouping, threshold, bus and label.
- **Bus**: Press this key to enter protocol decoding setting, to set the decoding of RS232, I²C, SPI, CAN, CAN-FD, LIN, FlexRay, I2S, 1553B, Manchester, SENT and ARINC429.
- **Position** : Vertical position rotary knob is used to move the vertical position of the waveform in the current channel. Press this rotary knob to move the channel position back to the vertical midpoint.
- **Scale** : Vertical scale rotary knob is used to adjust the vertical scale in the current channel. Turn clockwise to decrease the scale, turn counterclockwise to increase the scale. The amplitude of waveform will increase or decrease with the adjustment and the scale at the



bottom of screen will change in real-time.

The vertical scale is step with 1-2-5, press this rotary knob to adjust the vertical scale between coarse tuning and fine tuning.

(2) Horizontal Control

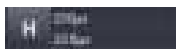


- **Menu** : Horizontal menu key is used to display the horizontal scale, time base mode (XY/YT), horizontal, auto roll, quick roll time base, horizontal position, time base extension and time base selection.

- **Scale** : Horizontal scale rotary knob is used to adjust all channel time base. During the adjustment, the waveform is compressed or extended in horizontal show on the screen and the horizontal scale value will change in real-time. The time base is step with 1-2-5, press this rotary knob to adjust the horizontal scale between coarse tuning and fine tuning.



- **Position** : Horizontal position rotary knob is used to move the trigger point to left or right side that relative to the center of the screen. During the adjustment, all channel waveforms move to left or right side and the horizontal shift value on the top of the screen



will change in real-time. Press this rotary knob to move the current position back to the horizontal midpoint.

(3) Trigger Control



- **Menu** : Display the trigger menu.
- **Force** : Force trigger key is used to generate one trigger when the trigger mode is Normal and Single.
- **Mode** : Press this key to switch the trigger mode to Auto, Normal or Single. The currently selected trigger mode indicator will illuminate.
- **Position** : Trigger level rotary knob, turn clockwise to increase the level, turn counterclockwise to decrease the level. During the adjustment, the trigger level



on the top right will change in real-time. When the trigger is single level, press this rotary knob to turn the trigger level to the trigger signal and quickly turn to 50%.

(4) Auto Setting



After this key is pressed, the oscilloscope will automatically adjust the vertical scale,

scanning time base and trigger mode according to the input to display the most suitable waveform.

Note: When use the waveform automatic setting, if the measured signal is sine wave, it requires its frequency cannot less than 10 Hz and the amplitude should at the range of 12 mVpp ~ 60 Vpp. Otherwise, the waveform automatic setting may be invalid.

(5) Run/Stop



This key is used to set the operating mode of the oscilloscope to “Run” or “Stop”.

In the “Run” state, the key is illuminated in green.

In the “Stop” state, the key is illuminated in red.

(6) Single Trigger



This key is used to set the trigger mode of the oscilloscope to “Single”, the key is illuminated in orange.

(7) Clear All



This key is used to clear all the load waveforms. When the oscilloscope is in the “RUN” state, the waveform is continuously refreshed.

(8) Touch/Lock



This key is used to enable/disable the touch screen function. When this key is pressed, the touch screen is enabled and the indicator will be illuminated. When the key is pressed again, the touch screen is disabled and the indicator will be extinguished.

(9) Print Screen



This key is used to quickly copy the waveform on the screen in PNG format to USB.

(10) Multi-purpose Rotary Knob



- Multipurpose rotary knob: This key is used to select the digital menu in function pop-up window. When the multi-purpose rotary knob is illuminated, indicating that this key can be used to change the numerical value.
-  Arrow key: When adjusting the numerical value, this key is used to move the cursor and set the corresponding value.

(11) Function Key



- **Measure** : Press the **Measure** key to enter the measurement menu, to set the counter, voltmeter, parameter snapshot, measurement statistics, add measurement, clear measurement and global setting.
- **Acquire** : Press the **Acquire** key to enter the acquisition setting menu, to set acquire mode, storage mode and interpolation method.
- **Cursor** : Press the **Cursor** key to enter the cursor measurement menu, to set time, voltage, screen measurement for each source.
- **Display** : Press the **Display** key to enter the display setting menu, to set wave display type, grid type, grid brightness, wave brightness, backlight brightness, transparency of pop-up windows,.
- **Storage** : Press the **Storage** key to enter the storage setting menu, to set storage, load and upgrade. The storage type includes setting, waveform and picture. It can save to local of the oscilloscope or external USB.
- **Utility** : Press the **Utility** key to enter the auxiliary function setting menu, to set the basic information, network, WiFi, frp, socket server, rear panel, USB, self-inspection, auto calibration, About, option and Auto.
- **Gen** : Press the **Gen** key to enter the Gen menu, to set Gen output.
- **APP** : Press the **APP** key to enter the shortcut APP setting box.

(12) Home Menu

Press the Home icon on the top right corner to pop up "Home" quick menu, including the quick menu of voltmeter, FFT, signal source, Math, reference, help, cursor, Bode diagram, storage, counter, measurement, regional drawing, display, auxiliary, decoding, search, regional diagram, guide, waveform recording, power analysis and Pass/Fail. Press the quick menu to enter the corresponding function module.



2.6.User Interface

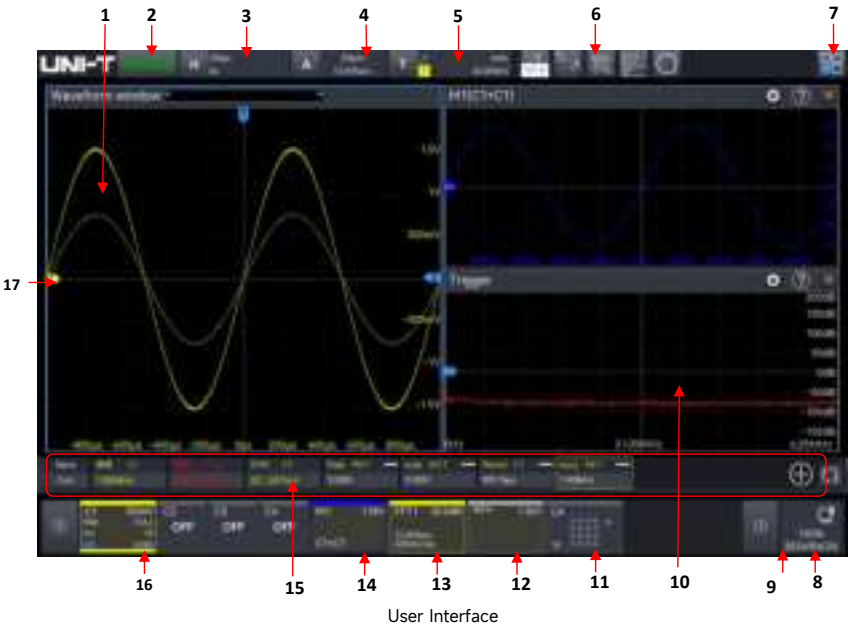


Table 3 User Interface

No.	Description	No.	Description
1	Waveform display window	10	Multiple window display area
2	Trigger state	11	Digital label
3	Time base label	12	Ref label

4	Sampling rate and memory depth label	13	FFT label
5	Trigger info bar	14	Math label
6	Function toolbar	15	Measured result display window
7	Home menu	16	Channel label
8	Notification	17	Analog channel icon
9	Volts/div signal bar		

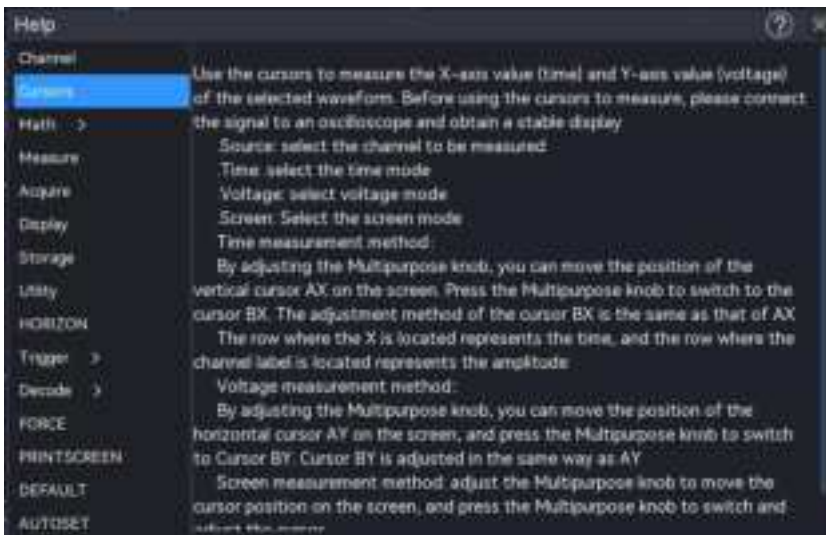
2.7.Help System

The help system describes the function key (include menu key) on the front panel.

The help system can be entered by the following steps.

- In Home menu, click on the help icon “?” to open the help menu.
- In each function menu popups, click on the help icon “?” on the top right to open the relevant help menu.

The help screen is divided into two parts, the left side is ‘Help Options’ and the right side is ‘Help Display Area’. By selecting a help option, the user can see all the help contents under that option on the right.



3. Parameter Setting

MSO2000X/3000X series supports use the Multipurpose rotary knob and touch screen to set the parameter, the setting steps as follows.

(1) Multipurpose rotary knob

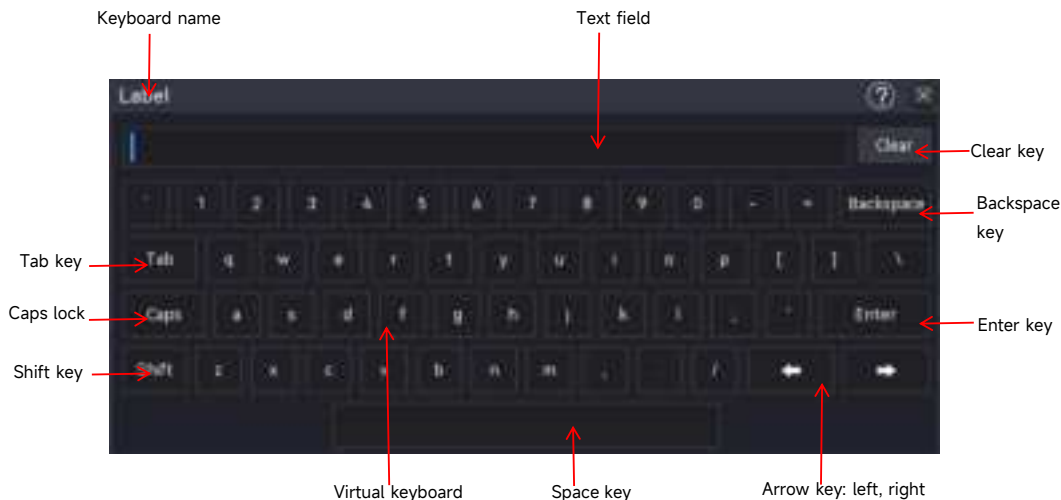
For the parameter of time and voltage, once the parameter is selected, rotating the Multipurpose rotary knob on the front panel to enter the parameter value.

(2) Touch screen

Once the parameter or text field has been selected, double-click to pop up the virtual keyboard to enter the parameter value, label name or file name.

1. Enter character string

When renaming the file or file folder, use the figure keyboard enter a string of characters.



a. Enter character string

When naming a file or folder, use the character keyboard to enter a string.

b. Text field

Enter text: letter, number, special character, the length up to 16 characters.

c. Clear key

Press the "Clear" key to delete all content in the text field.

d. Caps key

Press the "Caps" key to switch between upper and lower case.

- e. Tab key
Press the "Tab" key to enter 2 spaces at a time.
 - f. Shift key
Press the "Shift" key to switch among number, special character, upper and lower case.
 - g. Arrow key (left, right)
If part of the content needs to be changed, press the "←", "→" key to move the cursor to left or right and then to edit the content.
 - h. Space key
Press the "Space" key to enter one space in the text field.
 - i. Backspace key
Press the "Backspace" key to delete a single character. This is used to delete a character when the text field a lot of content
 - j. Enter key
Once the content has been entered, press the "Enter" key to confirm the setting and close the virtual keyboard.
2. Enter numeric value
When setting or editing a parameter, use the numeric keyboard to enter the numeric value.
 1. Click the number or unit to enter



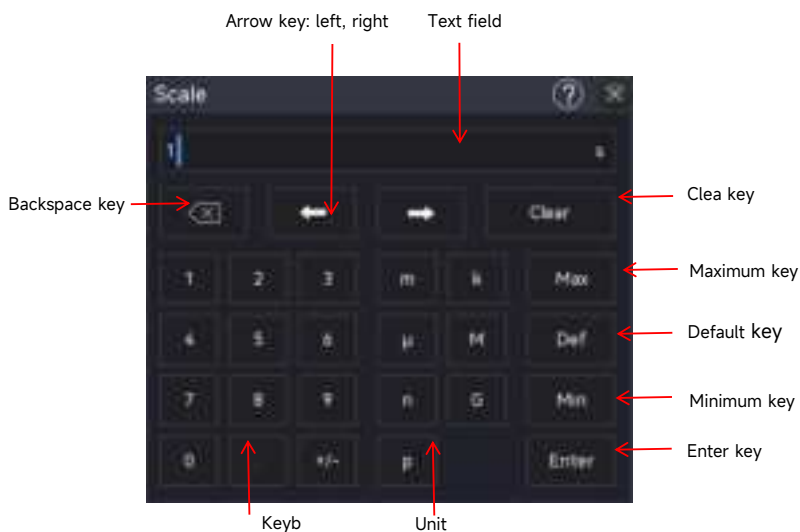
Once all the numeric value and unit have been entered, the numeric keyboard will

automatically turn off, that means the parameter setting is completed. In addition, when the numeric value is entered, you can directly click on the “Enter” key to close the numeric keyboard, the unit of parameter will be set by default. You can also use the numeric keyboard to process the setting as follows.

- a. Delete the parameter value that has been entered
 - b. Set the parameter to Max or Min (sometimes, it refers specifically to the maximum or minimum value in the current state)
 - c. Set the parameter to default value
 - d. Clear the text field of parameter
 - e. Move the cursor to edit the parameter value
3. Enter numeric value

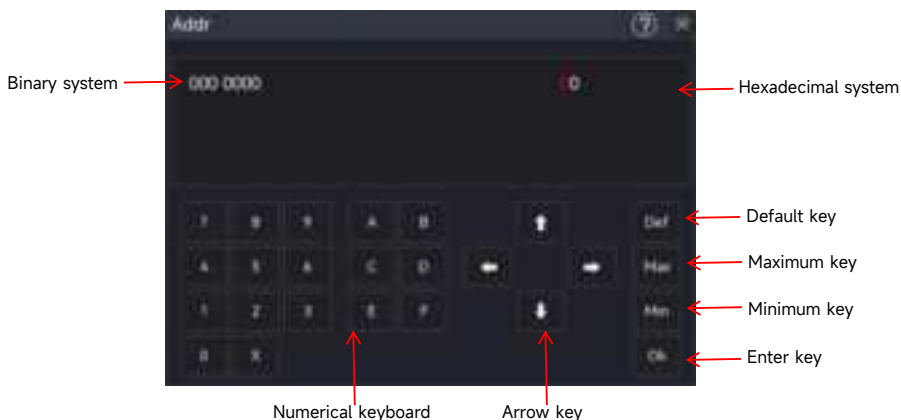
When setting or editing a parameter, use the numeric keyboard to enter the numeric value.

1. Click the number or unit to enter



- a. After entering all the values and selecting the desired units, the numeric keypad will automatically close, completing the parameter setting. Additionally, the user can manually close the numeric keypad by clicking the confirm key, in which case the unit will default to the preset unit. On the numeric keypad, the user can also perform the following operations:
- b. Delete the entered parameter value.

- c. Set the parameter to the maximum or minimum value (sometimes specifically the maximum or minimum value for the current state).
 - d. Set the parameter to the default value.
 - e. Clear the parameter input field.
 - f. Move the cursor to modify the parameter value.
 - g. Enter binary, hexadecimal system value
 - h. During the decoding trigger, use the numeric keypad to enter binary or hexadecimal values for data and address settings.
2. Enter Method: Tap to select the number or text field to be edited, and then use the numeric keypad to enter the desired numeric or letter values.



- (3) After entering all the values and pressing the “Ok” button, the numeric keypad will automatically close, completing the parameter setting. Additionally, on the numeric keypad, the user can perform the following operations:
 - a. Move the cursor to modify the parameter value.
 - b. Set the parameter to the maximum or minimum value (sometimes specifically for the current state).
 - c. Set the parameter to the default value.
 - d. Clear the parameter input field.
 - e. Delete the entered parameter value

4. Touch Screen

MSO2000X/3000X series provides 10.1 inch super capacitive touch screen, multiple point touch control and gesture control. MSO2000X/3000X has easily operating system with flexible and high sensitive touch screen features for great waveform display and excellent user experience.

Touch control function includes tap, squeeze, drag and rectangle drawing.

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

(1) Tap

Use one finger to slightly tap on an icon or a word on the screen as shown in the following figure.

Tap gesture can use for:

- Tap the menu display on the screen and then to setup
- Tap the function icon on the top right corner to open the corresponding function
- Tap the pop-up numeric keyboard to set the parameter
- Tap the virtual keyboard to set the label name and file name
- Tap a message to pop up a close button on the top right corner to close the pop-up window.
- Tap other window displayed on the screen and then to setup



Tap Gesture

(2) Squeeze

Squeeze two fingers together or separate. Squeeze gesture can zoom out or zoom in the waveform. If the waveform need to zoom out, squeeze two finger together and then slide away; If the waveform need to zoom in, separate two fingers and then squeeze two fingers together as shown in the following figure.

Squeeze gesture can use for:

- Adjust the horizontal time base of waveform by squeezing on the horizontal direction
- Adjust the vertical time base of waveform by squeezing on the vertical direction



Squeeze Gesture

(3) Drag

Use one finger to press and drag the selected item to the aimed position as shown in the following figure.

Drag gesture can use for:

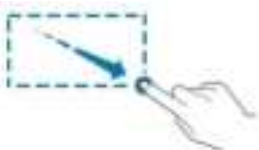
- Drag the waveform to change the waveform position
- Drag the window to change the window position
- Drag the cursor to change the cursor position



Drag Gesture

(4) Rectangle Drawing

Open the Home menu and click the icon "Rectangle Drawing" to enable the function, drag your finger to draw a rectangle on the screen as shown in Figure (a), (b), move the finger, a menu will appear on the screen, at this point, "Region A", "Region B", "Intersection", "Non-intersect" can be selected. Drag your finger from bottom right to the top left on the screen to draw the trigger area.



(a)



(b)

Drawing Gesture

Select "Region A":

- Draw the trigger region A
- Open the trigger region A
- Open "Region trigger" menu

Select "Region B":

- Draw the trigger region B
- Open the trigger region B;
- Open "Region trigger" menu

Tips : Click on "rectangle drawing" to step through rectangle drawing and operating waveform mode. Click on "rectangle drawing", if the icon shows , it means that "rectangle drawing" mode is enabled; if the icon shows , it means that "operating waveform" mode is enabled.

5. Remote Control

MSO2000X/3000X series mixed signal oscilloscopes can communicate with a PC via USB and LAN port for remote control. The remote control is implemented on the basis of the SCPI (Standard Commands for Programmable Instruments).

MSO2000X/3000X series has three methods for remote control.

(1) Custom Programming

The user can perform the programming control on the oscilloscope through SCPI (Standard Commands for Programmable Instruments). For detailed descriptions on command and programming, please refer to *MSO2000X/3000X Series Mixed Signal Oscilloscope-Programming Manual*.

(2) PC Software Control (Instrument manager)

The user can use a PC software to remotely control the oscilloscope. The instrument manager can display the oscilloscope screen in real time, and control the operation with the mouse. It is recommended to use the PC software provided by UNI-T. It can be downloaded from UNI-T official website (<https://www.uni-trend.com>).

Operating steps:

- Setup the communication between the instrument and a PC
- Open the instrument manager software and search the instrument source
- Right-click to open the oscilloscope, operate the instrument manager to remotely control the oscilloscope (refer to *Instrument Manager-User's Manual* for more details)

(3) Web Control

Once the network is connected, use IP to open the Web. Log in to the Web to remotely control the oscilloscope. Web Control can display the oscilloscope screen in real time. It supports login from PC, mobile phone and iPad, and the network can use intranet or outer net. The user name and password are "admin" and "uni-t".

6. Troubleshooting

- (1) If the oscilloscope remains black screen without any display when press the power soft key.
 - a. Check if the power plug is properly connected and the power supply is normal.
 - b. 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 green. When the power soft key is enabled, the power soft key should be blue and the oscilloscope will make active sound. There should be a normal relay rattle when the soft switch key is pressed.
 - c. If the relay has sound, it indicates that the oscilloscope is normal boot-up. Press the **Default** key and press the "Yes" key, if the oscilloscope returns to normal, indicating that the backlight brightness is set too low.
 - d. Restart the oscilloscope after completing the above steps.
 - e. 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.
 - a. Check whether probe and DUT are connected properly.
 - b. Check whether the signal output channel is open.
 - c. Check whether the signal connecting line is connect to analog channel.
 - d. Check whether the signal source has DC offset.
 - e. Plug out the connected signal, to check whether the base line is within the screen range (If not, please perform self-calibration).
 - f. If the product still does not work properly, contact the UNI-T Service Center for assistance.
- (3) The measured voltage amplitude value is 10 times larger or 10 times smaller than the actual value.

Check whether the channel probe attenuation coefficient settings are consistent with the used probe attenuation rate.
- (4) There is a waveform display but not stable.
 - a. Check the trigger settings in trigger menu whether is consistent with the actual signal input channel.
 - b. Check the trigger type: the general signals should use "Edge" trigger. The waveform can only be displayed stably if the trigger mode is set correctly.
 - c. Try to change trigger coupling to HF rejection or LF rejection, to filter out the high-frequency or low-frequency noise that interfere the trigger.
- (5) No waveform display after press the **Run/Stop** key.
 - a. Check whether the trigger mode is in normal or single and whether the trigger level is

exceed the waveform range.

- b. If the trigger mode is in normal or single and the trigger level is in the center, set the trigger mode to Auto.
- c. Press the Auto key to automatically complete the above settings.

(6) Waveform refresh is very slow.

- a. Check whether the acquisition method is average and the average times are large.
- b. Check whether the storage depth is maximum.
- c. Check whether the trigger holdoff is large.
- d. Check whether it is normal trigger and is slow timebase.
- e. All of the above will lead to slow waveform refresh, it is recommended to restore the factory settings, then the waveform can be refreshed normally.

说明书菲林做货要求:

序号	项目	内容	
1	尺寸	外尺寸: (148x210) $\pm 1\text{mm}$.	
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	其它		
版本		REV. 0	
DWH 设计		MODEL 机型: ((CD)MS03000X 系列 	Part NO. 110401112663X
CHK 审核			
APPRO 批准			优利德科技(中国)股份有限公司 UNI-TREND TECHNOLOGY (CHINA) CO.,LTD