UNI-T

Instruments.uni-trend.com

Quick Guide

MSO2000X/3000X Series Mixed Signal Oscilloscope

This document applies to the following models:

MSO2000X series

MSO3000X series

V1.0

2024.07

Foreword

Dear Users,

Hello! Thank you for choosing this brand new UNI-T instrument. In order to use this instrument safely and correctly, please read this manual thoroughly, especially the Safety Requirements part. After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

Copyright Information

Warranty Service

If the product is proved to be defective within the warranty period, UNI-T reserves the rights to either repair the defective product without charging of parts and labor, or exchange the defected product to a working equivalent product. Replacement parts and products may be brand new, or perform at the same specifications as brand new products. All replacement parts, modules, and products become the property of UNI-T.

The “customer” refers to the individual or entity that is declared in the guarantee. In order to obtain the warranty service, "customer" must inform the defects within the applicable warranty period to UNI-T, and to perform appropriate arrangements for the warranty service. The customer shall be responsible for packing and shipping the defective products to the designated maintenance center of UNI-T, pay the shipping cost, and provide a copy of the purchase receipt of the original purchaser. If the product is shipped domestically to the location of the UNI-T service center, UNI-T shall pay the return shipping fee. If the product is sent to any other location, the customer shall be responsible for all shipping, duties, taxes, and any other expenses.

This warranty shall not apply to any defects or damages caused by accidental, machine parts’ wear and tear, improper use, and improper or lack of maintenance. UNI-T under the provisions of this warranty has no obligation to provide the following services:

a) Any repair damage caused by the installation, repair, or maintenance of the product by non UNI-T service representatives.

b) Any repair damage caused by improper use or connection to an incompatible device.

c) Any damage or malfunction caused by the use of a power source which does not conform to the

requirements of this manual.

d) Any maintenance on altered or integrated products (if such alteration or integration leads to an increase in time or difficulty of product maintenance).

This warranty is written by UNI-T for this product, and it is used to substitute any other express or implied warranties. UNI-T and its distributors do not offer any implied warranties for merchant ability or applicability purposes.

For violation of this guarantee, regardless of whether UNI-T and its distributors are informed that any indirect, special, incidental, or consequential damage may occur, UNI-T and its distributors shall not be responsible for any of the damages.

File Version

MSO2000X/3000X 20240529-V1.00

Statement

- UNI-T products are protected by patent rights in China and foreign countries, including issued and pending patents.
- UNI-T reserves the rights to any product specification and pricing changes.
- UNI-T reserves all rights. Licensed software products are properties of Uni-Trend and its subsidiaries or suppliers, which are protected by national copyright laws and international treaty provisions. Information in this manual supersedes all previously published versions.

1. Safety Requirements

This section contains information and warnings that must be followed to keep the instrument operating under safety conditions. In addition, user should also follow the common safety procedures.

Safety Precautions		
Warning	**Please follow the following guidelines to avoid possible electric shock and risk to personal safety.**	
	Users must follow the following conventional safety precautions in operation, service and maintenance of this device. UNI-T will not be liable for any personal safety and property loss caused by the user's failure to follow the following safety precautions. This device is designed for professional users and responsible organizations for measurement purposes. Do not use this device in any way not specified by the manufacturer. This device is only for indoor use unless otherwise specified in the product manual.	
Safety Statements		
Warning	"Warning" indicates the presence of a hazard. It reminds users to pay attention to a certain operation process, operation method or similar. Personal injury or death may occur if the rules in the "Warning" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Warning" statement.	
Caution	"Caution" indicates the presence of a hazard. It reminds users to pay attention to a certain operation process, operation method or similar. Product damage or loss of important data may occur if the rules in the "Caution" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Caution" statement.	
Note	"Note" indicates important information. It reminds users to pay attention to procedures, methods and conditions, etc. The contents of the "Note" should be highlighted if necessary.	
Safety Sign		
	**Danger**	It indicates possible danger of electric shock, which may cause personal injury or death.
	**Warning**	It indicates that you should be careful to avoid personal injury or product damage.
	**Caution**	It indicates possible danger, which may cause damage to this device or other equipment if you fail to follow a certain procedure or condition. If the "Caution" sign is present, all conditions must be met before you proceed to operation.

	**Note**	It indicates potential problems, which may cause failure of this device if you fail to follow a certain procedure or condition. If the "Note" sign is present, all conditions must be met before this device will function properly.
	**AC**	Alternating current of device. Please check the region's voltage range.
	**DC**	Direct current device. Please check the region's voltage range.
	**Grounding**	Frame and chassis grounding terminal
	**Grounding**	Protective grounding terminal
	**Grounding**	Measurement grounding terminal
	**OFF**	Main power off
	ON	Main power on
	**Power**	Standby power supply: when the power switch is turned off, this device is not completely disconnected from the AC power supply.
CAT I	Secondary electrical circuit connected to wall sockets through transformers or similar equipment, such as electronic instruments and electronic equipment; electronic equipment with protective measures, and any high-voltage and low-voltage circuits, such as the copier in the office.	
CAT II	Primary electrical circuit of the electrical equipment connected to the indoor socket via the power cord, such as mobile tools, home appliances, etc. Household appliances, portable tools (e.g. electric drill), household sockets, sockets more than 10 meters away from CAT III circuit or sockets more than 20 meters away from CAT IV circuit.	
CAT III	Primary circuit of large equipment directly connected to the distribution board and circuit between the distribution board and the socket (three-phase distributor circuit includes a single commercial lighting circuit). Fixed equipment, such as multi-phase motor and multi-phase fuse box; lighting equipment and lines inside large buildings; machine tools and power distribution boards at industrial sites (workshops).	
CAT IV	Three-phase public power unit and outdoor power supply line equipment. Equipment designed to "initial connection", such as power distribution system of power station, power instrument, front-end overload protection, and any outdoor transmission line.	
CE	**Certification**	CE indicates a registered trademark of EU
	**Waste**	Do not place equipment and its accessories in the trash. Items must be properly disposed of in accordance with local

		regulations.
	**EFUP**	This environment-friendly use period (EFUP) mark indicates that dangerous or toxic substances will not leak or cause damage within this indicated time period. The environment-friendly use period of this product is 40 years, during which it can be used safely. Upon expiration of this period, it should enter the recycling system.
Safety Requirements		
Warning		
Preparation before use		Please connect this device to AC power supply with the power cable provided; The AC input voltage of the line reaches the rated value of this device. See the product manual for specific rated value. The line voltage switch of this device matches the line voltage; The line voltage of the line fuse of this device is correct. It is not used to measure the main circuit.
Check all terminal rated values		Please check all rated values and marking instructions on the product to avoid fire and impact of excessive current. Please consult the product manual for detailed rated values before connection.
Use the power cord properly		You can only use the special power cord for the instrument approved by the local and state standards. Please check whether the insulation layer of the cord is damaged or the cord is exposed, and test whether the cord is conductive. If the cord is damaged, please replace it before using the instrument.
Instrument Grounding		To avoid electric shock, the grounding conductor must be connected to the ground. This product is grounded through the grounding conductor of the power supply. Please be sure to ground this product before it is powered on.
AC power supply		Please use the AC power supply specified for this device. Please use the power cord approved by your country and confirm that the insulation layer is not damaged.
Electrostatic prevention		This device may be damaged by static electricity, so it should be tested in the anti-static area if possible. Before the power cable is connected to this device, the internal and external conductors should be grounded briefly to release static electricity. The protection grade of this device is 4 kV for contact discharge and 8 kV for air discharge.
Measurement accessories		Measurement accessories are of lower class, which are definitely

	not applicable to main power supply measurement, CAT II, CAT III or CAT IV circuit measurement. Probe subassemblies and accessories within the range of IEC 61010-031 and current sensor within the range of IEC 61010-2-032 can meet its requirements.
Use the input / output port of this device properly	Please use the input / output ports provided by this device in a properly manner. Do not load any input signal at the output port of this device. Do not load any signal that does not reach the rated value at the input port of this device. The probe or other connection accessories should be effectively grounded to avoid product damage or abnormal function. Please refer to the product manual for the rated value of the input / output port of this device.
Power fuse	Please use power fuse of specified specification. If the fuse needs to be replaced, it must be replaced with another one that meets the specified specifications by the maintenance personnel authorized by UNI-T.
Disassembly and cleaning	There are no components available to operators inside. Do not remove the protective cover. Maintenance must be carried out by qualified personnel.
Service environment	This device should be used indoors in a clean and dry environment with ambient temperature from 0 °C - 40 °C。 Do not use this device in explosive, dusty or humid air.
Do not operate in humid environment	Do not use this device in a humid environment to avoid the risk of internal short circuit or electric shock.
Do not operate in flammable and explosive environment	Do not use this device in a flammable and explosive environment to avoid product damage or personal injury.
Caution	
Abnormality	If this device may be faulty, please contact the authorized maintenance personnel of UNI-T for testing. Any maintenance, adjustment or parts replacement must be done by the relevant personnel of UNI-T.
Cooling	Do not block the ventilation holes at the side and back of this device; Do not allow any external objects to enter this device via ventilation holes; Please ensure adequate ventilation, and leave a gap of at least 15 cm on both sides, front and back of this device.

Safe transportation	Please transport this device safely to prevent it from sliding, which may damage the buttons, knobs or interfaces on the instrument panel.
Proper ventilation	Poor ventilation will cause the device temperature to rise, thus causing damage to this device. Please keep proper ventilation during use, and regularly check the vents and fans.
Keep clean and dry	Please take actions to avoid dust or moisture in the air affecting the performance of this device. Please keep the product surface clean and dry.
Note	
Calibration	The recommended calibration period is one year. Calibration should only be carried out by qualified personnel.

1.1. Environmental Requirements

This instrument is suitable for the following environment.

- Indoor use
- Pollution degree 2
- Overvoltage category: This product should be connected to a power supply that meets Overvoltage Category II. This is a typical requirement for connecting devices via power cords and plugs.
- In operating: altitude lower than 3000 meters; in non-operating: altitude lower than 15000 meters
- Unless otherwise specified, operating temperature is 0 to +40°C; storage temperature is -20 to + 70
- In operating, humidity temperature below to +35°C, ≤90% RH. (Relative humidity); In non-operating, humidity temperature +35°C to +40°C, ≤60% RH. (Relative humidity).

There are ventilation opening on the rear panel and side panel of the instrument. So please keep the air flowing through the vents of the instrument housing. To prevent excessive dust from blocking the vents, please clean the instrument housing regularly. The housing is not waterproof, please disconnect the power supply first and then wipe the housing with a dry cloth or a slightly moistened soft cloth.

1.2. Connecting Power Supply

The specification of input AC power.

Voltage Range	Frequency
100V to 240 VAC (fluctuant: ±10%)	50 Hz/60 Hz
100V to 120 VAC (fluctuant: ±10%)	400 Hz

Please use the attached power lead to connect to the power port.

Connecting to service cable

This instrument is a Class I safety product. The supplied power lead has good performance in terms of case ground. This spectrum analyzer is equipped with a three-prong power cable that meets international safety standards. It provides good case grounding performance for the specification of your country or region.

Please install AC power cable as follow.

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

1.3. Electrostatic Protection

Electrostatic discharge may cause damage to component. Components can be damaged invisibly by electrostatic discharge during transportation, storage and use.

The following measure can reduce the damage of electrostatic discharge.

- Testing in anti-static area as far as possible.
- Before connecting the power cable to the instrument, inner and outer conductors of the instrument should be briefly grounded to discharge static electricity.
- Ensure all the instruments are properly grounded to prevent the accumulation of static.

2. Introduction

This manual is to introduce the safety requirements, installment and the operation of MSO2000X/3000X series mixed signal oscilloscope.

3. 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

4. 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.

4.1. 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

Please check appendix for the list of accessories. If any of the accessories are missing or damaged, please contact UNI-T or 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.

4.2. Before Use

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

(1) Connecting to the Power Supply

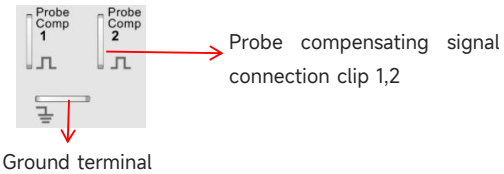
Use the assembled power line or other power line that meets the local country standards to connect the oscilloscope. When the power switch  on the rear panel is not opened, the power soft indicator in the left bottom on the rear panel is extinguished, which indicates this soft switch key is no-effect.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

(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.



Probe Compensating Signal Connection Clip and Ground Terminal

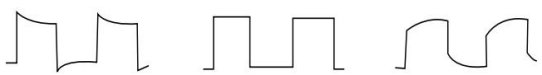
(4) Function Check

Press the Auto key, a square wave (amplitude 3 Vpp, frequency 1 kHz) should appear on the screen. Repeat the step 3 to check all channels.

(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.



Excessive Compensation Correct Compensation Insufficient Compensation

Probe Compensation Calibration

- 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.

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.

4.3. Front Panel

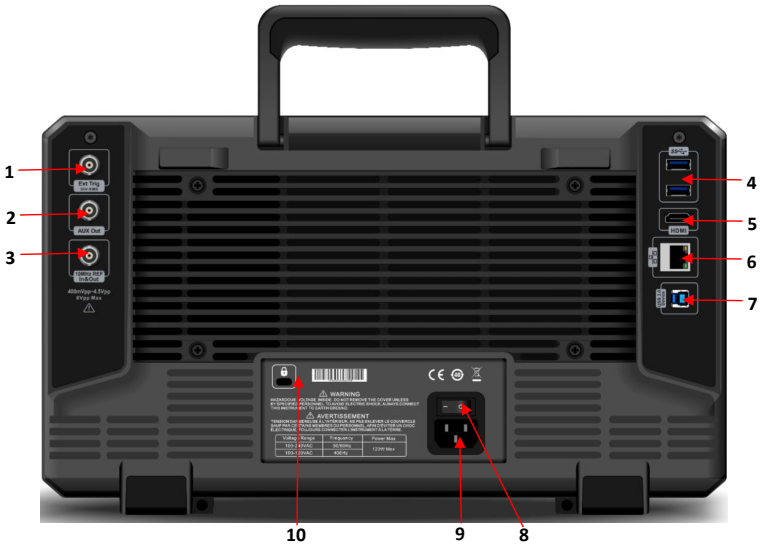
Front Panel

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

4.4. 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

4.5. Operation Panel

(1) Vertical Control

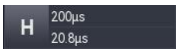
- Ref : Loading the reference waveform from 'local or USB", so the measured waveform can compare with the reference waveform.
- 1 , 2 , 3 , 4 : Analog channel setting key respectively represents CH1, CH2, CH3 and CH4. Four channel's tab are identified by different colors and it also corresponding to 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, I^2C, 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 

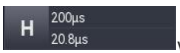
will change in real-time.
The vertical scale is step with1-2-5, press this rotary knob to adjust the vertical scale between coarse tuning and fine tuning.

(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.

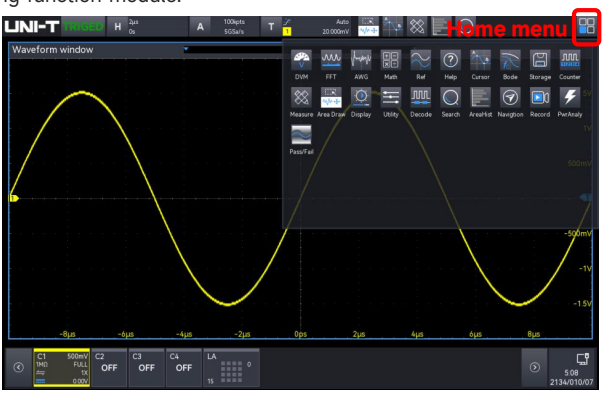
(11) Function Key

- 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, transparence 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.

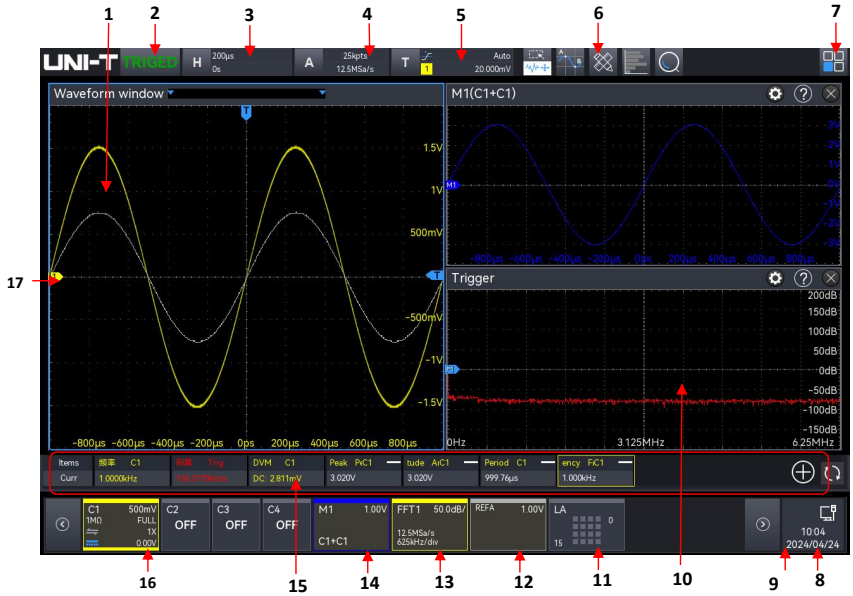
- Utility : Press the Utility key to enter the auxiliary function setting menu, to set the basic information, network, WiFi, frp, socket server, rear panel, USB, self-inspection, auto calibration, About, option and Auto.
- Gen: Press the Gen key to enter the Gen menu, to set Gen output.
- APP: Press 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.



4.6. User Interface



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 storage depth	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		

4.7. Help System

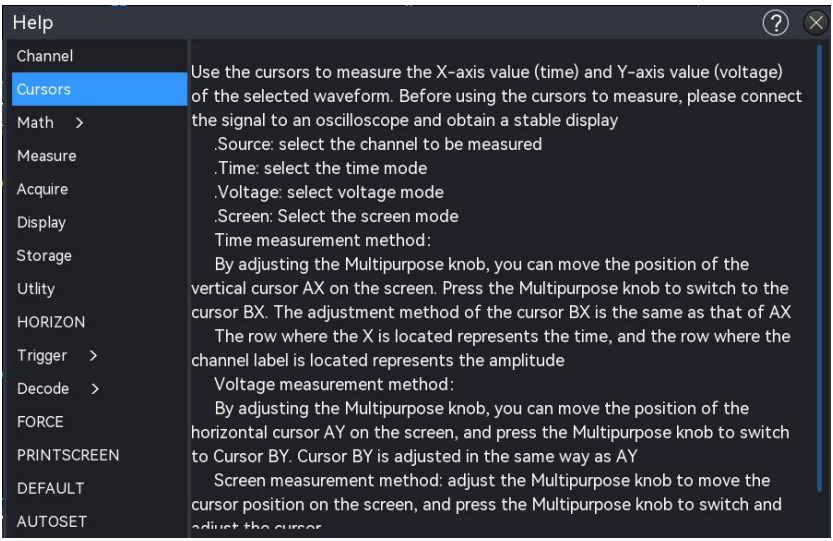
The help system describes the function key (include menu key) on the front panel.

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.



5. 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

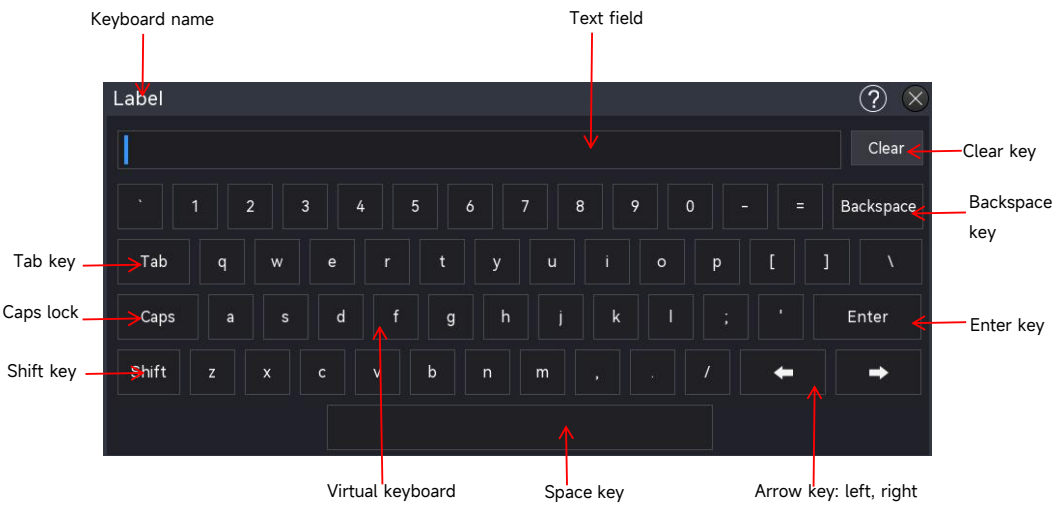
For the parameter of time and voltage, once the parameter is selected, rotating the Multipurpose rotary knob on the front panel to enter the parameter value.

(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. Text field

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

b. Clear key

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

c. Caps key

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

d. Tab key

Press the "Tab" key to enter 2 spaces at a time.

e. Shift key

Press the "Shift" key to switch among number, special character, upper and lower case.

f. 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.

g. Space key

Press the "Space" key to enter one space in the text field.

h. 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

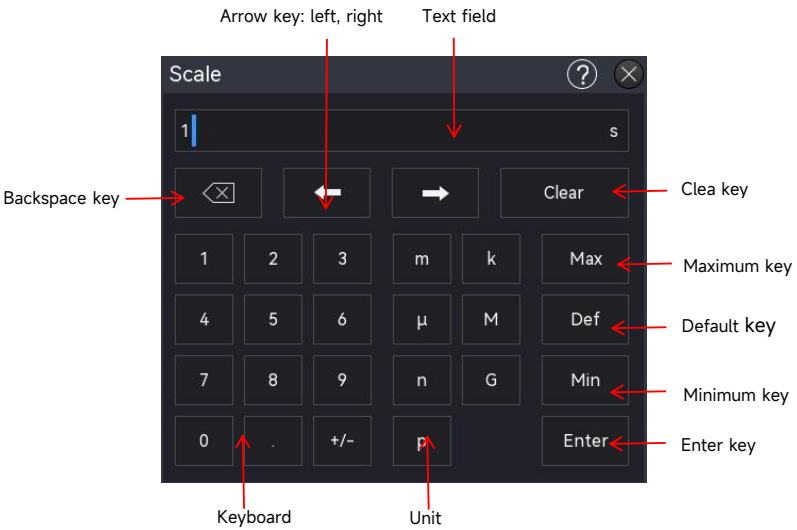
i. Enter key

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 binary, hexadecimal system value

During the decoding trigger, use the numeric keyboard to enter the binary, hexadecimal system value for data and address settings.

Enter method: Tap to select the number or the numeric to be edited in the text field, and then select the numeric or letter in the numeric keyboard to enter.

Once all the numeric value has been entered, press the "Ok" key , the numeric keyboard will automatically switch off, that means the parameter setting is completed. You can also use the numeric keyboard to process the setting as follows.

a. Move the cursor to edit the parameter value
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. Delete the parameter value that has been entered

6. 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.

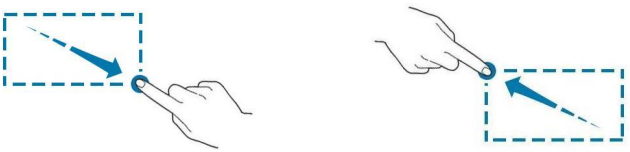
Drag gesture can use for:

- 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.

7. 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".

8. 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.

9. Appendix Contact Us

If the use of this product has caused any inconvenience, if you in mainland China you can contact UNI-T company directly.

Service support: 8am to 5.30pm (UTC+8), Monday to Friday or via email. Our email address is infosh@uni-trend.com.cn

For product support outside mainland China, please contact your local UNI-T distributor or sales center. Many UNI-T products have the option of extending the warranty and calibration period, please contact your local UNI-T dealer or sales center.

To obtain the address list of our service centers, please visit our website at URL: http://www.uni-trend.com

Scan to Download relevant document, software, firmware and more

PN:110401112663X