User Manual

DS100 Mini Digital Oscilloscope User Manual

DS100 Mini Oscilloscope

ALIENTEK

Revision History

Version	Date	Note
V1.0	2021/03/20	First Realse
V1.1	2021/06/16	Add some parameter descriptions
V1.2	2021/06/30	Adapt to version 4.0 firmware
V1.3	2022/04/12	Adapt to version 4.5 firmware
V1.4	2023/07/26	Add FAQ

Notices

1、 This document applies to firmware version V3.7 and hardware version V2.4. Other versions will be slightly different.

2、 Only when the hardware charging indicator light goes off or the charging icon disappears will it be fully charged.

3、 Due to the difference in the size of the MCX pin of the alligator clip and the oscilloscope probe (the inner pin of the alligator clip is larger), please do not attach the alligator clip to the CHA/CHB for use. The alligator clip is only used at the OUT channel (waveform output), so as to avoid the use of the alligator clip with the large MCX hole of the oscilloscope analog channel, resulting in poor contact of the oscilloscope probe.

4、 Please refer to the section on vertical systems to enable channel B.

5、 The four keys of the oscilloscope are fragile. In order to avoid damage (collapse), please press them as gently as possible and avoid pressing them vigorously.

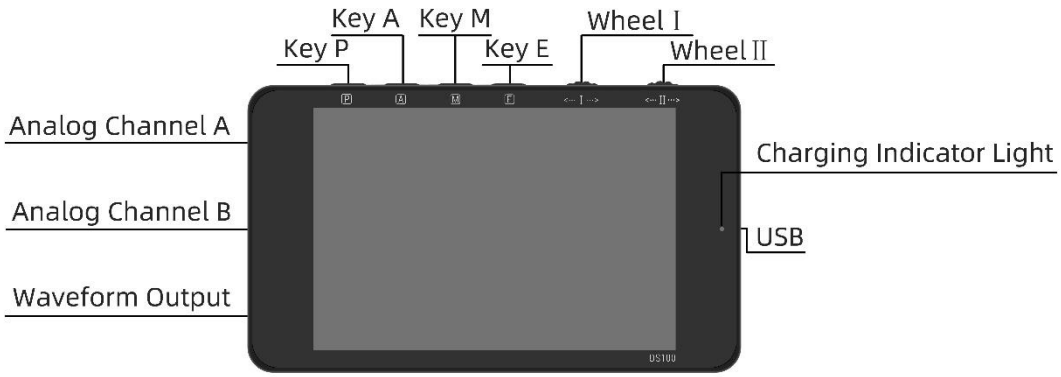
6、 When the contact between the oscilloscope probe and the oscilloscope is loose/bad, you can use fingernail/forceps to push the 6 reeds of the outer ring of the probe MCX seat slightly out (do not dial too much, otherwise it can not be inserted) to increase the contact pressure and restore the contact well.

Main Features

Model	DS100	Coupling	AC/DC
Channel	2	Auto Set	Support
Screen	3.5-inch IPS	Quick Center	Support
Resolution	480*320	Save Waveform	bmp or csv
Analog Bandwidth	50M	Max. Waveform Capture Rate	500 wfms/s
Sample Rate	250MSa/S	Auto Measurement	20
Channel Isolation	>40dB	Measurement Accuracy	±2%
Rise Time	<7ns	Frequency Accuracy	±1‰
Memory Depth	128Kpts	Waveform Generator	Square/Sine/Triangle/Sawtooth
Input Impedance	1MΩ	Waveform Frequency	Sine/Triangle/ Sawtooth 1Hz~50KHz@3V Vp-p Square 1Hz~10MHz@3V Vp-p
Time Scale	8ns~50s	Firmware Upgrade	Support
Vertical Scale	10mV/div~100V/div	Language	Simplified Chinese/ Traditional Chinese/ English
Maximum Measurement Voltage Range	±40V（@X1） ±400V（@X10） ±4kV（@X100） ±40kV（@X1000）	Interface	MCX（Probe） USB（ Charging and Communication ）
Sweep Mode	Auto/Normal/Single	Battery Life	≈7h
Trigger Type	Rising/Falling	Charging Time	≈3h（USB）
Timebase Mode	YT/XY/ROLL	Net Weight	109g
Persistence	Min/1 sec/Infinite	Dimensions	100mm*58mm*15mm

1，Quick Start

1.1，Appearance



1.2，Key Function

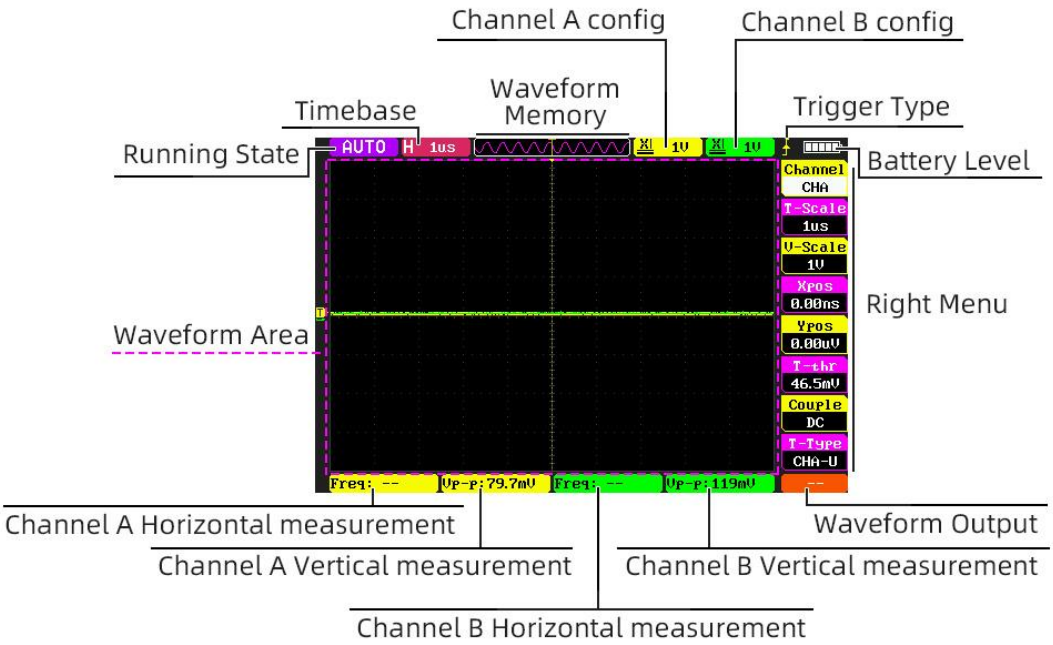
Key P: Long press, Power on/off; Short press, Pause/Run
Key A: Auto set
Key M: Menu/Confirm
Key E: Exit/Quick Center /Double click to switch channels
Wheel Ⅰ: Select the item
Wheel Ⅱ: Set the item

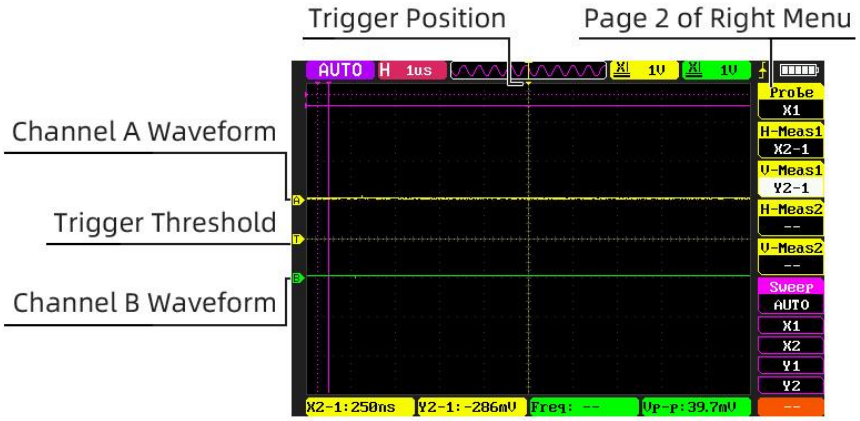
Shortcut Key:
1、Key M + Key E: Printscreen (The USB status UI is invalid)
2、Press key M + Wheel Ⅰ: Adjust the horizontal position
3、Press key M + Wheel Ⅱ: Adjust the vertical position
4、Press key E + Wheel Ⅰ: Adjust the timebase
5、Press key E + Wheel Ⅱ: Adjust the vertical scale

1.3，UI

1.3.1，Main UI

The yellow items correspond to channel A and the green items correspond to channel B.
The Main UI is illustrated in the following two figures:





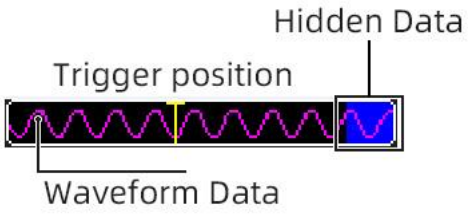
1.3.2，Waveform Memory

Illustrated in the following figure:

（1） The wavy line indicates the length of the sampled data.

（2） The wavy lines covered in blue represent data that is not displayed in the UI.

（3） The T-shaped icon indicates the trigger position.



1.4，Functional Inspection

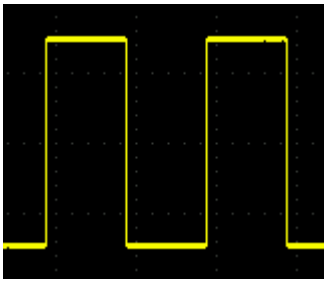
1、 Connect the probe to the alligator clip, and then connect the probe to the analog channel (CHA or CHB), and the alligator clip is connected to the output interface of waveform generator.

2、 Set the probe to X10, note that this is the X10 and X1 selector switch on the probe, not the oscilloscope probe ratio setting.

3、 Set the output waveform in the oscilloscope, the peak-to-peak value is 3.0V, the type is square wave, and the frequency is 1kHz. Refer to the section " Waveform Generator" for setting.

4、 Press the key A of the oscilloscope and the input waveform will be automatically display properly.

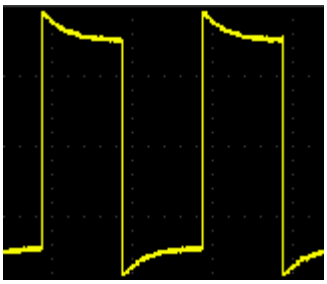
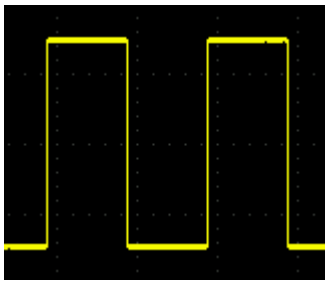
5、 Observe the waveform on the display screen of the oscilloscope, normally as shown in the figure below.



1.5，Probe Compensation

When the probe is used for the first time, if the probe can compensate (such as P6100), you should compensate the probes to make them match the input channels of the oscilloscope.

1、Perform the steps in the previous section, and the waveform obtained is compared with the below.


Over compensated Perfectly compensated Under compensated

2、Adjust the compensation place until the displayed waveform "Perfectly compensated" as shown above.

2，Vertical System

DS100 provides two analog input channels (CHA and CHB), and each channel is equipped with an independent vertical control system. The setting methods for the vertical systems of the two channels are the same. This chapter takes CHA as an example to introduce the setting method for the vertical system. For this oscilloscope, only CHA is enabled by default.

2.1，To Enable or Disable the Analog Channel

2.1.1，Enable the analog channel

Refer to the next section to open analog channels by setting the coupling mode to DC or AC.
After opening the channel, the channel label on the upper-right will display the vertical scale, as shown in the figure below:

2.1.2，Disable the analog channel

Refer to the next section. Setting the coupling mode to '--' to close the analog channel.
After the channel is closed, the channel label on the upper-right will not show the vertical scale, as shown in the figure below:

2.2，Channel Coupling

Descriptions are shown in the following table:

Coupling Mode	Note
DC	The DC and AC components of the signal under test can both pass the channel.
AC	The DC components of the signal under test are blocked
--	Channel is closed

The channel label on the top-right is displayed, as shown in the figure below:

DC

AC

--

Modification steps:

1、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll the wheel Ⅱ to select "CHA"(or "CHB").
2、Scroll the wheel Ⅰ to select the "Couple" option on the right side of the menu bar, then scroll the wheel Ⅱ to select coupling mode.

2.3，Probe Ratio

DS100 allows you to set the probe ratio manually. To obtain the correct measurement results, you must set the probe ratio properly. By default, the probe ratio is X1.

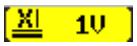
Modification steps:
1、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "CHA".
2、Scroll the wheel Ⅰ to select the "Probe" option on the right (page 2) side of the menu bar, and then scroll the wheel Ⅱ to select the ratio of the probe.

Probe ratio as shown in the table below:

probe	display amplitude of the signal: actual amplitude of the signal
X0.1	0.1:1
X0.2	0.2:1
X0.5	0.5:1
X1（default）	1:1
X2	2:1
X5	5:1
X10	10:1
X20	20:1
X50	50:1
X100	100:1
X200	200:1
X500	500:1
X1000	1000:1

2.4，Vertical Scale

Vertical scale indicates the voltage value per grid in the vertical axis of the screen. It is often expressed in V/div. While you adjust the vertical scale, the display amplitude of the waveform would enlarge or reduce. At the same time, the information of the label on the upper-right of the screen will also change in real time, as shown in the figure below:



The adjustable range of the vertical scale is related to the currently set probe ratio. By default, the probe ratio is X1. The adjustable range of the vertical scale is from 10mV/div to 10 V/div.

Modification steps:
1、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "CHA" item.
2、Scroll the wheel Ⅰ to select the "V-scale" option on the right side of the menu bar, and then scroll the wheel Ⅱ to select the vertical scale.

2.5，Vertical Offset

Vertical offset indicates the offset of the signal ground level position of the waveform from the screen center in the vertical direction. When adjusting the vertical offset, the waveforms of the corresponding channel move up and down.

Modification steps:
2、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll the wheel Ⅱ to select "CHA".
3、Scroll the wheel Ⅰ to select the "Ypos" option on the right side of the menu bar, and then scroll the wheel Ⅱ to change the vertical offset.

2.6，Amplitude Unit

Select the amplitude display unit for the current channel. The available units are W, A, and V. When the unit is changed, the unit related to the relevant functions of the channel will change accordingly.

Modification steps:
1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the "Unit" option.
3、Press the key M to pop up the settings of channel amplitude unit.
4、Scroll the wheel Ⅰ to select the item of CHA channel.
5、Scroll the wheel Ⅱ to modify the settings of channel amplitude unit.
6、Press the key E to exit the settings of channel amplitude unit, then key E to exit the pop-up menu.

2.7，Invert

When inverting is turned on, the voltage of the waveform is inverted.

Modification steps:

1、Press the key M to pop up the menu.

2、Scroll the wheel Ⅰ to select the " Invert " option.

3、Press the key M to pop up the settings of channel amplitude unit.

4、Scroll the wheel Ⅰ to select the item of CHA channel.

5、Scroll the wheel Ⅱ to modify the settings of Invert of the channel.

6、Press the key E to exit the settings of channel amplitude unit, then key E to exit the pop-up menu.

3，Horizontal System

3.1，Horizontal Timebase

Horizontal timebase, also called the horizontal scale, refers to the time of each grid in the horizontal direction of the screen. It is usually expressed in s/div. The label on the upper-left of the screen will display the timebase in real time, as shown in the figure below:

Modification step: scroll the wheel Ⅰ to select the "T-Scale" option on the right side of the menu bar, and then scroll the wheel Ⅱ to select the timebase.

3.2，Horizontal Position

Horizontal position, also called trigger position, refers to the trigger point position of the waveforms of all channels in the horizontal direction relative to the screen center. When the waveform trigger point is at the right (left) side of the screen center, the horizontal position is a positive (negative) value.
Modify step: scroll the wheel Ⅰ to select the "Xpos" option on the right side of the menu bar, and then scroll the wheel Ⅱ to change the horizontal position.

4，Sample System

4.1，Timebase Mode

DS100 supports three available timebase modes, as shown in the table below.

Timebase Mode	Note
YT mode	In this mode, the Y axis represents voltage, and the X axis represents time. (Timebase range is 1s to 8ns)
XY mode	In this mode, both the X axis and the Y axis represent the voltage. The mode changes the display from voltage-time display mode to voltage-voltage display. (Timebase range is 100ms to 8ns)
ROLL mode	In this mode, the waveform scrolls from right to left to update the display,and the trigger function is invalid. (Timebase range is 50s to 200ms)

Modification steps:

1、Press the key M to pop up the menu.

2、Scroll the wheel Ⅰ to select the "Timebase" option.

3、Press the key M to pop up the item of timebase mode.

4、Scroll the wheel Ⅱ to select the timebase mode.

5、Press the key E to exit the settings of timebase mode, then key E to exit the pop-up menu.

4.2，Sampling Mode

DS100 only supports the real-time sampling mode. In this mode, the oscilloscope produces the waveform display from samples collected during one trigger event.

4.3，Sample Rate And Memory Depth

Sampling is the process of converting the analog signal into the digital signal at a specified time interval and then restoring them in sequence. The sample rate is the reciprocal of the time interval.

The maximum real-time sample rate in the single-channel mode of DS100 is 250MSa/s. This rate requires settings to enable.
Modification steps:
1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the "Max Speed" option.
3、Press the key M to pop up the item of maximum real-time sample rate.
4、Scroll the wheel Ⅱ to modify the settings of maximum real-time sample rate.
5、Press the key E to exit the settings of maximum real-time sample rate, then key E to exit the pop-up menu.

Memory depth refers to the number of points of the oscilloscope that can store in one trigger acquisition. It reflects the storage capability of the acquisition storage. This oscilloscope is equipped with memory depth of up to 128Kpts. The relationship between timebase, sampling rate and memory depth is as follows.

Note: The sampling rate and memory depth of dual channel are halved compared with single channel of the same timebase.

The situation in AUTO trigger mode of YT mode of single channel is shown in the table below:

Timebase	Sampling Rate	Memory Depth
8ns	250MSa/S	20pts
10ns	200MSa/S	20pts
16ns	250MSa/S	40pts

20ns	200MSa/S	40pts
40ns	250MSa/S	100pts
50ns	200MSa/S	100pts
80ns	250MSa/S	200pts
100ns	200MSa/S	200pts
160ns	250MSa/S	400pts
200ns	200MSa/S	400pts
500ns	200MSa/S	1Kpts
1us	200MSa/S	2Kpts
2us	200MSa/S	4Kpts
5us	200MSa/S	10Kpts
10us	200MSa/S	20Kpts
20us	200MSa/S	40Kpts
50us	200MSa/S	100Kpts
100us	100MSa/S	100Kpts
200us	50MSa/S	100Kpts
500us	20MSa/S	100Kpts
1ms	10MSa/S	100Kpts
2ms	5MSa/S	100Kpts
5ms	2MSa/S	100Kpts
10ms	1MSa/S	100Kpts
20ms	500KSa/S	100Kpts
50ms	200KSa/S	100Kpts
100ms	100KSa/S	100Kpts
200ms	50KSa/S	100Kpts
500ms	20KSa/S	100Kpts
1s	10KSa/S	100Kpts

The situation in NORMAL trigger mode of YT mode of single channel is shown in the table below:

Timebase	Sampling Rate	Memory Depth
8ns	250MSa/S	20pts
10ns	200MSa/S	20pts
16ns	250MSa/S	40pts
20ns	200MSa/S	40pts
40ns	250MSa/S	100pts
50ns	200MSa/S	100pts
80ns	250MSa/S	200pts
100ns	200MSa/S	200pts
160ns	250MSa/S	400pts
200ns	200MSa/S	400pts

500ns	200MSa/S	1Kpts
1us	200MSa/S	2Kpts
2us	200MSa/S	4Kpts
5us	200MSa/S	10Kpts
10us	200MSa/S	20Kpts
20us	200MSa/S	40Kpts
50us	100MSa/S	50Kpts
100us	50MSa/S	50Kpts
200us	25MSa/S	50Kpts
500us	10MSa/S	50Kpts
1ms	5MSa/S	50Kpts
2ms	2.5MSa/S	50Kpts
5ms	1MSa/S	50Kpts
10ms	500KSa/S	50Kpts
20ms	250KSa/S	50Kpts
50ms	100KSa/S	50Kpts
100ms	50KSa/S	50Kpts
200ms	25KSa/S	50Kpts
500ms	10KSa/S	50Kpts
1s	5KSa/S	50Kpts

The situation in SINGLE trigger mode of YT mode of single channel is described as below:
Sampling rate is the same as AUTO trigger mode. The memory depth is 128Kpts without FFT enabled. When FFT is enabled, it is 112Kpts.

The situation in ROLL mode of single channel is described as below:
The memory depth is 128Kpts without FFT enabled. When FFT is enabled, it is 112Kpts.
In timebase range is 200ms to 1s, sampling rate is the same as in the AUTO trigger mode in YT mode.
The situation in timebase range is 2s to 50s, is shown in the table below:

Timebase	Sampling Rate
2s	5KSa/S
5s	2KSa/S
10s	1KSa/S
20s	500Sa/S
50s	200Sa/S

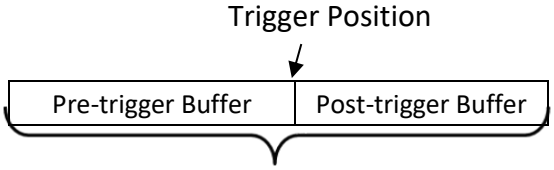
The situation in XY mode is the same as YT mode.

5，Trigger System

As for trigger, you set certain trigger condition according to the requirement and when a waveform in the waveform stream meets this condition, the oscilloscope captures this waveform as well as the neighboring part, and displays them on the screen. For the digital oscilloscope, it samples waveform continuously no matter whether it is stably triggered, but only stable trigger can be stably displayed. The trigger system ensures that every timebase sweep or acquisition starts from the user-defined trigger condition, namely every sweep is synchronous with the acquisition and the waveforms acquired is overlapped so as to display the stable waveforms

5.1，Trigger Mode

The following figure is the schematic diagram of the acquisition memory. In order to easily understand the trigger event, we classify the acquisition memory into the pre-trigger buffer and post-trigger buffer.



Acquisition Memory

After sampling begins, the oscilloscope will first fill the pre-trigger buffer. After filling, the oscilloscope will start the search trigger, and during the search, the sampled data will continue to be transferred to the pre-trigger buffer (new data will constantly overwrite existing data). When a trigger is found, the pre-trigger store will contain the sampled data before the trigger. The oscilloscope will then fill the post-trigger buffer and display the data from the acquisition memory.

The trigger mode of DS100 is described in the following table:

Trigger Mode	Note
AUTO	In this trigger mode, if the specified trigger condition is not found within a certain period of time, the oscilloscope will force triggering and collecting to display the waveform.
NORMAL	In this trigger mode, the oscilloscope will trigger and collect once only when the specified trigger condition is found.
SINGLE	In this trigger mode, the oscilloscope will trigger and collect once only when the specified trigger condition is found. And then stop sampling.

Modification steps: Scroll the wheel Ⅰ to select the "Sweep" option on the right side of the menu bar(page 2), and then scroll the wheel Ⅱ to select the trigger mode.

5.2，Trigger Type

The trigger type of DS100 is described in the following table:

Trigger Type	Note
CHA-U	The rising edge of channel A trigger
CHA-D	The falling edge of channel A trigger
CHB-U	The rising edge of channel B trigger
CHB-D	The falling edge of channel B trigger

Modification steps: Scroll the wheel Ⅰ to select the "T-type" option on the right side of the menu bar, and then scroll the wheel Ⅱ to select the trigger type.

5.3，Trigger Threshold

The adjustment of the trigger threshold is related to the type of the trigger source.

Modification steps: Scroll the wheel Ⅰ to select the "T-thr" option on the right side of the menu bar, and then scroll the wheel Ⅱ to change the trigger threshold.

6，Operations and Measurements

DS100 can perform math operations, auto measurements, and cursor measurements on sampled and displayed data.

6.1，Measurements Setting

1、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll the wheel Ⅱ to select "CHA" or "CHB".
2、Scroll the wheel Ⅰ to select the "H-Meas1" option on the right side of the menu bar(page 2), and then scroll the wheel Ⅱ to select the measurement.

The other three measurements can set in the same way.

6.2，Measurement Parameter

Note: Only the signal displayed on the screen is calculated, not the total memory depth.

Horizontal measurement parameters are described in the table below:

Parameter	Note
Freq	Frequency
Cycl	Cycle（1/Freq）
+Duty	Positive duty cycle (average positive duty cycle for all periods)
+Wid	Positive pulse width (average of positive pulse width for all cycles)
+Pul	Positive pulse count
-Duty	Negative duty cycle (average of negative duty cycle for all periods)
-Wid	Negative pulse width (average of negative pulse width for all cycles)
-Pul	Negative pulse count
X2-1	The time of cursor X2 minus cursor X1
Xf	The frequency between cursor X2 and cursor X1

Vertical measurement parameters are described as follows:

Parameter	Note
Vavg	Average value
Vrms	Root-mean-square value
Vcrm	Root-mean-square value of period (point less than one cycle, not calculated)
Vmax	Maximum value
Vmin	Minimum value
Vp-p	Peak-to-peak value(Vmax – Vmin)
Vtop	Top value(The value with the highest probability between (Vmax – 0.3*Vp-p) to Vmax)

Vbas	Base value(The value with the highest probability between Vmin to (Vmin + 0.3*Vp-p))
Vamp	Amplitude value(Vtop – Vbas)
Y2-1	The value of cursor Y2 minus cursor Y1

6.3，Cursor Measurement

Cursor measurement can measure the X-axis values (e.g Time) and Y-axis values (e.g. Voltage) of the selected waveform.

6.3.1，X Cursor

X cursor is a vertical solid/dotted line that is used to make horizontal adjustments.
Modification steps:

1、Scroll the wheel Ⅰ to select the "H-Meas1" or "H-Meas2" option on the right side of the menu bar(page 2), and then scroll the wheel Ⅱ to select the "X2-1" item.

2、Scroll the wheel Ⅰ to select the "X1" or "X2" option on the right side of the menu bar(page 2), and then scroll the wheel Ⅱ to change the position.

6.3.2，Y Cursor

Y cursor is a horizontal solid/dotted line that is used to make vertical adjustment.
Modification steps:

1、Scroll the wheel Ⅰ to select the "V-Meas1" or "V-Meas2" option on the right side of the menu bar(page 2), and then scroll the wheel Ⅱ to select the "Y2-1" item.

2、Scroll the wheel Ⅰ to select the "Y1" or "Y2" option on the right side of the menu bar(page 2), and then scroll the wheel Ⅱ to change the position.

6.4，Math Operation

DS100 oscilloscope supports 6 operations, which are described as follows:

Operation	Note
--	Turn off
A+B	Addition
A-B	Subtraction
AxB	Multiplication
A/B	Division
Abs	Calculate the absolute value

FFT	Fast Fourier Transform

6.4.1，Addition

Adds the waveform voltage values of signal channel A and B point by point and displays the results.
The setup steps are as follows:
1、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "Math" item.
2、Scroll the wheel Ⅰ to select the "OP" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "A+B" item.
3、Scroll the wheel Ⅰ to select the "Scale" option on the right side of the menu bar, then scroll wheel Ⅱ to select the suitable vertical scale.
4、Scroll the wheel Ⅰ to select the "Offset" option on the right side of the menu bar, then scroll wheel Ⅱ to set the suitable vertical offset.

6.4.2，Subtraction

The waveforms of channel A minus B point by point and the results are displayed.
The setup steps refer to addition operations.

6.4.3，Multiplication

Multiply the waveforms of channel A and B point by point and display the results.
The setup steps refer to addition operations.

6.4.4，Division

The waveforms of channel A divided by B point by point and display the results.
The setup steps refer to addition operations.

6.4.5，Abs

Calculates the absolute value of the selected source and displays the results.
The setup steps are as follows:
1、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "Math" item.
2、Scroll the wheel Ⅰ to select the "OP" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "Abs" item.
3、Scroll the wheel Ⅰ to select the "Source" option on the right side of the menu bar, then scroll wheel Ⅱ to select the source.

4、Scroll the wheel Ⅰ to select the "Scale" option on the right side of the menu bar, then scroll wheel Ⅱ to select the suitable vertical scale.
5、Scroll the wheel Ⅰ to select the "Offset" option on the right side of the menu bar, then scroll wheel Ⅱ to set the suitable vertical offset.

6.4.6，FFT

FFT (Fast Fourier Transform) is used to transform time-domain signals to frequency-domain components (frequency spectrum). FFT counts up to 1000 points. When less than 1000 points, the missing part is zeroed. The logarithm calculation formula is 20lg(VRMS), that is, calculate the logarithm base 10 of the Root-mean-square value of the corresponding frequency point, and then multiply by 20.

The setup steps are as follows:
1、Scroll the wheel Ⅰ to select the "Channel" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "Math" item.
2、Scroll the wheel Ⅰ to select the "OP" option on the right side of the menu bar, then scroll wheel Ⅱ to select the "FFT" item.
3、Scroll the wheel Ⅰ to select the "Source" option on the right side of the menu bar, then scroll wheel Ⅱ to select the source.
4、Scroll the wheel Ⅰ to select the "Center" option on the right side of the menu bar, then scroll wheel Ⅱ to set the suitable center frequency.
5、Scroll the wheel Ⅰ to select the "Hz/Div" option on the right side of the menu bar, then scroll wheel Ⅱ to select the suitable horizontal Scale.
6、Scroll the wheel Ⅰ to select the "Scale" option on the right side of the menu bar, then scroll wheel Ⅱ to select the suitable vertical Scale.
7、Scroll the wheel Ⅰ to select the "Offset" option on the right side of the menu bar, then scroll wheel Ⅱ to set the suitable vertical offset.
8、Scroll the wheel Ⅰ to select the "Unit" option on the right side of the menu bar, then scroll wheel Ⅱ to select the suitable unit.
9、Scroll the wheel Ⅰ to select the "Window" option on the right side of the menu bar(page 2), and then scroll the wheel Ⅱ to select the window function.

7，Waveform storage

DS100 oscilloscope configuration has 16M flash, support to save the collected waveform, you can choose to save “bmp” format or “csv” format. When you save the waveform in “csv” format, you need to pause sampling first. Refer to the section "Connect your computer with USB" to connect your computer to view the saved waveform file.

Steps：

1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the "Save Wave" option.
3、Press the key M to pop up the item.
4、Scroll the wheel Ⅰ to select the format of file.
5、Scroll the wheel Ⅱ to select the name of file.
6、Press the key M to save waveform(“csv” format stores 128K data, it takes about 25 seconds).
7、Press the key E to exit the pop-up menu.

8，Waveform Generator

The DS100 oscilloscope has a built-in waveform generator. The output signal has a DC offset of the half of the peak-to-peak value. Note that in the USB UI cannot output signal.
Wave Shape: Sine, Square, Sawtooth, Triangle.
Frequency: Minimum 1Hz, maximum 50 kHz. Square wave also supports 100K, 200K, 500K, 1M, 2M, 5M and 10M frequency points.
Duty: When the square wave is less than or equal to 50kHz, the duty cycle can be set.
Peak-to-peak value: When the frequency is less than or equal to 50kHz, peak-to-peak value setting is supported.

Modification steps:
1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the "Waveform" option.
3、Press the key M to pop up the item.
4、Scroll the wheel Ⅰ to select the shape(frequency,Duty,Vpp).
5、Scroll the wheel Ⅱ to change the item.
6、Press the key E to exit the settings of waveform mode, then key E to exit the pop-up menu.

9，System Utility

9.1，Persistence Time

Persistence is a dimmer way to show the waveforms that have disappeared. It can be set only in YT mode.

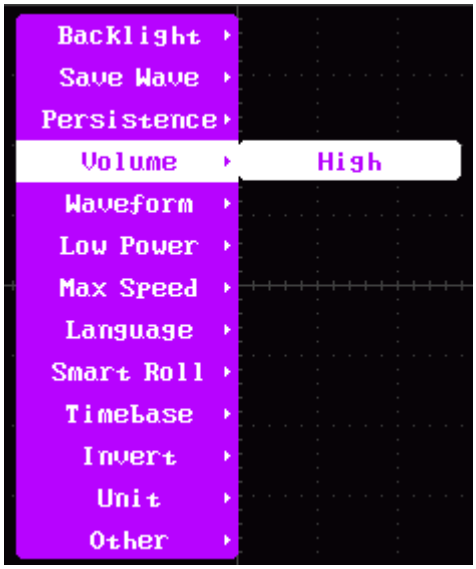
Modification steps:

1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the " Persistence " option.
3、Press the key M to pop up the item of persistence.
4、Scroll the wheel Ⅰ to select the option you want to change.
5、Scroll the wheel Ⅱ to change the option.
6、Press the key E to exit the settings of persistence, then key E to exit the pop-up menu.

9.2，Key Volume

Modification steps:

1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the " Volume " option.
3、Press the key M to pop up the item of volume.
4、Scroll the wheel Ⅱ to change the option.
5、Press the key E to exit the settings of volume, then key E to exit the pop-up menu.



9.3，Language

DS100 supports simplified Chinese, traditional Chinese and English.

Modification steps:

1、Press the key M to pop up the menu.

2、Scroll the wheel Ⅰ to select the "Language " option.

3、Press the key M to pop up the item of language.

4、Scroll the wheel Ⅱ to change the option.

5、Press the key E to exit the settings of language, then key E to exit the pop-up menu.

9.4，Backlight

DS100 supports backlight Settings.

Modification steps:

1、Press the key M to pop up the menu.

2、Scroll the wheel Ⅰ to select the "Backlight " option.

3、Press the key M to pop up the item of language.

4、Scroll the wheel Ⅱ to change the option.

5、Press the key E to exit the settings of backlight, then key E to exit the pop-up menu.

9.5，Low Power

When the DS100 enter the idle state (no any operation), and maintain a period of time. The DS100 will either lower the backlight or power off.

Modification steps:

1、Press the key M to pop up the menu.

2、Scroll the wheel Ⅰ to select the "Low Power " option.

3、Press the key M to pop up the item of low-power

4、Scroll the wheel Ⅰ to select the "Half " or “Shut” option.

5、Scroll the wheel Ⅱ to change the option.

6、Press the key E to exit the settings of low-power, then key E to exit the pop-up menu.

9.6，Zero Calibration

DS100 supports zero-calibration when the analog channel zeros are offset.

Steps:

1、Unplug the USB cable and the probes of channel A and channel B

2、Press the key M to pop up the menu.

3、Scroll the wheel Ⅰ to select the "Other" option.

4、Press the key M to pop up the items of “Other”.

5、Scroll the wheel Ⅰ to select the " Calibration "option.

6、Press the key M to enter the UI of confirmation.

7、Press the key M to calibrate.

9.7，Smart Roll

When the timebase is greater than or equal to 200ms, it can be automatically converted from YT mode to Roll mode. On the contrary, it is converted from ROLL to YT.

Modification steps:

1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the "Smart Roll" option.
3、Press the key M to pop up the item of "Smart Roll".
4、Scroll the wheel Ⅱ to change the option.
5、Press the key E to exit the settings of "Smart Roll", then key E to exit the pop-up menu.

9.8，Connect to your computer via USB

DS100 can connect to your computer via USB. But you must first enter USB mode.

Steps:

1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the "Other" option.
3、Press the key M to pop up the items of “Other”.

4、Scroll the wheel Ⅰ to select the "USB"option.

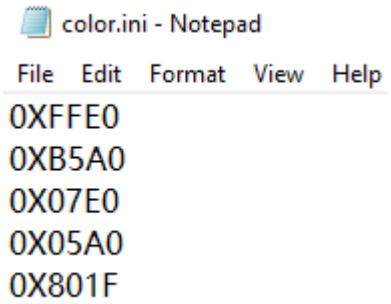
5、Press the key M to enter the UI of USB(Note that this UI does not support M+E shortcut screenshots).

6、Press the key E to exit the UI of USB.

9.9，Custom channel colors

DS100 supports custom colors of analog channel and the math operation.

Steps:
In the root directory of the U disk, place a “color. ini” (refer to the user manual “color. ini”) . The file content is as follow:



File content description:
Line 1 is the color of channel A.

Line 2 is the persistence (showing the vanished waveform in A dimmer color) color of channel A.
Line 3 is the color of channel B.
Line 4 is the persistence (showing the vanished waveform in A dimmer color) color of channel B.
Line 5 is the color of math operation.

Colors are expressed in the hexadecimal numbers of RGB565 (the high 5 bits are the red component, the middle 6 bits are the green component, and the low 5 bits are the blue component).

9.10，Factory Reset

DS100 supports resetting. This function will reset all parameters (language setting remain) and **delete all files on the USB disk**.

Steps:
1、Press the key M to pop up the menu.
2、Scroll the wheel Ⅰ to select the "Other" option.
3、Press the key M to pop up the items of “Other”.
4、Scroll the wheel Ⅰ to select the "Resetting "option.

5、Press the key M to enter UI of confirmation.

6、Press the key M to reset.

9.11，System Information

Steps:

1、Press the key M to pop up the menu.

2、Scroll the wheel Ⅰ to select the "Other" option.

3、Press the key M to pop up the items of "Other".

4、Scroll the wheel Ⅰ to select the "About" option.

5、Press the key M to enter the UI of system information.

9.12，Firmware Update

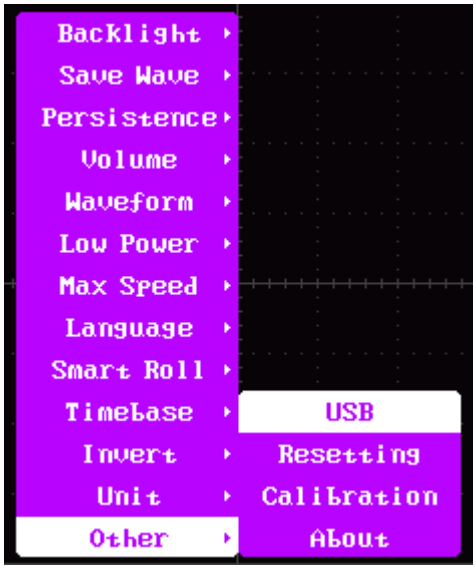
9.12.1，Method 1

1、Press the key M to pop up the menu.

2、Scroll the wheel Ⅰ to select the "Other" option.

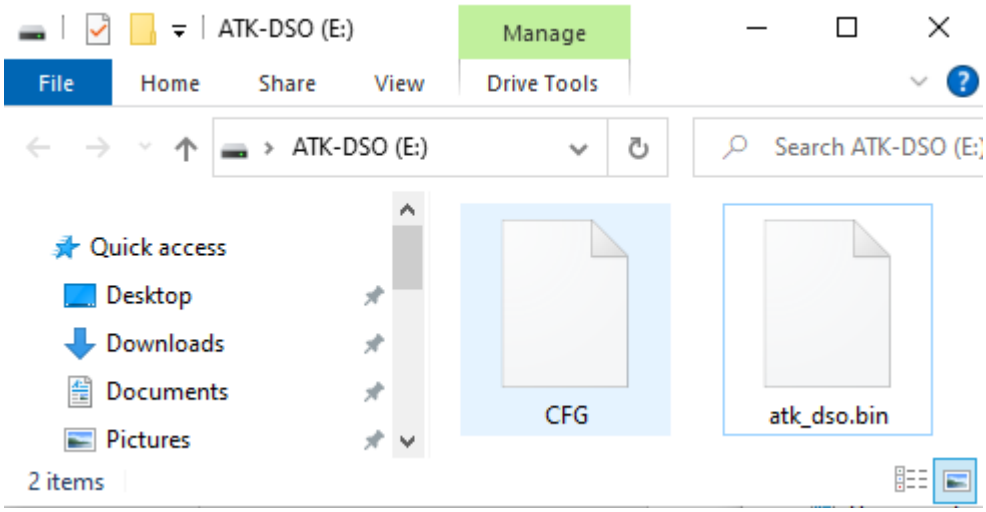
3、Press the key M to pop up the items of "Other".

4、Scroll the wheel Ⅰ to select the "USB" option.



5、Press the key M to enter the UI of USB.

6、Connect the computer through the USB cable, the computer will appear a removable U disk, then copy the firmware to the U disk and rename it to "atk_dso.bin" or "atk_dso" (if the extension is hidden).The results are shown below:

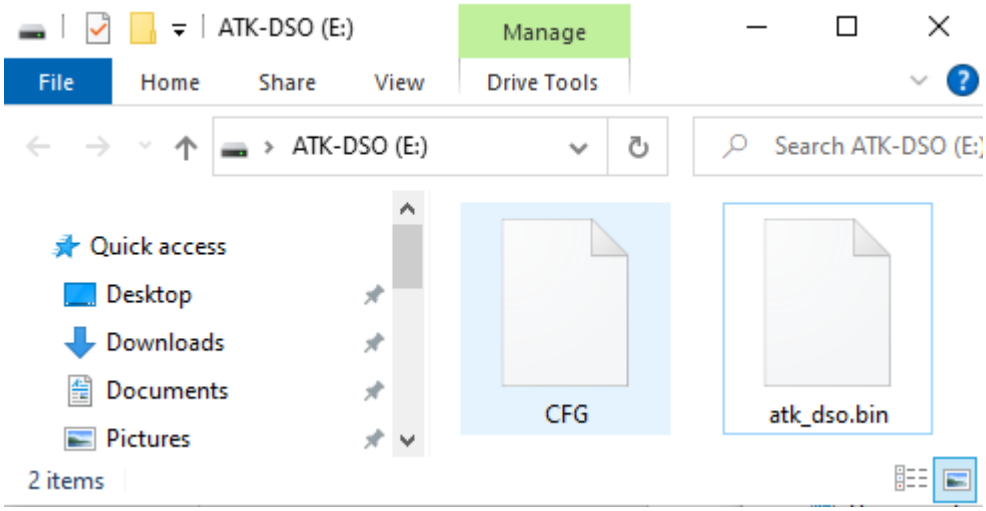


7、Remove the U dsik and restart the oscilloscope.

9.12.2，Method 2

1、In the shutdown state, hold down key A first, and then long press key P, DS100 will enter the update mode.

2、Connect the computer through the USB cable, the computer will appear a removable U disk, then copy the firmware to the U disk and rename it to "atk_dso.bin" or "atk_dso"(if the extension is hidden).The results are shown below:



3、Remove the U disk and press the key M to update the firmware.

10，FAQ

10.1，How do I close or open channels.

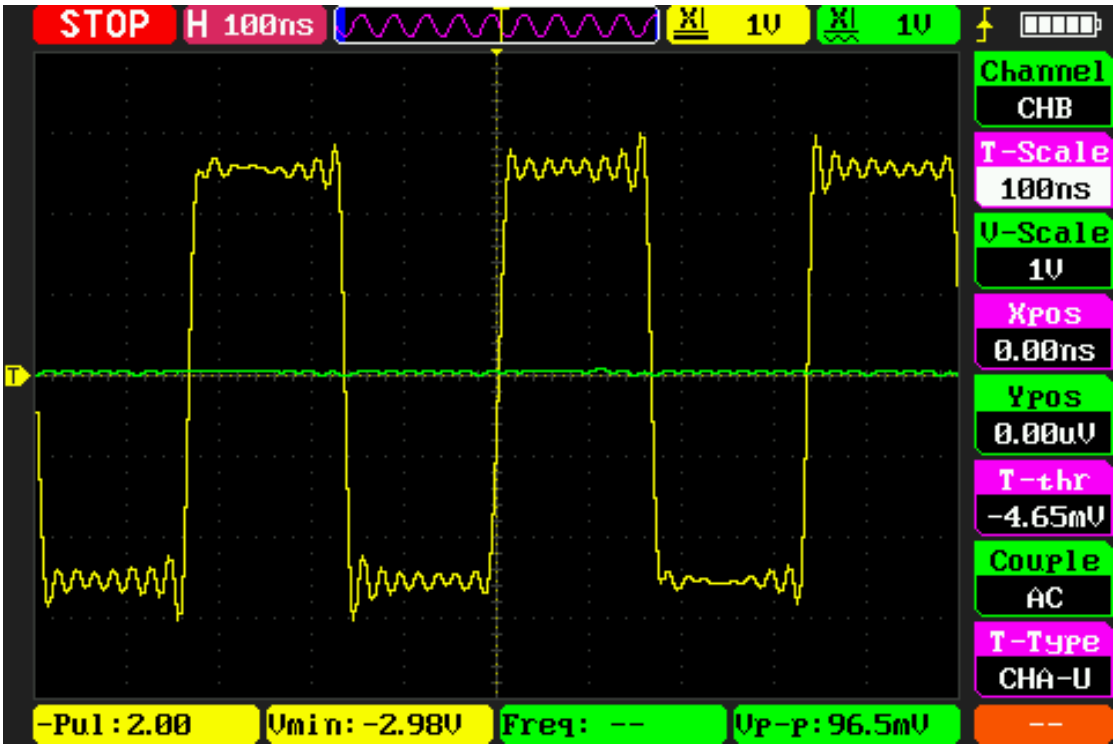
Open: Select “DC” or “AC” on the coupling mode of the channel.
Close: Select “--” on the coupling mode of the channel.

10.2，Failed to boot because firmware update failed.

First hold down the key A, and then long press the key P to power on. Enter the mandatory update mode and update the firmware again.

10.3，The square wave measured by two channels is not square enough.

As shown in the figure below:



A: When both channels are enabled at the same time and the timebase is less than or equal to 200ns, if the rising (falling) time of the square wave is less than 15ns, the “sinc” interpolation algorithm may cause some distortion of the square wave. This is caused by the interpolation algorithm, rather than signal or sampling.

10.4，Charging status is abnormal.

A: In SINGLE mode and NORMAL mode, the charging status may not be detected in time. This is normal.

10.5，As soon as the charging cable is pulled out, the battery will show that the power decrease.

A: After unplugging the charging cable, wait a few seconds to accurately measure the battery level.

11，Services

1. After – sales Service：

DS100 host has a one-year free warranty service in the case of non-artificial damage. Please contact the dealer for warranty service.

2. Website

Download : www.alientek.com/download
Company : www.alientek.com
Aliexpress : www.aliexpress.com/store/1102909571

3. Contact US

E-mail : fae-smt@alientek.com