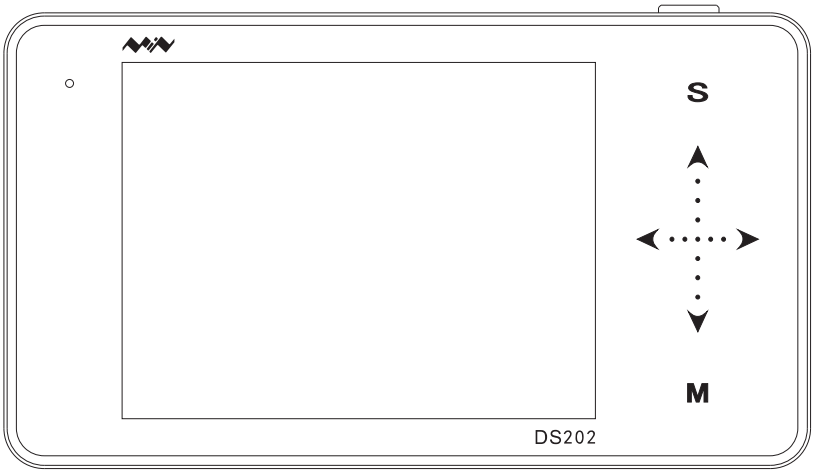
DS202

User Manual

Version 1.0



Contents

This user manual is based onAPP V1.28

Warning: Warning statements identify conditions or practices that could result in injure yourself or others

Caution: Caution statements identify conditions or practices that could result in damage to your device or other property

Attention: Attention statements identify annotations, usage tips or additional information

Safety Statement

General Safety Information

WARNING

- Read carefully all the following safety precautions to avoid personal injury and prevent damage to the device or any products connected to it. Failure to follow these safety instructions could result in personal injuries or risk of fire.

WARNING

- Use proper power cord. Please use power cord specified for this product and certified for your country/district of use.
- Connect and disconnect properly. Do not connect or disconnect probe or test leads while they are connected to voltage source. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement instrument.
- Observe all the terminal ratings. To avoid fire or shock hazard, please do not measure signals at DC40V or above. Consult the product manual for further ratings information before making connections to the device.

WARNING

- Do not operate in wet/damp conditions.
- Do not operate in a potentially inflammable/explosive atmosphere.
- Please keep the surface of the product clean and dry.

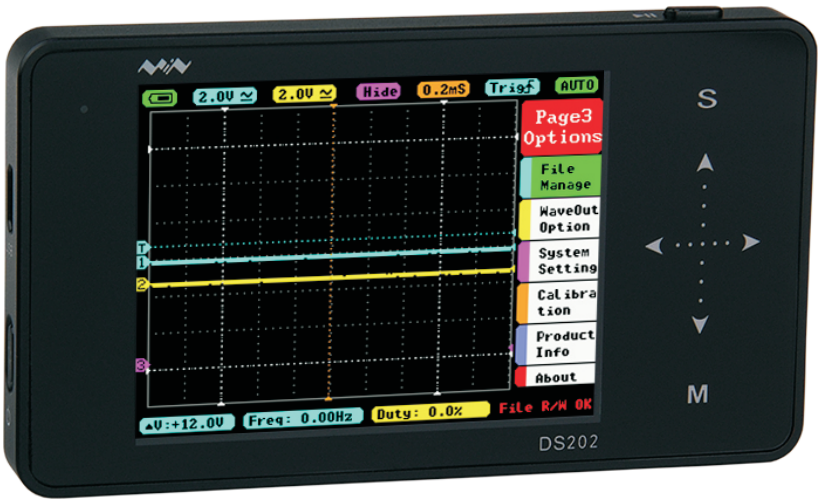
Operating Environment

Operating Environment	Requirement	
Temperature	Operating Condition:	+0°C 到50°c
	Non-operating Condition:	-20°c 到+60°c
Humidity	Operating Condition:	High Temperature：40°C 到 50°C，0% 到90%RH
		Low Temperature： 0° C 到 40°C，10%到90%RH
	Non-operating Condition:	High temperature：40°C 到 60°C，5%到95%RH
		Low temperature：0° C 到 40°C，5%到95%RH

Chapter 1

Overview of DS202

Specifications



Performance parameters

Coupling	AC/DC
Analog bandwidth	1MHz
Maximum sampling rate	10MSa/s
Analog input impedance	1MΩ
Maximum input voltage	±40V(X1 probe)
Maximum sample memory depth	8K
Horizontal time base speed	1uS/Div~2S/Div(in 1-2-5 sequence step)
Vertical Sensitivity	20mv/Div~10V/Div (in 1-2-5 sequence step)

Chapter 1

Overview of DS202

Specifications

Functional parameters

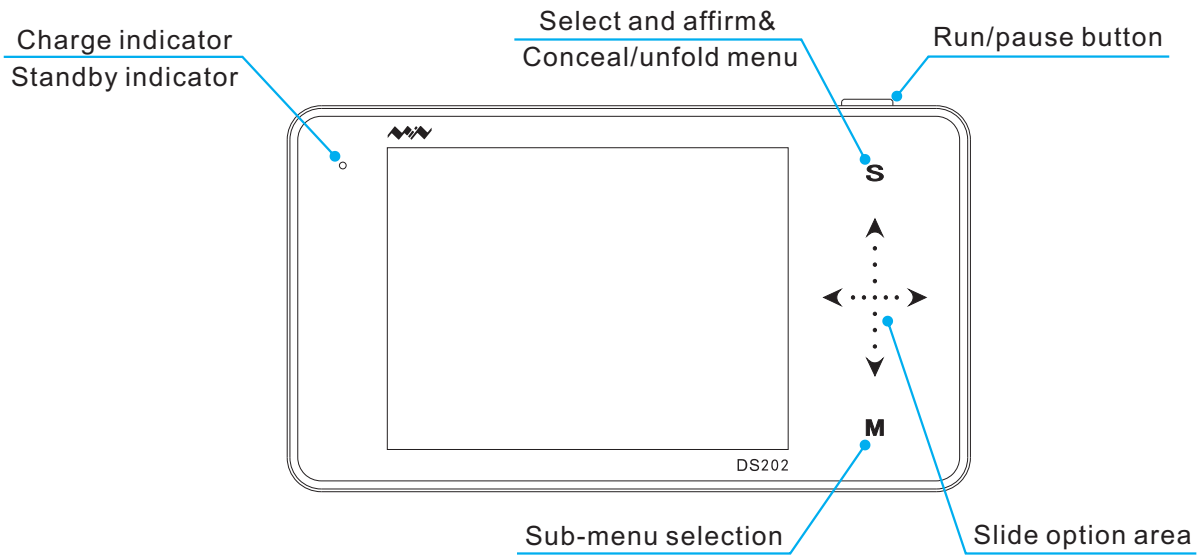
Mode	Contain Auto，Normal，Single，None，Scan synchronous mode
Trigger mode	ascend/descend Edge trigger mode
Setting modes available	set adaptive level, vertical range, trigger threshold mode
Autonomous channel reveal	A,-B，A+B，A-B，RecA，RecB，RecC operation waveform
Waveform Functions Auto measurement	frequency/cycle time /duty cycle, voltage peak-to-peak value/ effective value /maximum value /minimum value/average value
Signal Generator	10Hz~1MHz square wave (duty adjustable) or 10Hz~20KHz Sine/ Square/Triangle/Sawtooth wave

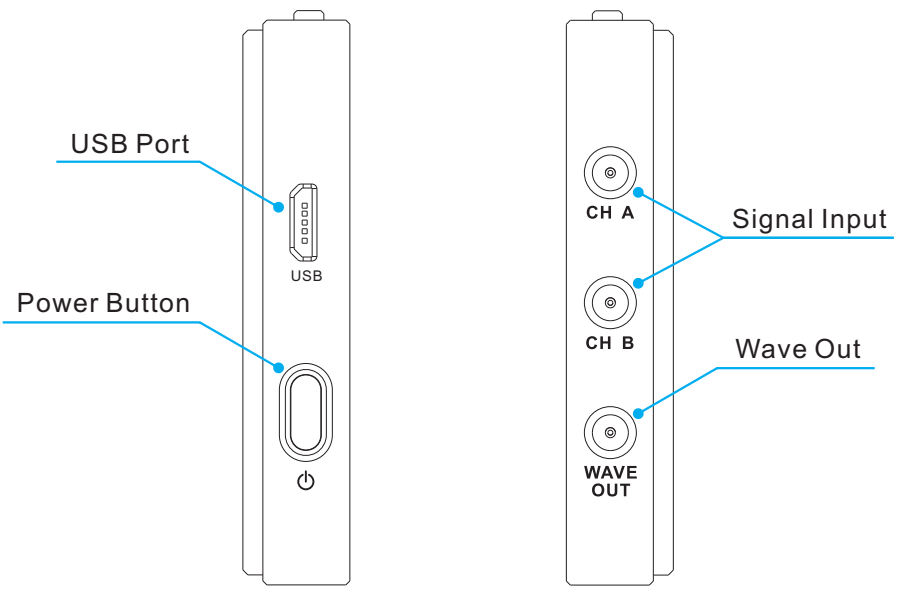
Product parameters

Memory capacity	Installed USB flash disk memory capacity 8MB，available for waveform statistics and pictures
Touch key-press	Capacitive touch key-press input, support swipe gestures input
Dimension	Dimension（100mm×56.5mm×10.7mm）
Battery	built-in 550mAhlithium battery, external USB port
Display	Color TFT LCD display (resolution320×240)

Overview of DS202

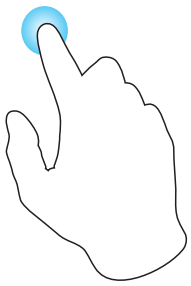
Introduction to device interface and key-press



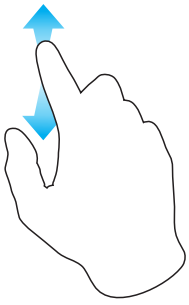


Overview of DS202

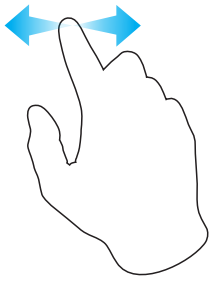
Operation on slide option area



- Capacitive Touch key-press
- Support slide gesture input
- Tap



- Vertical slide



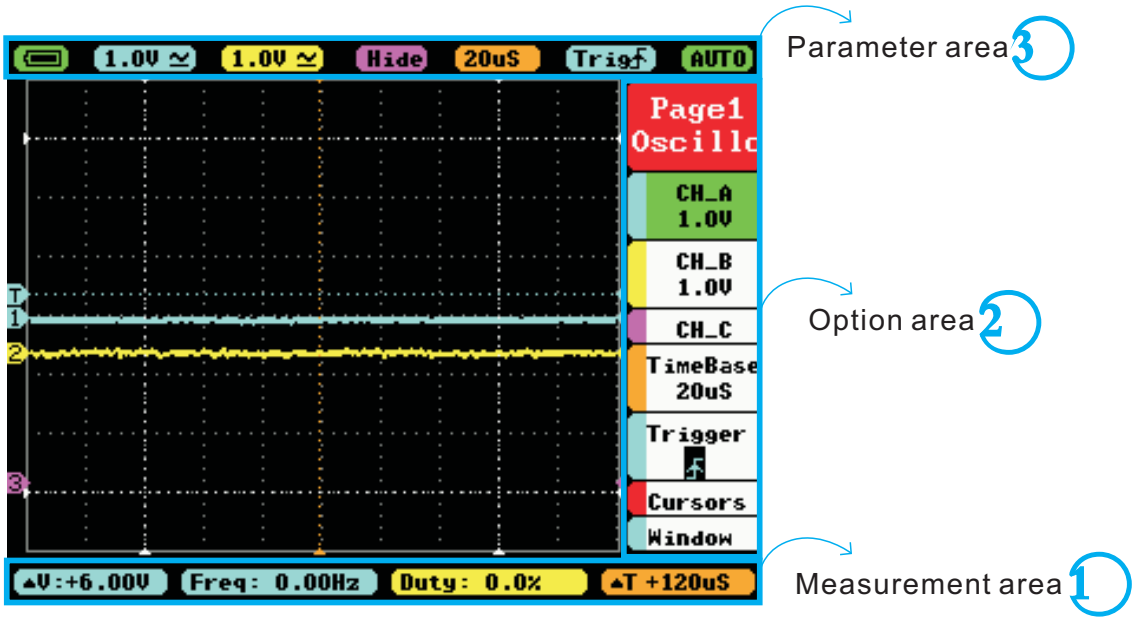
- Horizontal slide

Button	Function
▶||	1) Run/pause button 2) save current picture on screen(long press)
S	1) Display/Hide menu item 2) Sub-menu confirm
▲	Upward selection(Slide Up)
▼	Downward selection（Slide Down）
➤	Reset Parameter(Tap Right/increase, slide Right)
◀	Alter set up parameter（Tap Left/Reduce, Slide Left）
M	On/Off Sub-menu

Note that each item's color in Parameter Area is the same as that in Measurement Area

Interface Introduction

Home screen introduction



Home screen

1 Measurement area introduction

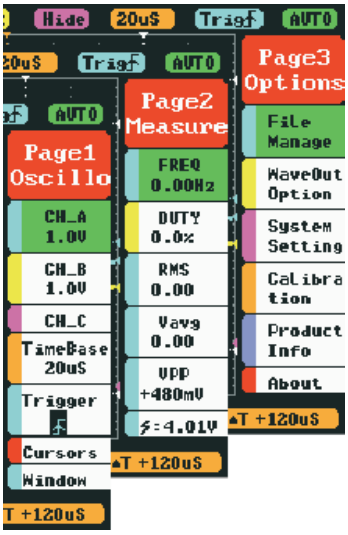
Menu	function introduction
▲V:+6.00V	△V=V1-V2
Freq: 0.00Hz	Measured Value（Blue corresponds with Channel A, Yellow with Channel B） corresponding the 1st and 2nd item in Page2
Duty: 0.0%	
▲T +120uS	△T=T2-T1

Interface Introduction

Home screen introduction

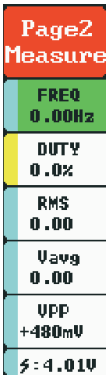
2

Option area introduction



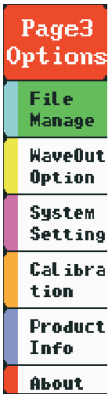
Page1(oscilloscope)

- A channel option
- Bchannel option
- C channel option
- TimeBase option
- Trigger option
- Vernier option
- Horizontal window



Page2(Measurement)

- Frequency
- Duty ratio
- root-mean-square value
- voltage average value
- voltage peak-to-peak value
- battery voltage



Page3(option)

- File management
- Output option
- System settings
- Adjusting option
- Product information
- relevant information

Annotation: detailed introduction to options refer to Page 13-18

Interface Introduction

Home screen introduction

3 Parameter area introduction

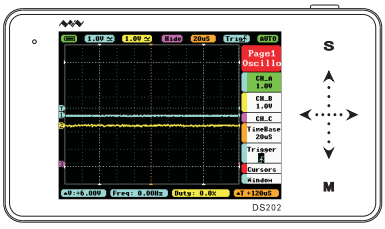
menu	options	function(operation : press ◀▶▲▼ ,slide)
		Battery supply/USB charging/full charge
	20mV—10V(1-2-5 sequence step) AC/DC	Channel A ordinate unit amplitude, AC/ DC coupling method
	20mV—10V(1-2-5 sequence step) AC/DC	Channel B ordinate unit amplitude, AC/ DC coupling method
	(-A)/(-B)/(A+B)/(A-B)/ RecA/RecB/RecC	(-A):channel A waveform reverse (-B): channel B waveform reverse (A+B): addition of waveforms in channel A and B (A-B):Subtraction of channel A waveform and channel B waveform RecA:Reload the previous saved waveform in channel A RecB:Reload the previous saved waveform in channel B RecC:RecC ： Reload the previous saved waveform in channel C
	1.0uS—1S(1-2-5sequence step)	time unit value
		Trigger mode： ascend/ descend trigger mode
	AUTO/NORM/SINGL/NONE/SCANSTOP	automatic/standard/single-pass/slow scan/immediate scan/operation/pause

Start Guide

Power On/Off

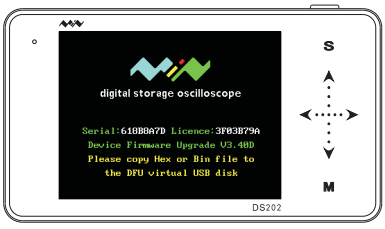
●Power On/Off Button

Starting up



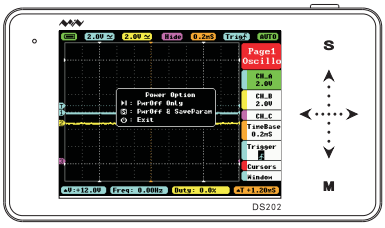
●In the shutdown state, press on Power Button"⏻" for approximately 2 seconds to start normally

The default enter into APP1



●Press and hold Power button"⏻"for approximately 4 seconds to enter into DFU mode

Upgrading/ Upgrade mode



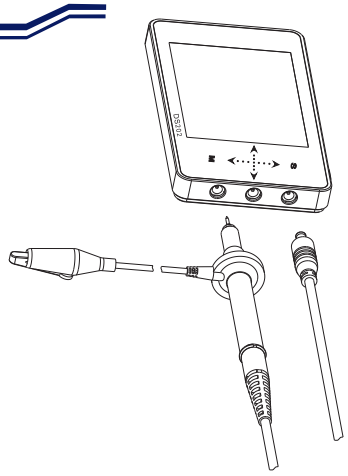
●Press "▶||" Run/Pause"button to Power On and enter APP2(if APP2 is not installed, then enter the DFU mode)

●In the Power On state, press Power button "⏻" for approximately 2 seconds to pop-up "Power Off" menu, according Icon operation Choose Power Off. (In the Power On state, long press "⏻" Power button for 8 seconds to force Shut Down.)

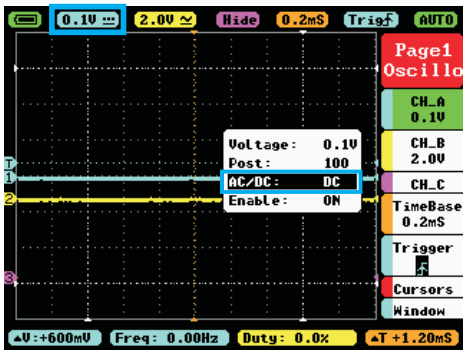
Forced Shut Down

Start Guide

Check up before use

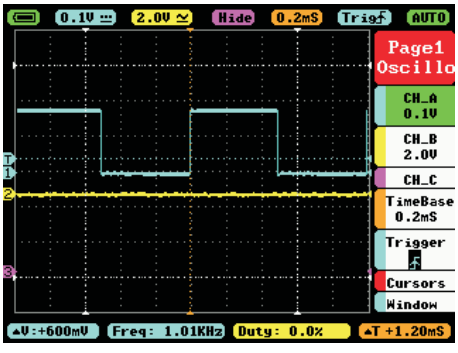


Connect probes to both the MCX and CHA input jacks



Adjust relevant parameters of CH A:

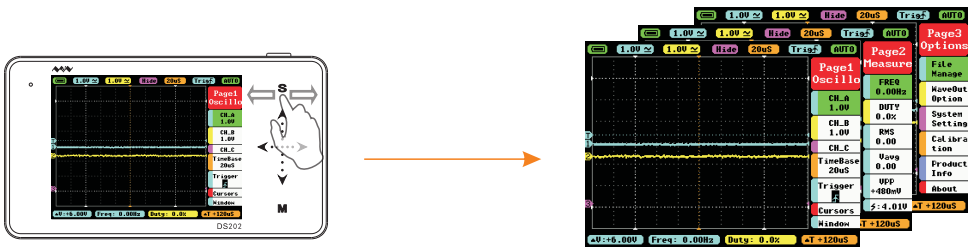
1. Adjust the DC mode in AC/DC function in CH A
2. Voltage adjustment: adjust probe X1 to 1V, adjust probe X10 to 0.1V



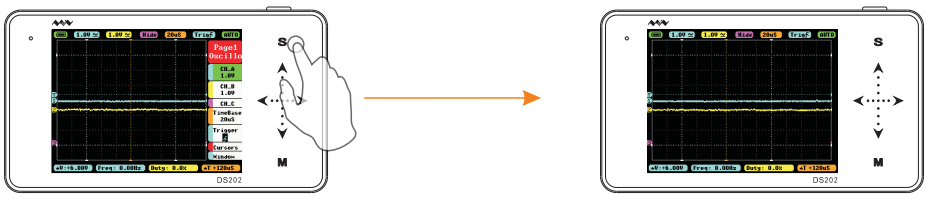
Measure WAVE OUT outlet waveform

Start Guide

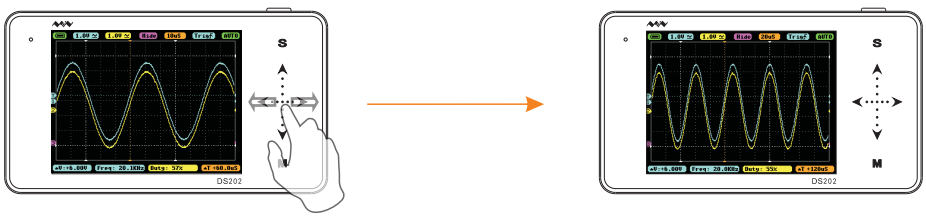
Operation introduction



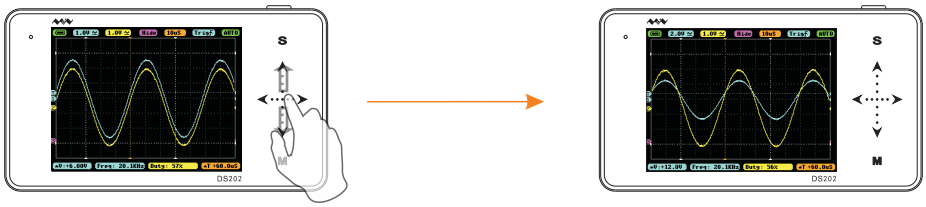
In the Main Menu interface, you can switch between the Main Menu pages by sliding horizontally on the upper Touchpad.



In the Main Menu interface, tap “S” button to switch the Main Menu Display/ Hide



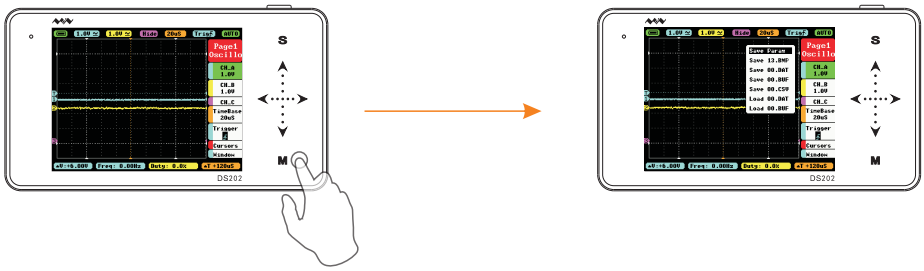
When the Main Menu is hidden, you can slide ◄ ••• ► horizontally to change the TimeBase



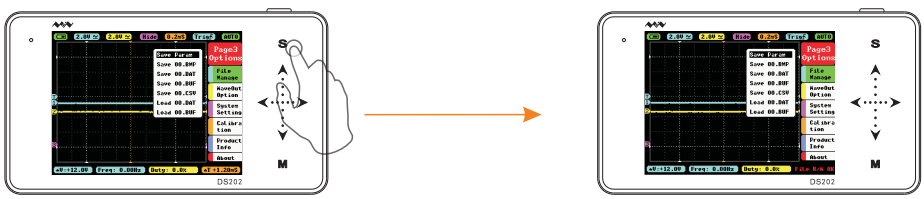
When the Main Menu is hidden, you can slide ▲ ··· ▼ vertically to change voltage (shortcut for Channel A only)

Start Guide

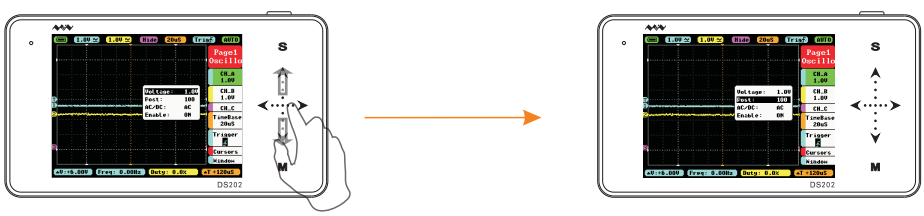
Operation introduction



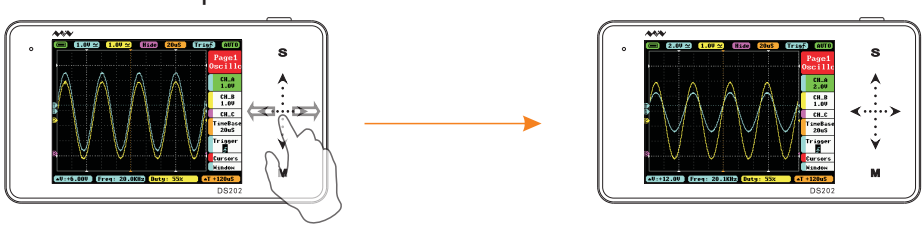
In the Main Menu interface, tap “M” button to switch the Sub-menu to Display/Hide



In the Sub-menu interface, tap “S” button to confirm the selection of operation



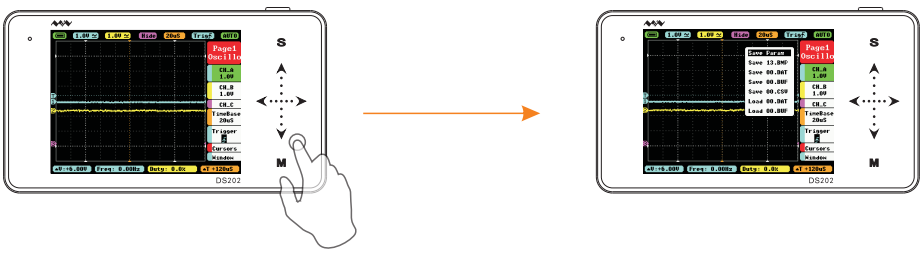
In the Main Menu or Sub-menu interface, tap "▲""▼"or"▲""▼"slide vertically to select items upward or downward



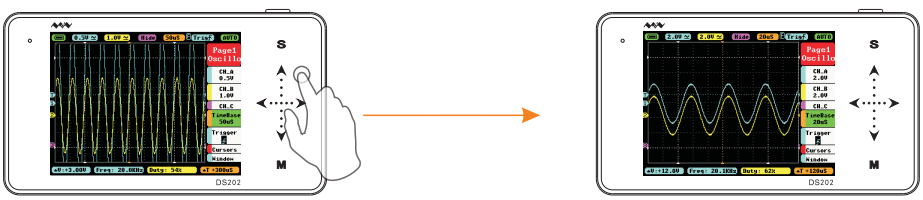
In the Main Menu or Sub-menu interface, tap"◀""▶"or"◀""▶"slide horizontally to adjust the Menu parameters(When you move Positions in Sub-menu interface, tap and hold your finger for continuous operation)

Start Guide

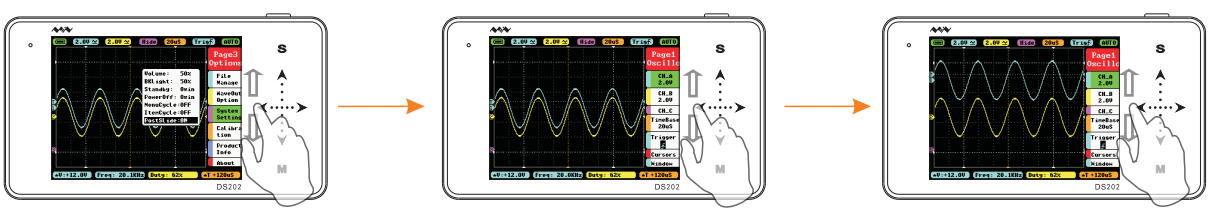
Operation introduction



In the Main Menu or Sub-menu interface,tap and hold an non-button identification area to Display/Hide file management sub-menu



When you turn on “Auto Fit” in “Trigger”, double-tap the non-button identification area, the device will adjust automatically the amplitude, the time base and the trigger grid.



In the System Setting interface, when “PostSlide” is ON, slide up/down vertically the touchpad in the left to adjust the position.

Basic Function

Specific Parameter Intro

Menu	Options	Functions	Annotation for functions	Options for function and annotation
Page1 Oscillo	CH_A 1.0V	Voltage	Channel A y-axis voltage per grid	20mV/50mV/0.1V/0.2V/0.5V/ 1.0V/2.0V/5.0V/10V
		Post	Adjust Channel A waveform position upward/downward in the window	Position:5-195
		AC/DC	channel A coupling	AD/DC
		Enable	channel A display/hide	ON/OFF
	CH_B 1.0V	Voltage	Channel B y-axis voltage per grid	20mV/50mV/0.1V/0.2V/0.5 V/1.0V/2.0V/5.0V/10V
		Post	Adjust Channel B waveform position upward/downward in the window	Position : 5-195
		AC/DC	channel B coupling	AD/DC
		Enable	channel B display/hide	ON/OFF
	CH_C	Match	Calculation between CH_A waveform and CH_B waveform	–A,-B , A+B , A-B , RecA , RecB,RecC
		Post	Adjust CH_C waveform position upward/downward in the window	Position : 5-195
		Enable	CH_C display / hide	ON/OFF
	TimeBase 20uS	TimeBase	TimeBase X-axis voltage per grid	1.0us-2.0s(1-2-5step)

Basic Function

Specific Parameter Intro

Menu	options	function	Annotation for functions	Options for function and annotation
Page1 Oscillo	Trigger	Syncmode	Selection for synchronous mode	AUTO/NORM/SINGL/ NONE/SCAN
				Automatic /standard / single pass /slow scan/ immediate scan
		Trigmode	Selection for trigger mode	Rising/falling edge
		Source	Selection for trigger channel	CHA/CHB
		Threshol	Horizontal Triggering Position Level	Position:5-198
		Enable	Display/Hide Horizontal Triggering Position Level	ON/OFF
		Auto Fit	Automatic adjustment	ON/OFF
	Cursors	T1.Post	Time measurement cursorT1	Position : 5-248
		T2.Post	Time measurement cursor T2	Position:5-248
		Enable.T	Show/hide Time measurement cursor	ON/OFF
		V1.Post	voltage measurement cursor V1	Site selection : 5-198
		V2.Post	voltage measurement cursor V2	Site selection:5-198
		Enable.V	Show/hide voltage measurement cursor	CHA/CHB/OFF

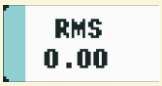
Basic Function

Specific Parameter Intro

Menu	item	options	Annotation for functions	Options for function and annotation
Page1 Oscillo	Window	Post	Move horizontally to check waveform	Select by storage depth
		Depth	Internal storage depth	1k～8k
		Enable	Show/hide event trigger line vernier	ON/OFF
Page2 Measure	FREQ 0.00Hz	Source	Select measurement channel	CHA/CHB
		Type	Select measurement type	FREQ/DUTY/RMS/ Vavg/Vpp/Vmax/Vmin
				Signal frequency/duty ratio, effective voltage value /average value/peak-to-peak value/maximum value/minimum value
		Enable	Display/hide measurement window	ON/OFF
	DUTY 0.0%	Source	Select measurement channel	CHA/CHB
		Type	Select measurement type	FREQ/DUTY/RMS/ Vavg/Vpp/Vmax/ Vmin
				Signal frequency/duty ratio,effective voltage value/average value/peak-to-peak value/maximum
		Enable	Display/hide measurement window	ON/OFF

Basic Function

Specific Parameter Intro

Menu	options	function	Annotation for functions	Options for function and annotation
Page2 Measure		Source	Select measurement channel	CHA/CHB
		Type	Select measurement type	FREQ/ DUTY/ RMS/ Vavg/ Vpp/ Vmax/ Vmin
				Signal frequency/duty ratio,effective voltage value /average value/peak-to-peak value/maximum
		Enable	Display/hide measurement window	ON/OFF
		Source	Select measurement channel	CHA/CHB
		Type	Select measurement type	FREQ/ DUTY/ RMS/ Vavg/ Vpp/ Vmax/ Vmin
				Signal frequency/duty ratio,effective voltage value/average value/peak-to-peak value/maximum
		Enable	Display/hide measurement window	ON/OFF
		Source	Select measurement channel	CHA/CHB
		Type	Select measurement type	FREQ/ DUTY/ RMS/ Vavg/ Vpp/ Vmax/ Vmin
				Signal frequency/duty ratio, effective voltage value/average value/peak-to-peak value/maximum
		Enable	Display/hide measurement window	ON/OFF
		Vbat	Battery voltage	

Basic Function

Specific Parameter Intro

Menu	options	function	Annotation for functions	Options for function and annotation
Page3 Setting / Page3 Options	File Manage	Save Param	Save current parameter settings	Tap “S”button to Save
		Save Bmp	Save bmp file (waveform image) to the built-in U disk.(Shortcut: long press”Run/Pause”button	Tap “S”button to Save
		Save Dat	Save dat file to built-in U disk	Tap “S”button to Save
		Save Buf	Save buf file (sampling data in buffering area) to built-in U disk	Tap “S”button to Save
		Save Csv	Save csv file (export sampling data in buffering area) to built-in U disk	Tap “S”button to Save
		Load Dat	Load dat file	Tap “S”buttonLoad files
		Load Buf	Load buf file	Tap “S”buttonLoad files
	WaveOut Option	Type	Output signal type	squar/sine/triangle /sawtooth
		Freq	Output signal frequecy	Squar（10Hz-1Mhz）sine/ triangle/sawtooth（10Hz-20kHz）
		Duty	Output signal duty cycle	10%-90%
	System Setting	Volume	Adjust buzzer volume	0%-90%
		Blight	Adjust backlight brightness	10%-100%
		Standby	Adjust standby time	0min-30min

Basic Function

Specific Parameter Intro

By the upward "▲" downward "▼" key or the options on the sliding option area, press M to unfold option setting menu; by the upward "▲" downward "▼" key or sliding the parameter option needed to be set and change the current parameter value by the "◀" or "▶" key or sliding

Menu	options	function	Annotation for functions	Options for function and annotation
Page3 Setting / Page3 Options	System Setting	PowerOff	Auto power off time	1min-30min
		MenuCycle	Main menu options circulation	ON/OFF
		ItemCycle	Submenu options circulation	ON/OFF
		PostSlide	Sway site	ON/OFF
	Calibration	Calibrate Zero	Press key "S" and self-calibration window pops up. Press key "S" to carry out self-calibration and pop up when calibration is finished, save calibration data	
		Restore Data	Press key "S" to pop up factory reset window. Press key"S" to carry out self-calibration and pop up when self-calibration is finished and save factory data.	
	Product Info	DeviceSN	SN number of the device	
		Hardware	Hardware version number	
		MCU Typy	Processor type	
		LCD Typy	Type of LCD	
		USB Disk	Volume of USB flash disk	
		DFU Typy	Version number of DFU	
		APP Typy	Version number of APP	
	About	Relevant satellite information		

Chapter 5

Product Inspection

Instruction on battery

- When the battery voltage status turns to "  " or display brightness is relatively dim, please charge the battery in time. Charging is available in both power-on and off mode. When the battery is being charged, the LED will light on until the charging process is finished.

- Long press on Power button " ⏻ " for 8 seconds under any circumstances will cause forced shutdown.

常规检查

- When you get a new DS202 oscilloscope, you are advised to inspect the product by the following steps.
- Inspect damages caused by shipping.
  If the packaging carton or the protection pad is seriously damaged, keep the package until the oscilloscope & accessories pass the electrical and the mechanical test.
- Inspect the product.
  Please contact the company if the following problems occur: 1) product surface is damaged, 2) product doesn't work properly, 3) product does not pass performance test.
  If the damage is resulted from shipping, please keep the package and contact the company for repair or exchange.

功能检查

- Make a quick inspection of functions to ensure the device is working soundly. Please perform following steps:
- Turn on power and access the homepage of the mini oscilloscope.
- Connect the oscilloscope with standard signals (e.g. square wave 20KHz，Vpp=5V), set the switch on probe tip as 1X, plug oscilloscope probe to the Input Channal.Check whether the measured signal value is the same as the standard value; it can be calibrated if the margin is small.

Chapter 6

Battery Disposal

Regulatory Markings

FCC statement of compliance

This device is complied with the regulation in the 15th part of FCC regulation. The two conditions below should be satisfied if you want to operate the device:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, include the interference that may lead to undesired operation.

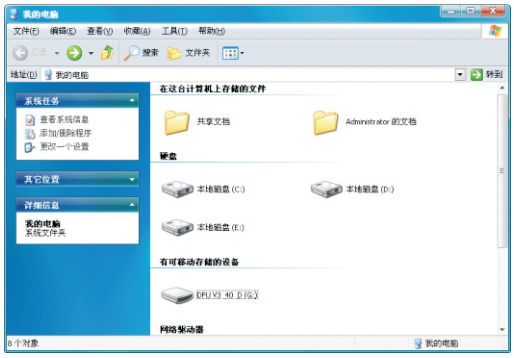
The CE mark is a registered trademark of European Community. This CE mark shows that the product complies with all the relevant European Legal Directives.

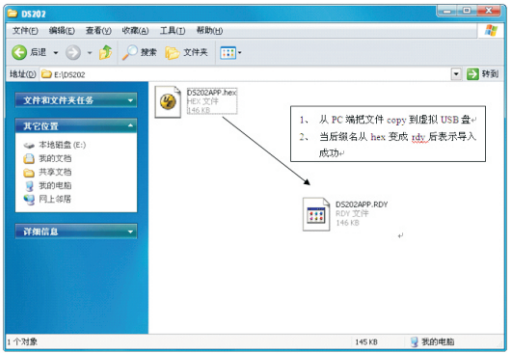
Do not dispose in domestice household waste

- This device complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.
- Disposal and recycling: you must dispose the mini oscilloscope according to local law and regulations. As the oscilloscope contains electronic building brick and battery, you must dispose it respectively with garbage.
- Please dispose the battery in accordance with local environmental regulations.

Technical Support

Firmware upgrading





To upgrade the firmware of oscilloscope, please carry out the operation below：

1. Open web browser to visit www.minidso.com , download the newest firmware appropriate to oscilloscope to your PC.

2. Press DS202's Power button “⏻” for approximately 4 seconds to enter into DFU firmware upgrading mode and the indicator light flickers.

3. Use USB data cord to connect DS202 to your PC, and a removable hard disk named “DFU V3_40_D” will appear on your PC. Copy the hex firmware to the root directory of that disk. After the extension of the firmware changes from “hex” to “rdy”, restart DS202. Then the upgrading process is finished.

For more information, please visit
www.minidso.com

For more service and information, pleas visit
http://www.minidso.com/forum.php