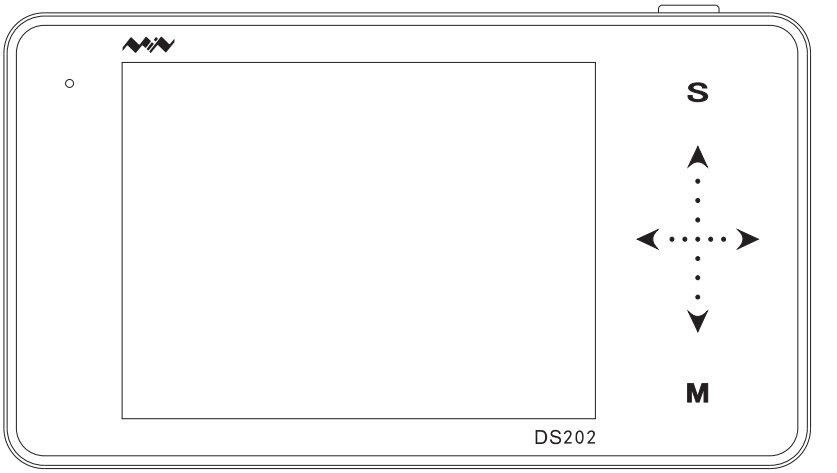
DS202

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. Before you connect or disconnect current probes,please disconnect power to the circuit under test.
- **Observe all the terminal ratings.** To avoid fire or shock hazard, please do not measure signals at DC40V or above. Please read the User Manual carefully to learn more about ratings before connection.

WARNING

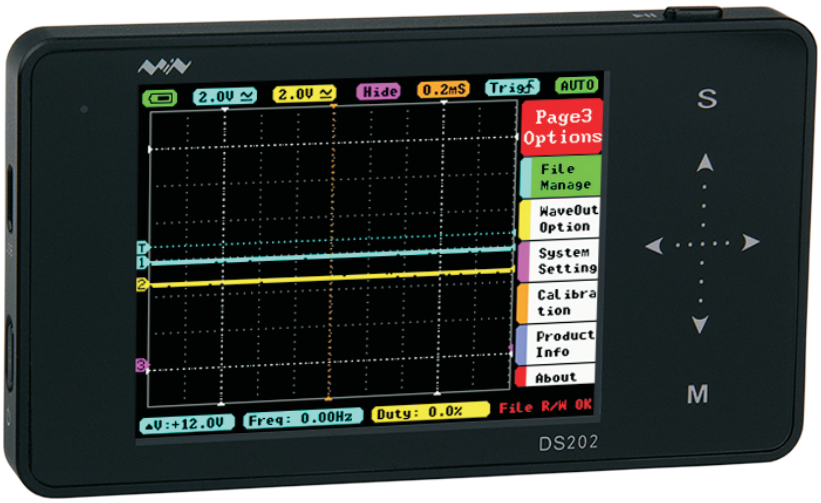
- Do not operate in a humid environment.
- Do not operate in a potentially inflammable/explosive atmosphere.
- Please keep the device surface clean and dry.

Operating Environment

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

DS202 Overview

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 sensitivity	1uS/Div~2S/Div(in 1-2-5 sequence step)
Vertical sensitivity	20mv/Div~10V/Div (in 1-2-5 sequence step)

Chapter 1

DS202 Overview

Specifications

Functionalities

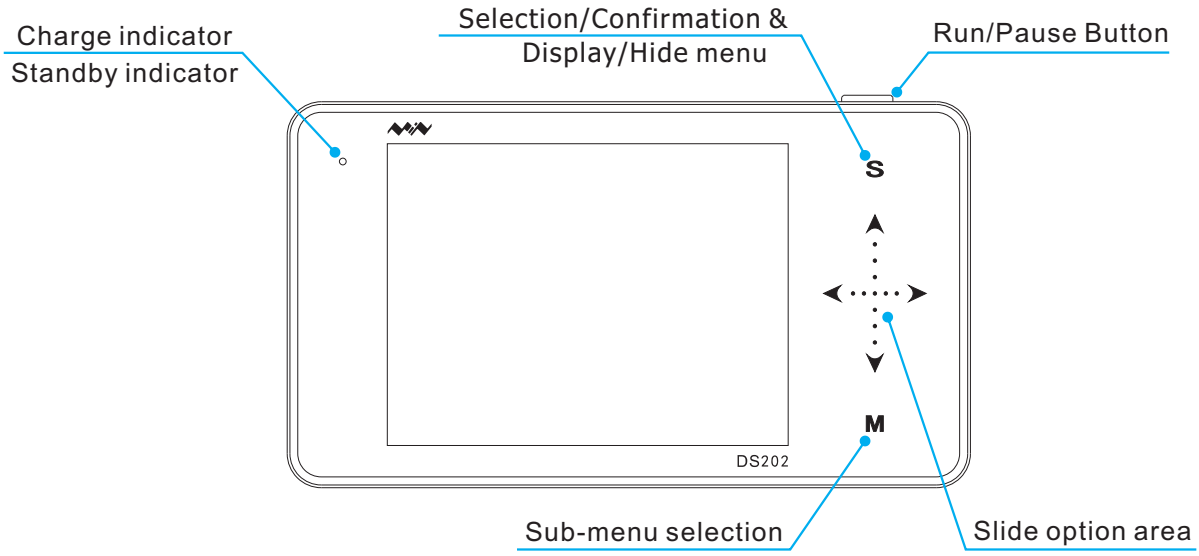
Modes	Vertical precise, horizontal precise measurement andtrigger threshold
Trigger mode	Rising/Falling edge trigger
Synchronous mode	Auto，Normal，Single，None，Scan
Math waveforms	A,-B，A+B，A-B，RecA，RecB，RecC
Auto measurement	frequency, cycle time, duty cycle,DC RMS voltage/ Vpp /Vmax/Vmin/Vavg
Inbuilt signal Generator	10Hz~1MHz square wave (duty adjustable) or 10Hz~20KHz Sine/ Square/Triangle/Sawtooth wave

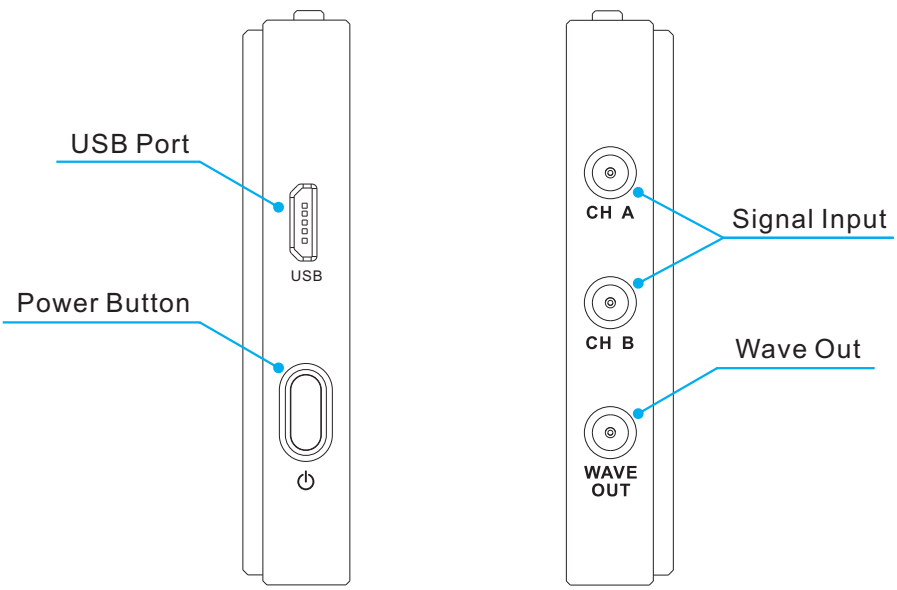
Product parameters

Storage	Inbuilt 8MB U disk storage for waveform data and images
Operation	Capacitive touchscreen,supporting swipe gestures
Dimension	（100mm×56.5mm×10.7mm）
Battery	Internal 550mAh Lithium battery, external USB port
Display	Color TFT LCD display (320X240 pixels)

DS202 Overview

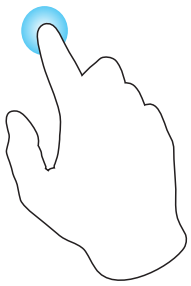
Interface & Buttons



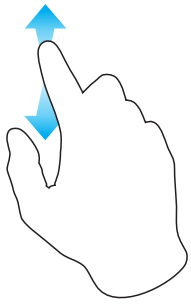


DS202 Overview

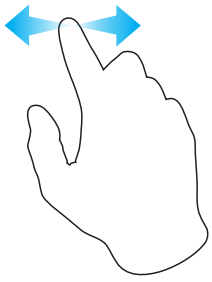
Operation on option area



- Capacitive touchscreen
- Supporting swipe gestures
- Tap



- Vertical slide



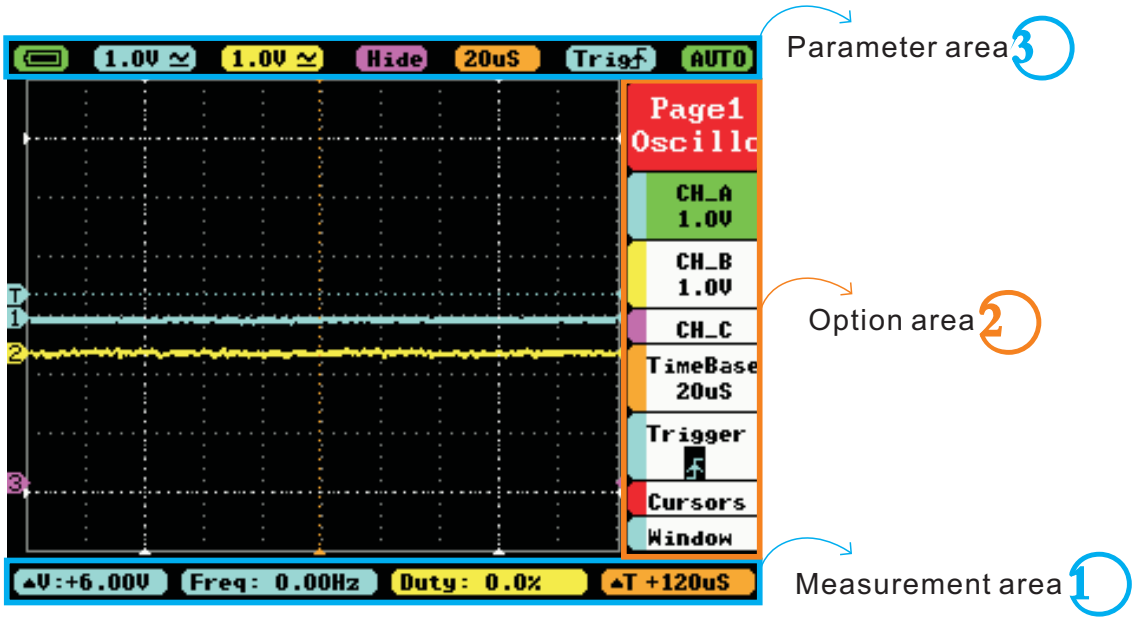
- Horizontal slide

Button	Function
▶||	1) Run/Pause 2) Save current parameter/screen display(long
S	1) Menu display/hide 2) Sub-menu confirmation
▲	Upward selection(Slide Up)
▼	Downward selection（Slide Down）
➤	Reset Parameters(Tap Right/Increase, Slide Right)
➤	Reset Parameters(Tap Left/Reduce, Slide Left)
M	Sub-menu On/Off

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

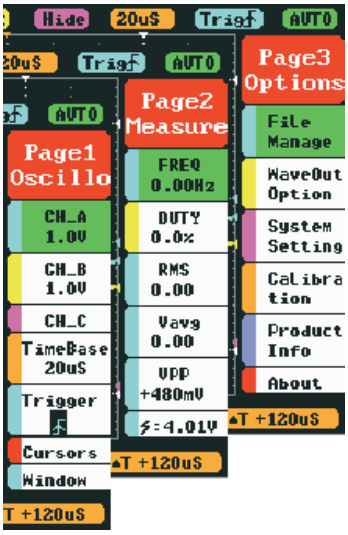
Menu	Function
▲V:+6.00V	△V=V1-V2
Freq: 0.00Hz	Measured Value（Blue corresponds with Channel A, Yellow with Channel B） corresponding the 1st and 2nd item in Page2
Duty: 0.0%	
▲T +120uS	△T=T2-T1

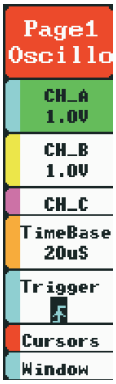
Interface Introduction

Home screen introduction

2

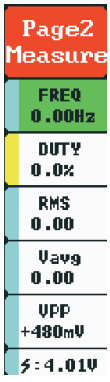
Option area introduction





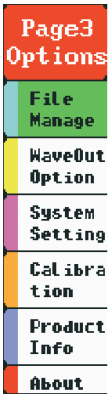
Page1(oscilloscope)

- 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

Chapter 2

Interface Introduction

Home screen introduction

3 Parameter area introduction

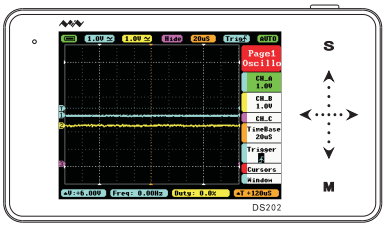
Menu	Item	Functions(Operation：Tap◀▶▲▼ ,or Slide)
		Battery supply/USB charging/Full charge
	20mV—10V(1-2-5 sequence step) AC/DC	(Channel A) y-axis voltage per grid, AC/ DC coupling method
	20mV—10V(1-2-5 sequence step) AC/DC	(Channel B) y-axis voltage per grid, AC/ DC coupling
	(-A)/(-B)/(A+B)/(A-B)/ RecA/RecB/RecC	(-A):Ch_A waveform reverses (-B): Ch_B waveform reverses (A+B): Ch_A waveform overlaps with Ch_B waveform; (A-B):Subtraction of channel A waveform and channel B waveform RecA:Reload the last waveform saved in Ch_A; RecB:Reload the last waveform saved in Ch_B RecC:RecC：Reload the last waveform saved in Ch_C
	1.0uS—1S(1-2-5sequence step)	Timebase (x-axis voltage per grid)
		Trigger mode： falling edge trigger/ rising edge trigger
	AUTO/NORM/SINGL/NONE/SCANSTOP	Auto/Normal/Single/Slow Scan/ Instant Scan/Run/Pause

Getting Started

Power On/Off

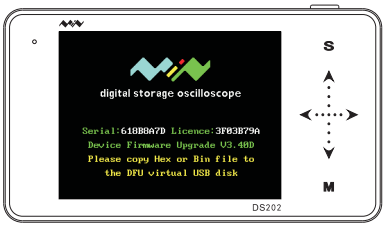
●Power On/Off Button

Starting up



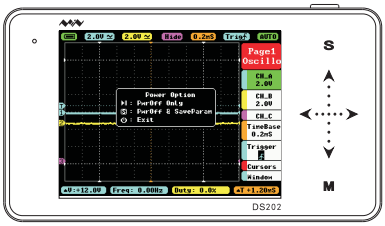
●In the Shutdown state, press "⏻" Power Button for approximately 2 seconds to start normally.

The Default get into APP1



●Long press "⏻" Power Buttonfor approximately 4 seconds to get into DFU mode.

Upgrade mode



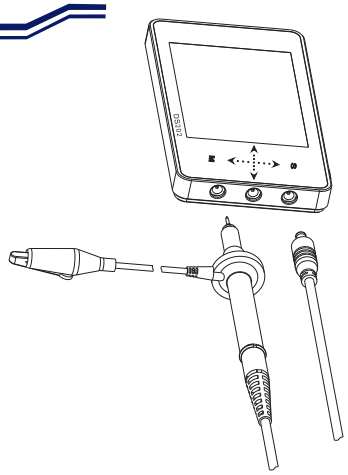
●Press "▶||" Run/Pause"Button to Power On and get into APP2(if APP2 is not installed, then get into DFU mode)

●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 approximately8 seconds to force Shut Down.)

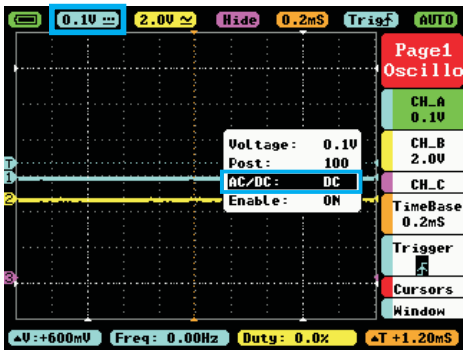
Forced Shut Down

Getting Started

Check up before use

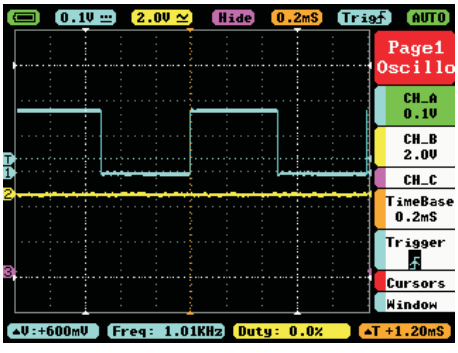


Connect probes to both the MCX and CHA input jacks



Adjust relevant parameters of CH A:

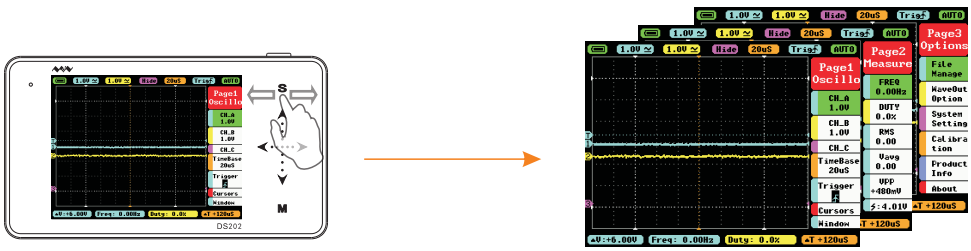
1. Adjust the DC mode in AC/DC function in CH A
2. Voltage adjustment: adjust probe X1 to 1V, adjust probe X10 to 0.1V



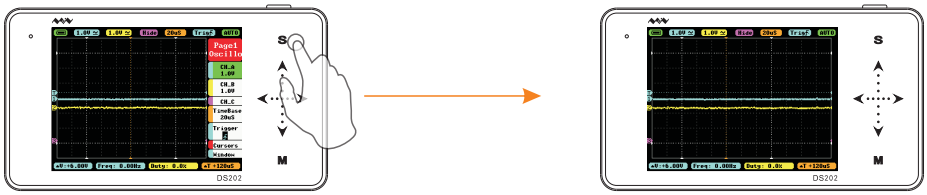
Measure WAVE OUT outlet waveform

Getting Started

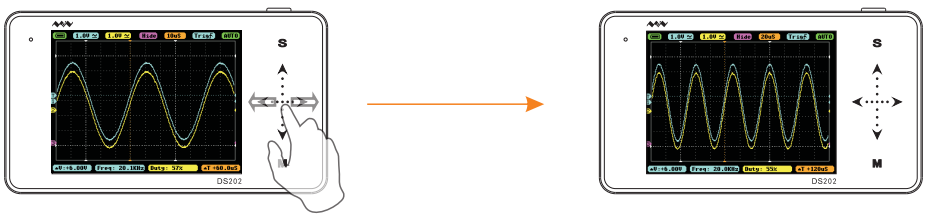
Operation Introduction



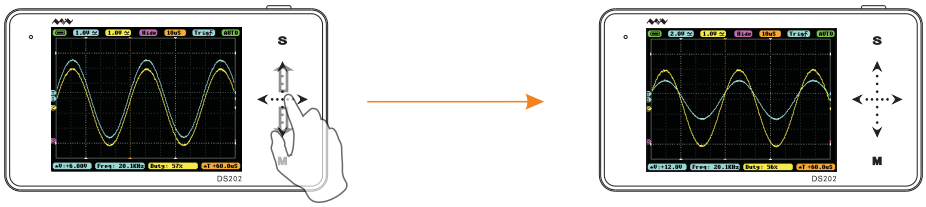
In the Main Menu interface, you can switch between the Main Menu pages by sliding horizontally on the upper Touchpad.



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



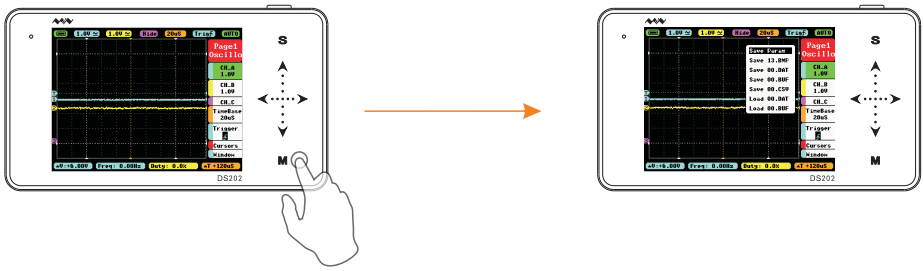
When the Main Menu is hidden, you can slide ◄ ••• ► horizontally to change the TimeBase.



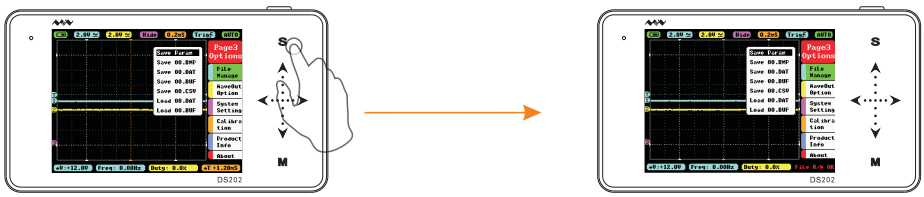
When the Main Menu is hidden, you can slide ▲ ··· ▼ vertically to change voltage. (shortcut for Channel A only)

Getting Started

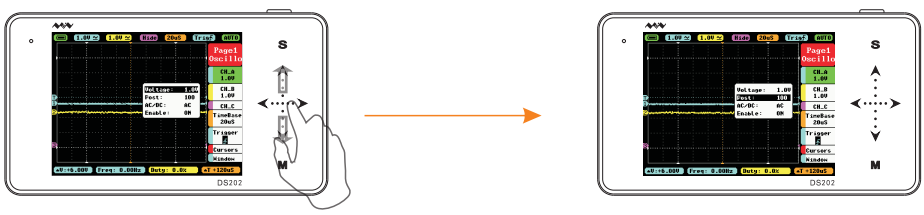
Operation Introduction



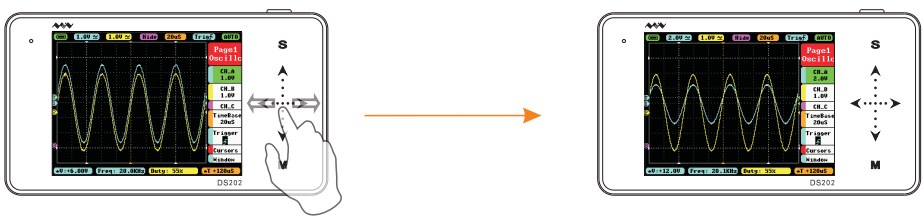
In the Main Menu interface, tap “M” Button to switch the Sub-menu to Display/Hide.



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



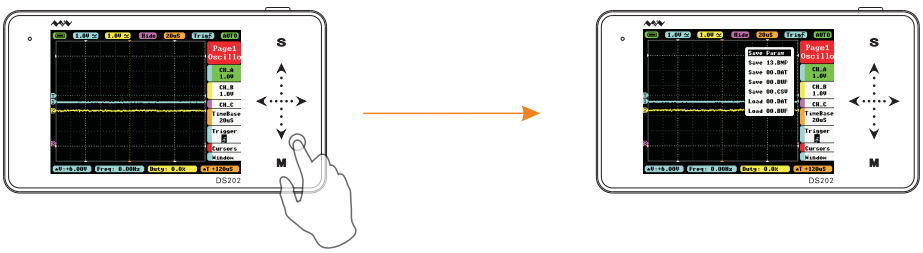
In the Main Menu or Sub-menu interface, tap "▲""▼"or slide vertically to select items upward or downward.



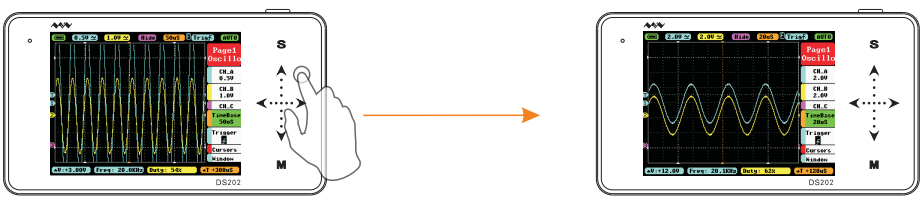
In the Main Menu or Sub-menu interface, tap"◀""▶"or slide horizontally to adjust the Menu parameters(When you move Positions in Sub-menu interface, tap and hold your finger for continuous operation).

Getting Started

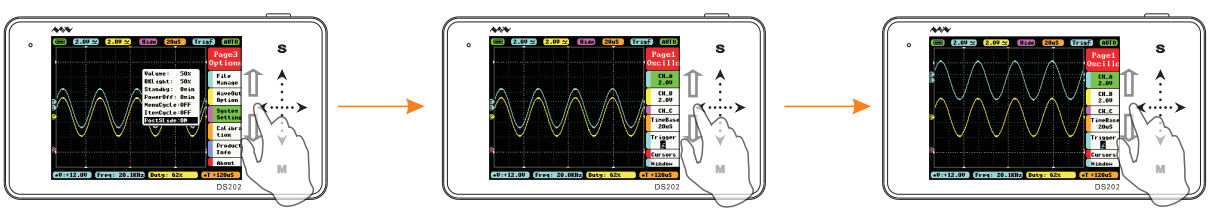
Operation Introduction



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 automatically adjust the amplitude, the time base and the trigger grid.



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

Functional Overview

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
Page1 Oscillo		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
		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 : 5-198
		AC/DC	channel B coupling	AD/DC
		Enable	channel B display/hide	ON/OFF
		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 : 5-198
		Enable	CH_C display / hide	ON/OFF
		TimeBase	TimeBase X-axis voltage per grid	1.0us-2.0s(1-2-5 sequence step)

Functional Overview

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
Page1 Oscillo	Trigger	Syncmode	Syncmode trigger mode selection	AUTO/NORM/SINGL/ NONE/SCAN
				Automatic /standard / single pass /slow scan/ immediate scan
		Trigmode	Choose the Triggering Mode	Rising edge/Falling edge Triggering mode
		Source	Choose the Triggering 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 : 5-198
		T2.Post	Time measurement cursor T2	Position:5-198
		Enable.T	Display/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	Display/Hide Voltage Measurement cursor	CHA/CHB/OFF

Functional Overview

Specific Parameter Intro

Menu	Item	Options	Annotation for Functions	Description
Page1 Oscillo	Window	Post	Horizontal movement to view waveform	Depends sample memory depth
		Depth	Internal storage depth	1k～8k
		Enable	Display/hide Trigger line cursor	ON/OFF
Page2 Measure	FREQ 0.00Hz	Source	Choose the Measurement channel	CHA/CHB
		Type	Choose the Measurement Type	FREQ/DUTY/RMS/ Vavg/Vpp/Vmax/Vmin
		Enable	Display/Hide measurement window	ON/OFF
	DUTY 0.0%	Source	Choose the Measurement channel	CHA/CHB
		Type	Choose the Measurement Type	FREQ/DUTY/RMS/ Vavg/Vpp/Vmax/ Vmin
		Enable	Display/Hide measurement window	ON/OFF

Functional Overview

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
Page2 Measure	RMS 0.00	Source	Choose the Measurement channel	CHA/CHB
		Type	Choose the Measurement Type	FREQ/ DUTY/ RMS/ Vavg/ Vpp/ Vmax/ Vmin
		Enable	Display/Hide measurement window	ON/OFF
	Vavg 0.00	Source	Choose the Measurement channel	CHA/CHB
		Type	Choose the Measurement Type	FREQ/ DUTY/ RMS/ Vavg/ Vpp/ Vmax/ Vmin
		Enable	Display/Hide measurement window	ON/OFF
	VPP +480mV	Source	Choose the Measurement Type	CHA/CHB
		Type	Choose the Measurement Type	FREQ/ DUTY/ RMS/ Vavg/ Vpp/ Vmax/ Vmin
		Enable	Display/Hide measurement window	ON/OFF
	⚡:4.01V	Vbat	Battery voltage	

Functional Overview

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
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	1min-30min

Functional Overview

Specific Parameter Intro

Choose the items in parameter area through tapping "▲"/"▼" buttons or sliding in, tap "M" button to access parameter setting menu, tap"▲"/"▼"or Slide in Choose the parameter item, and then tap "◀"/"▶" or Slide in to change the parameter value of the place where the cursor blinks.

Menu	Options	Functions	Annotation for Functions	Description
Page3 Setting	System Setting	PowerOff	Auto power off time	1min-30min
		MenuCycle	Main Menu option cycle	ON/OFF
		ItemCycle	Sub-menu option cycle	ON/OFF
		PostSlide	Ripid Slide post	ON/OFF
Page3 Options	Calibration	Calibrate Zero	Tap "S" Button, Auto Calibration window pops up retap "S" to perform Auto Calibration, after Auto Calibration is completed, tap "S" Button to confirm saving the calibrated data.	
		Restore Data	Tap "S" Button, from a pop-up window, you can select Restall in the dialog that appears, then tap "S" to perform Auto Calibration, after Auto Calibration is completed, tap "S" Button to confirm saving the calibrated data.	
	Product Info	DeviceSN	device serial number	
		Hardware	Hardware version number	
		MCU Typy	Processor type	
		LCD Typy	LCD screen mode	
		USB Disk	U Disk capacity	
		DFU Typy	DFU version	
		APP Typy	APP version	
	About	Relevant ancillary information		

Product Inspection

Charge and monitor the 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.

- In case of any problems, long press "⏻" Power Button for eight seconds to force Shut Down.

General Inspection

- 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.

Inspecting

- 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 compliance statement

This device is complied with the regulation in the 15th part of FCC regulation. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference,and
(2) This device must accept any interference received, including the interference that may cause undesired operation.

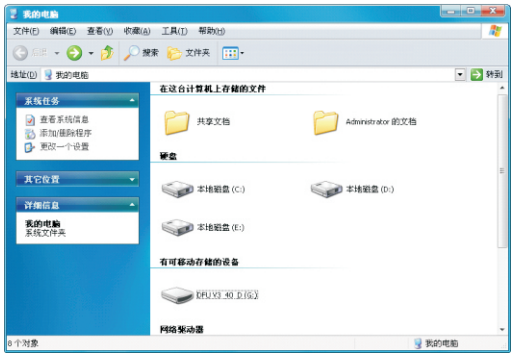
The CE mark is a registered trademark of European Community. This CE mark shows that the product complies with all the relevant European Legal Directives.

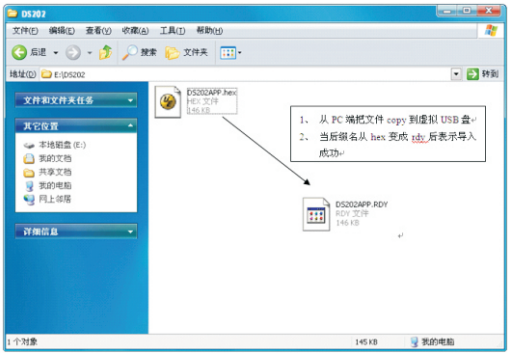
Do not dispose in domestice household waste

- 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