

HANDHELD OSCILLOSCOPE

Users Manual

Read this manual thoroughly before use

To Users

Dear User:

Thanks for your purchase of this portable oscilloscope. This oscilloscope can serve and accompany you at any time and can make your work easier and more efficient.

This manual is intended to introduce the notices as well as the information about how to use the oscilloscope. Please read this manual carefully before using the oscilloscope. In this manual, we provide images which are as consistent as possible with the product's actual displays; and if there is any difference, use actual display of the oscilloscope. Our company reserves the right to improve the product, and if some instructions in this manual are not consistent with the oscilloscope's actual operations, use your experience or knowledge about the oscilloscope's actual operations.

NOTE:

- Understand all the instructions in this manual.
- The instrument contains a built-in 4Ah lithium polymer battery. To avoid hazard, use only the charger supplied with the instrument to charge the battery. Never use any charger or adapter of other product or other model.
- To avoid electric shock and damage, do not apply input voltages above the rating of the instrument. Pay attention to the input voltage limits of the instrument.
- When using multimeter function, disconnect circuit power and discharge all capacitors before testing resistance, continuity, diode, or capacitance.
- Before use, inspect the test leads and test probes for damaged insulation. Make sure that the test leads and the test probes are not damaged. Do not use the instrument if the test leads, the test probes or the case is damaged or if the instrument operates abnormally.
- Keep your fingers behind the finger guards on the probes.
- Remove all probes and test leads that are not in use.
- To avoid electric shock, do not touch any naked live conductor with hand or skin.
- Use caution when working with voltage above 30V ac, 42V peak, or 60V dc. Such voltages pose a shock hazard
- Do not use the instrument where explosive gas, vapor or dust is present.
- Do not use the instrument with the case open; otherwise electric shock may occur.
- To avoid damage and danger, do not tamper with the internal circuit of the instrument.
- To avoid overheat or damage, never place the instrument near any high-temperature object.
- To avoid damage caused by dropping, never place the instrument on any kind of unstable platform.
- Do not let any liquid flow into the instrument.
- Never place any heavy object on the instrument.
- To clean the instrument, use dry, soft cloth. Never use liquid or gas cleaner.
- Make sure that the instrument 's built-in lithium battery has been fully charged before you store the instrument for a long period of time. If the lithium battery needs to be replaced, please contact our company.

Catalogue

Chapter 1 Introduction	5
1-1 Unpacking and Checking the Test Tool Kit	5
1-2 Introduction for this Product	5
1-2-1 Functions	5
1-2-2 Characteristics	6
Chapter 2 Controls and Initial Interface	6
2-1 Charging the Battery	6
2-2 Buttons' Layout and Functions	7
2-3 Instruction for Scope Interface	8
2-4 Instruction for Multimeter Interface	10
2-5 Power Off	11
Chapter 3 Using the Scope	11
3-1 Channel Control	11
3-1-1 Range Control	11
3-1-2 Moving the Waveform	12
3-1-3 Setting the Channel	12
3-1-4 Auto Set Function	13
3-1-5 HOLD/RUN Mode	13
3-2 Trigger Controls	13
3-2-1 Trigger type	13
3-2-2 Trigger mode	14
3-2-3 HF Rejection	14
3-3 Automatic Scope Measurement	15

3-4	How to Save/Recall Waveform	16
3-5	Setting the Display	17
3-5-1	Setting the Display	17
3-5-2	Saving the Configuration Setup	18
Chapter 4	Waveform Output	18
4-1	Turning on/off Waveform Output	18
4-2	Setting the Output Amplitude	19
4-3	Setting the Output Frequency	19
4-4	Selecting Desired Waveform Type	20
Chapter 5	Using the Multimeter	21
5-1	Measuring DC or AC Voltage	21
5-2	Measuring Resistance	22
5-3	Measuring Capacitance	22
5-4	Continuity Test	23
5-5	Diode Test	23
Chapter 6	Using Communications	24
6-1	Recalling Saved Waveform	24
6-2	Synchronous Display and Control	25
Appendix	27
Appendix A	Main Technical Data	27
Appendix B	Trouble Shooting	31
Appendix C	How to Use the Terminals	32
Appendix D	Calibrating the Test Probe	33
Appendix E	Packing List	35

Chapter 1 Introduction

1-1 Unpacking and Checking the Test Tool Kit

When you just obtain this new portable oscilloscope, please check it following the procedure below:

1. Check whether there is damage due to transportation.

If the packing box or protective foam mattress shows any severe damage, please keep it and contact the salesman.

2. Check the accessories.

Check the accessories that comes with the oscilloscope for any missing or damaged accessory. If any, please contact the salesman. (The accessories are listed in the **Appendix E** section.)

3. Check the oscilloscope.

If the oscilloscope shows any visible damage or malfunctions, please contact the salesman. Please keep the packing material if the damage of the oscilloscope was caused by transportation.

1-2 Introduction for this Product

This oscilloscope is designed according to the research, production, debugging and repair requirements of many electronic engineers. In contrast to traditional oscilloscope, this oscilloscope is equipped with a built-in lithium battery and can work without external power supply, so it is convenient for carrying, especially for field application. It has three trigger modes - Auto, Normal and Single. You can lock and save the waveform of a non-periodical signal which a traditional oscilloscope can not capture.

The oscilloscope features compactness, beautiful appearance and friendly interfaces. It can quickly and accurately detect the faults of the circuit under test and can serve as an electronic engineer's assistant, and will provide great convenience for you in work.

1-2-1 Functions

- Scope function

- Multimeter function
- Signal generator function

1-2-2 Characteristics

- 320 × 240 pixels high-resolution color LCD, which has a higher information displaying capacity and a better displaying effect
- The oscilloscope is equipped with a high-capacity lithium battery, and supports multi placement methods, for example, it can be placed on the tilt stand, gripped by one hand, or hung. It is convenient for applications in various fields.
- Waveform and waveform parameter(s) can be displayed simultaneously on the screen, you can measure and display any three of the ten parameters – peak to peak value, maximum value, minimum value, average value, mean square root, frequency, period, duty cycle, rise time and fall time.
- Auto set function sets time base and vertical range automatically
- Selectable language (Chinese or English), easy to operate
- Compactness and light weight (about 700g)

Chapter 2 Controls and Initial Interface

2-1 Charging the Battery

Before you use the oscilloscope for the first time, you should charge the built-in battery for about 10 hours; after that, 6 hours is enough for each charging.

2-2 Buttons' Layout and Functions

Figure 1 shows the layout of the buttons.

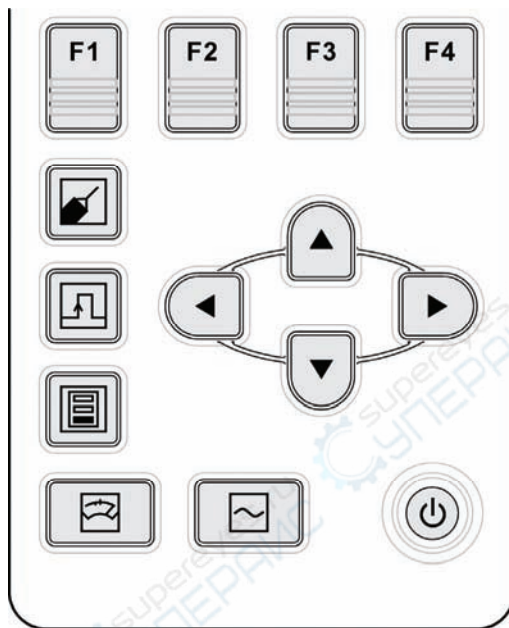


Figure 1 Buttons

Explanations:



Function button F1



Function button F2



Function button F3



Function button F4



Used to enter/exit channel setting interface



Used to enter/exit trigger setting interface



Used to enter/exit menu setting interface



Used to enter/exit multimeter interface



Used to enter/exit waveform output setting interface



and



1. Used to change the vertical range in CH1 range control.
2. Used to move the waveform of CH1 upwards or downwards.
3. Used to move the option cursor upwards or downwards on pull-up menu.
4. Used to change trigger level in the trigger setting interface.



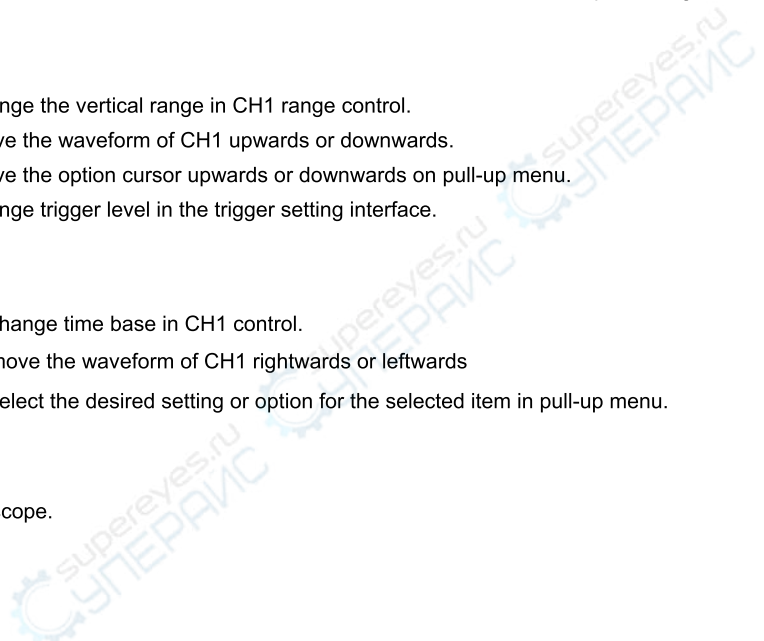
and



1. Used to change time base in CH1 control.
2. Used to move the waveform of CH1 rightwards or leftwards
3. Used to select the desired setting or option for the selected item in pull-up menu.



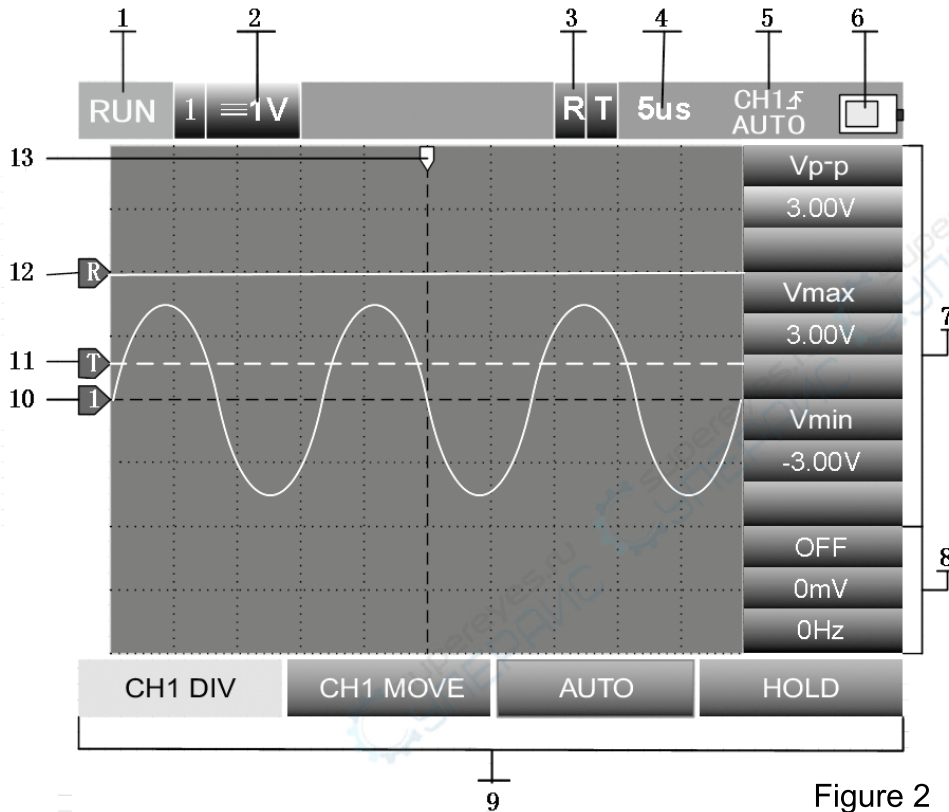
Used to turn on/off the oscilloscope.



2-3 Instruction for Scope Interface

After you turn on the oscilloscope, the screen will show initial interface (you can press any button or wait about 5 secs to enter initial interface).

Figure 2 shows an example of initial interface.



1. RUN or HOLD mode indicator
2. CH1 coupling type and amplitude range indication
3. REF display indicator
4. Time base
5. Trigger setup indication (refer to **3-2 Trigger Controls**. When HF rejection is turned on, " HF " will appear.)
6. Battery charge level indicator
7. Scope measurement results
8. Waveform output specification (refer to chapter 4)
9. Labels which define the present use for the four function buttons (**F1 – F4**)
10. CH1 waveform position indicator
11. Trigger level indicator
12. REF waveform position indicator
13. Indicator which indicates the horizontal displaced position of the waveform

Figure 2

The interface divides into 4 areas: The main area is waveform display area, the top line of the interface is status line, the bottom line of the interface is function and operation indication area, the column on the right of the interface is the numeric display area.

The waveform display area shows grid, waveform, and icon which indicates the position of waveform. The grid divides into 8 divisions in the vertical direction

and 10 divisions in the horizontal direction. A division has 25 pixels.

The status line indicates the present operating status of the Scope.

The function and operation indication area shows the 4 labels which defines the present use for the 4 function buttons (**F1**, **F2**, **F3** and **F4**).

The numeric display area shows the measurement results of the input signal waveform and the parameters of the output signal waveform.

2-4 Instruction for Multimeter Interface

Figure 3 shows an example of multimeter interface.

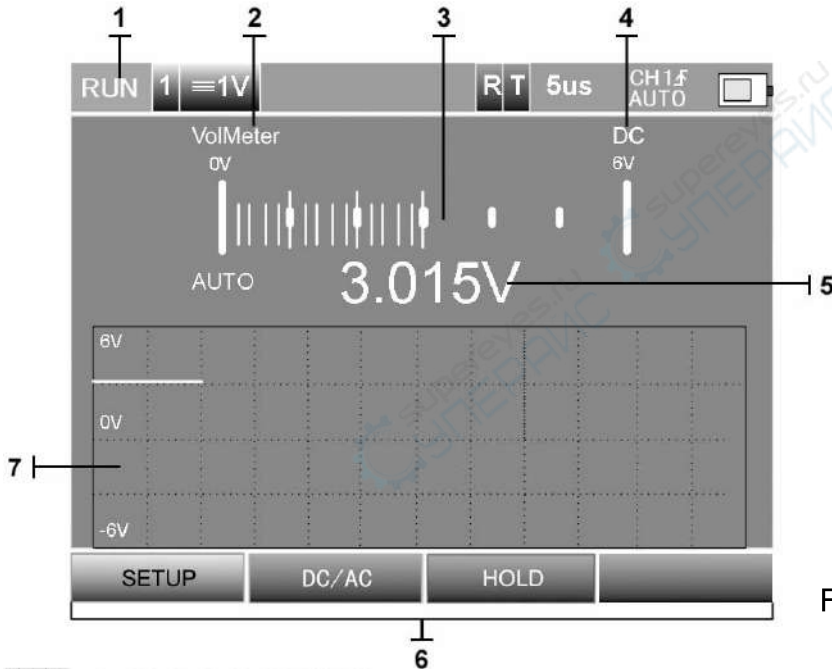


Figure 3

2-5 Power Off

When you finish measurement, press the  button to turn off the oscilloscope.






If the built-in lithium battery is not high enough, the oscilloscope will turn off automatically; if you want to use the oscilloscope in this condition, you can connect the supplied charger to the oscilloscope; but it is strongly recommended that you complete charging the battery before you start using the oscilloscope. Normally, the fully charged lithium battery can support about 6 hours of continuous use.

Chapter 3 Using the Scope

3-1 Channel Control

When you turn on the oscilloscope, the screen will show channel setting interface. If you are in other interface, you can press  to switch to channel setting interface.






3-1-1 Range Control

When in the channel setting interface, press  to select “CH1 DIV”. Then press  and  to change the vertical range of CH1. The available vertical ranges are: 5V/DIV, 2V/DIV, 1V/DIV, 500mV/DIV, 200mV/DIV, 100mV/DIV, 50mV/DIV, 20mV/DIV, 10mV/DIV. Press  and  to change the time base of CH1. The available time bases are: 2ns/DIV, 5ns/DIV, 10ns/DIV, 20ns/DIV, 50ns/DIV, 100ns/DIV, 200ns/DIV, 500ns/DIV, 1us/DIV, 2us/DIV, 5us/DIV, 10us/DIV, 20us/DIV, 50us/DIV, 100us/DIV, 200us/DIV, 500us/DIV, 1ms/DIV, 2ms/DIV, 5ms/DIV, 10ms/DIV, 20ms/DIV, 50ms/DIV, 100ms/DIV, 200ms/DIV, 500ms/DIV, 1s/DIV, 2s/DIV, 5s/DIV.


Note: For the 2ns/DIV and 5ns/DIV ranges, waveform is acquired by equivalent time sampling. For the other ranges, waveform is acquired by real time sampling.

Explanation: Equivalent time sampling is a sampling technique in which waveform is reconstructed by multiple triggers and multiple-sampling. Equivalent time sampling is used only with repetitive signals.

3-1-2 Moving the Waveform

When in the channel setting interface, press  to select "CH1 MOVE". Then you can press  or  to move the waveform of the CH1 channel upwards or downwards, or press  or  to move the waveform of the CH1 channel leftwards or rightwards.

3-1-3 Setting the Channel

When in the channel setting interface, you can press  twice (or once) to open the CH1 channel setup pull-up menu, which is explained in Table 1.







Press  again to close this pull-up menu.

Table 1 Instruction for CH1 Channel Setup Pull-Up Menu


Item	Options	Description
ON/OFF	[] OFF [*] ON	Press the left or right arrow key to turn on or off the CH1 channel.
COUPLING	[] AC [*] DC	Press the left or right arrow key to select AC-coupling or DC-coupling for the CH1 channel.
ATTENUATION	[*] X1 [] X10 [] X100	Press the left or right arrow key to select a proper attenuation factor according to the attenuation coefficient setting of the test probe being used, ensure that the attenuation factor you select is the same as the attenuation coefficient setting of the test probe.
INVERT	[*] OFF [] ON	Press the left or right arrow key to select whether to invert the waveform of the CH1 channel.

When the CH1 channel setup pull-up menu is shown, you can press  or  to select desired item, and then press  or  to select desired setting or option for this item.

3-1-4 Auto Set Function





When in initial scope interface, you can press  to enable the auto set function; the oscilloscope will select suitable vertical range and time base automatically according to the input signal.

3-1-5 HOLD/RUN Mode

When in initial scope interface, you can press  to enter HOLD mode; the waveform will be held on the display. Press again to exit HOLD mode.


3-2 Trigger Controls



Trigger determines when the oscilloscope starts sampling and displaying waveform. Selecting suitable trigger mode, trigger level, and trigger type will help obtain desired measurement results and find out the problem of the circuit under test.

Press  to enter trigger setting interface, press  again to return to channel setting interface. When in trigger setting interface, you can press  or  to change trigger level.

3-2-1 Trigger Type


The Scope's trigger type is edge trigger, trigger occurs on rising or falling edge of waveform.

After entering trigger setting interface, you can press  to select the rising or falling edge of the waveform to trigger on; the display will show the

corresponding symbol “” (trigger occurs on rising edge of waveform) or “” (trigger occurs on falling edge of waveform).

3-2-2 Trigger Mode

There are three trigger modes: Auto, Normal, and Single.

When in the trigger setting interface, you can press  to select desired trigger mode: Auto, Normal or Single; the display will show the corresponding symbol: “ **AUTO** ”, “ **NORMAL** ”, or “ **ONCE** ”.


Auto trigger mode: Acquisition of waveforms is possible even if no trigger is found.

Normal trigger mode: The Normal trigger mode allows the oscilloscope to acquire a waveform only when it is triggered. If no trigger occurs, the oscilloscope keeps waiting, and the previous waveform, if any, will remain on the display.

Single trigger mode: Sampling is performed on the input signal when one trigger is detected, then sampling ceases.

3-2-3 HF Rejection

The HF Rejection function removes high frequency components from the input signal while allowing low frequency components to pass.

When in the trigger setting interface, you can press  to enable or disable the HF Rejection function. When the HF Rejection function is enabled, the display shows the symbol “ **HF** ” as an indication.

3-3 Automatic Scope Measurement









Press  to enter menu setting interface, press again to return to channel setting interface. When in menu setting interface, you can press  to open automatic measurement setup pull-up menu, and press again to close this pull-up menu. When the automatic measurement setup pull-up menu is displayed, you can press  or  to select desired measurement item on this menu, and then press  or  to turn on this measurement. The numeric display area (the column on the right of the screen) can display up to three kinds of automatic scope measurement results. If you select a fourth automatic scope measurement, the first automatic scope measurement will be cancelled automatically. If the waveform exceeds the oscilloscope's viewing capability, the display will show “ *.* ” instead of the reading.





Table 2 10 Kinds of Automatic Scope Measurements

Item	Options	Description
Vpp	[] OFF [*] ON	Press the right or left arrow key to turn on peak-to-peak value measurement.
VMAX	[] OFF [*] ON	Press the right or left arrow key to turn on max. value measurement.
VMIN	[] OFF [*] ON	Press the right or left arrow key to turn on min. value measurement.
AVERAGE	[*] OFF [] ON	Press the right or left arrow key to turn on average value measurement.
VRMS	[*] OFF [] ON	Press the right or left arrow key to turn on root mean square value measurement.
FREQ	[*] OFF [] ON	Press the right or left arrow key to turn on frequency measurement.
PERIOD	[*] OFF [] ON	Press the right or left arrow key to turn on period measurement.
DUTY	[*] OFF [] ON	Press the right or left arrow key to turn on duty cycle measurement.
RISETIME	[*] OFF [] ON	Press the right or left arrow key to turn on rise time measurement.
FALLTIME	[*] OFF [] ON	Press the right or left arrow key to turn on fall time measurement.

Note: If you select frequency measurement, you must select a suitable trigger level for the channel; otherwise frequency reading may be not available.

3-4 How to Save/Recall Waveform

When in menu setting interface, you can press  to open the waveform storage/recall setup pull-up menu, and press  again to close this menu.

When the waveform storage/recall setup pull-up menu is displayed, you can press  or  to select desired item on this menu, and then press  or  to select the desired setting or option for this item.

There are 6 memory locations for you to select from. When a saving succeeds, the display will flash once as an indication.

Table 3 Instruction for the Waveform Storage/Recall Setup Pull-Up Menu

Item	Options	Description
REF	[] OFF [*] ON	Press the right or left arrow key to turn on or off the REF channel.
LOAD_POS	[*] 1 [] 2 [] 3 [] 4 [] 5 [] 6	Press the right or left arrow key to select the desired memory location where the saved waveform to be recalled to the REF channel is stored.
LOAD	»	Press the right arrow key to recall the saved waveform from the selected memory location to the REF channel.
INVERT	[] OFF [*] ON	Press the right or left arrow key to select whether to invert the waveform of the REF channel.
SAVE_POS	[*] 1 [] 2 [] 3 [] 4 [] 5 [] 6	Press the right or left arrow key to select the desired memory location for saving waveform.
SAVE	»	Press the right arrow key to save the waveform.

Note: Only after you have saved a waveform successfully can you recall this saved waveform from its memory location to the REF channel.

3-5 Setting the Display

3-5-1 Setting the Display






When in the menu setting interface, you can press  to open the display setup pull-up menu, and press again to close this menu. When the display setup pull-up menu is shown, you can press  or  to select desired item on this menu, and then press  or  to select desired setting or option for this item.

Table 4 Instruction for the Display Setup Pull-Up Menu

Item	Options	Description
GRID	[*] OFF [] ON	Press the right or left arrow key to show or hide the grid.
AVERAGES	[*] 1 [] 2 [] 4 [] 8 [] 16 [] 32	Press the right or left arrow key to select desired average number.
PERSISTENCE	[*] 0 [] 3 [] 5 [] 7	Press the right or left arrow key to select desired persistence degree.
DISTYPE	[*] VECTORS [] DOTS	Press the left or right arrow key to display waveform as vectors or dots.
BACKLIGHT	« »	Press the right or left arrow key to select the desired brightness.
LANGUAGE	[] CHINESE [*] ENGLISH	Press the right or left arrow key to select desired interface language.
COLOR	[*] 1 [] 2 [] 3 [] 4	Press the right or left arrow key to select the desired background color.
SAVE SETUP	»	Press the right arrow to save the setup.
RESET	»	Press the right arrow to restore the oscilloscope to the factory settings.






Explanation

Persistence: When the persistence function is enabled, displayed waveform will stay on the screen for a while, which is similar to the waveform display of an analog oscilloscope.


3-5-2 Saving the Configuration Setup

The system's configuration setup is to provide a suitable observation condition for user. You can change the configuration setup according to your preference and then save it so that when you turn on the oscilloscope the next time, the oscilloscope will start up using this configuration setup. The configuration setup covers the settings of: turning on or off CH1 channel, vertical range, horizontal range, automatic measurement function, grid display, average number, persistence degree, waveform display type, backlight, interface language, background color, and etc.


Use the following procedure to save the configuration setup:

After you set up the desired settings, press  to enter menu setting interface. Press  to open the display setup pull-up menu. Press  or  to select the “**SAVE SETUP**” item, then press  to save the configuration setup; the screen will flash once to indicate that this saving has succeeded.

Chapter 4 Waveform Output

The oscilloscope can output waveform for user to calibrate the test probe or test other equipments. Press  to enter waveform output setting interface, press again to return to initial scope interface. The waveform output setting interface provides 4 function options: “**ON/OFF**”, “**AMP**”, “**FREQ**”, and “**WAVEFORM**”.

4-1 Turning on/off Waveform Output

When in waveform output setting interface, you can press  to turn on or off waveform output. When waveform output is turned off, “**OFF**” will appear

as an indication.

4-2 Setting the Output Amplitude








Press  to enter the waveform output setting interface, press  to open the output amplitude setting pull-up menu. Then press  or  to select desired item on the menu, and press  or  to select desired setting for the item. Press  again to close the pull-up menu.

Table 5 Instruction for the Output Amplitude Setting Pull-Up Menu

Item	Options	Description
COARSE	« »	Press the right or left arrow key to increase or decrease the output amplitude coarsely.
FINE	« »	Press the right or left arrow key to increase or decrease the output amplitude finely.

For output amplitude adjustments, coarse adjustment is in increments or decrements of 50mV, while fine adjustment is in increments or decrements of 5mV. The output amplitude range is: 0 – 2500mV.

4-3 Setting the Output Frequency








Press  to enter the waveform output setting interface, then press  to open the output frequency setting pull-up menu. Press  or  to select desired item in this menu, and then press  or  to select desired setting for the item. Press  again to close the pull-up menu.

Table 6 Instruction for the Output Frequency Setting Pull-Up Menu

Item	Options	Description
COARSE	« »	Press the right or left arrow key to increase or decrease the output frequency coarsely.
FINE	« »	Press the right or left arrow key to increase or decrease the output frequency finely.

For output frequency adjustments, coarse adjustment is in increments or decrements of 200Hz while fine adjustment is in increments or decrements of 1Hz. Output frequency range is: 26Hz - 50kHz.

4-4 Selecting Desired Waveform Type






Press  to enter the waveform output setting interface, then press  to open the waveform type setting pull-up menu. Press  or  to select desired waveform type. Press  again to close the pull-up menu.

Table 7 Instruction for the Waveform Type Setting Pull-Up Menu

Item	Description
[*]DC []SQU []TRI []SAW []SIN []PUL	Press the right or left arrow key to select desired output waveform type.

The available output waveform types are: DC, square, triangular, sawtooth, sine, and pulse waveforms.

Chapter 5 Using the Multimeter







Press  to enter multimeter interface, press again to return to initial scope interface. After entering multimeter interface, you can press  to open the multimeter setup pull-up menu, and press again to close this menu. When the multimeter setup pull-up menu is displayed, you can press  or  to select desired item on this menu, and then press  or  to select desired option for this item.

Table 8 Instruction for the Multimeter Setup Pull-Up Menu






Item	Options	Description
MEASURE	[*] VOLT [] OHM [] CAP [] CON. [] DIODE	Press the right or left arrow key to select desired measurement function.
TRENDPLOT	[*] OFF [] ON	Press the right or left arrow key to turn on or off trend plot display.



Available multimeter measurement functions include: voltage, resistance, capacitance, continuity and diode measurement functions.

Voltage function is divided into dc voltage function and ac voltage function.

The bar graph and trend plot on multimeter interface allow user to observe the measurement result more visually.

5-1 Measuring DC or AC Voltage






Press  to enter multimeter interface, press  to open the multimeter setup pull-up menu. Press  or  to select the "VOLT" item and enter voltage measurement interface. Then press  (which is under the "DC/AC" label) to select dc voltage or ac voltage measurement function, the

display will show the corresponding symbol. You can press  to hold the measurement results on the display, “ **HOLD** ” will appear on the display as an indication. To exit HOLD mode, just press  again. “ **HOLD** ” disappears.

Voltage function has 3 ranges: 6V, 60V, and 600V; and range change is automatic.






Note: To avoid damage to the multimeter, do not change the multimeter’s function from voltage function to other function if a voltage higher than 3V is being measured; otherwise the screen will display a warning message.

5-2 Measuring Resistance

Press  to enter multimeter interface, press  to open the multimeter setup pull-up menu. Press  or  to select the “ **OHM** ” item and enter resistance measurement interface and then you can start to perform resistance measurement. You can press  to hold the measurement results on the display, and press again to exit HOLD mode.

Resistance function has 6 ranges: 600Ω, 6kΩ, 60kΩ, 600kΩ, 6MΩ and 60MΩ; range change is automatic.

5-3 Measuring Capacitance

Press  to enter multimeter interface, press  to open the multimeter setup pull-up menu. Press  or  to select the “ **CAP** ” item and enter capacitance measurement interface and then you can start to perform capacitance measurement. You can press  to hold the measurement results


on the display, and press again to exit HOLD mode.

Capacitance function has 7 ranges: 6nF, 60nF, 600nF, 6uF, 60uF, 600uF, and 6mF; and range change is automatic.

For measurements in 6nF range, measurement is likely to be interfered with by external interference via the test leads because the test current is very low. Please connect the two leads of the capacitor to be tested to the two multimeter input terminals directly or use a pair of test leads which are as short as possible for connection, in order to eliminate the interference from the external environment.

5-4 Continuity Test


Press  to enter multimeter interface, press  to open the multimeter setup pull-up menu, press  or  to select the “CON.” item

and enter continuity test interface and then you can start to perform continuity test. You can press  to hold the measurement results on the display, and press again to exit HOLD mode.

Continuity test uses the 600Ω range. When the resistance is less than about 25Ω, the built-in buzzer will sound.

5-5 Diode Test

Press  to enter multimeter interface, press  to open the multimeter setup pull-up menu. Press  or  to select the “DIODE” item

and enter diode test interface, then you can start to perform diode test. You can press  to hold the measurement results on the display, and press again to exit HOLD mode. When the forward voltage drop of the diode under test is > 2V or when the test circuit is open, the display will show “OL”. When the forward voltage drop of the diode is < 0.25V, the built-in buzzer will sound.

Chapter 6 Using Communications

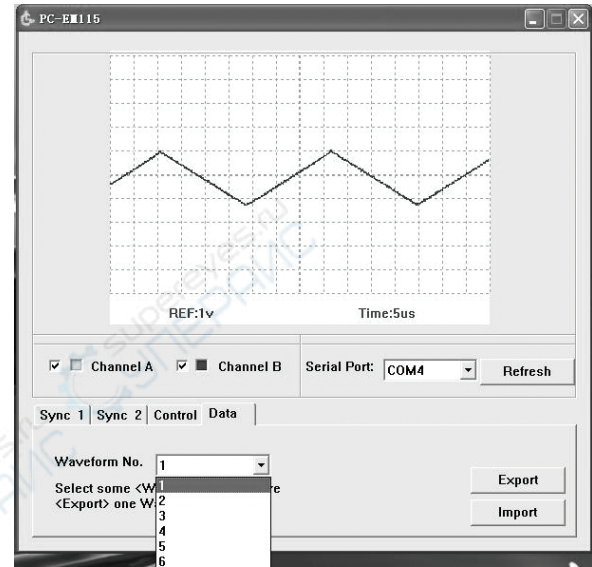
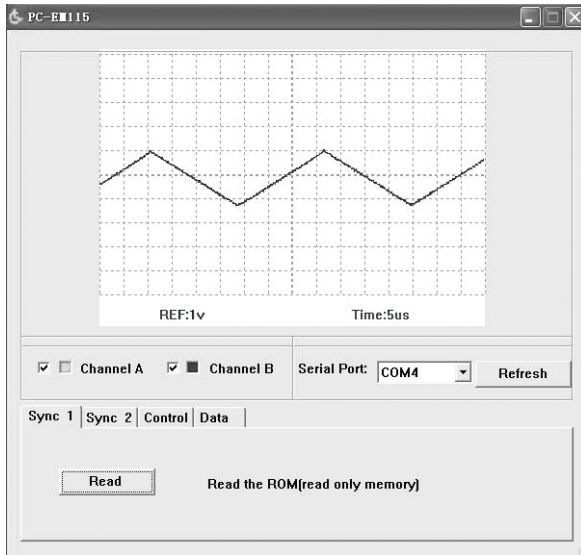
You can use the communication software to recall the saved waveforms, control the oscilloscope, or display the waveform(s) in real-time mode. Before you use the software for the first time, you must install the USB driver (located in the CD) in your computer. After installing the USB driver, turn on the oscilloscope and connect it to the computer with the data line. Run the communication software and then select the proper serial port. Now you can start to use the communication function.

6-1 Recalling Saved Waveform

Run the communication software. Click the “ **Sync 1** ” tab name, and then click the “ **Read** ” button to upload the saved waveforms from the oscilloscope to the computer. Then click the “ **Data** ” tab name, and select the desired number in the “ **Waveform No** ” drop-down list box to display the corresponding waveform. There are up to 6 waveforms in total.

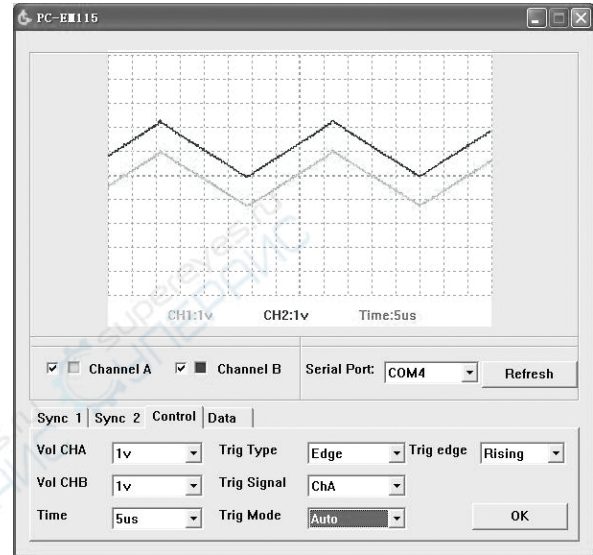
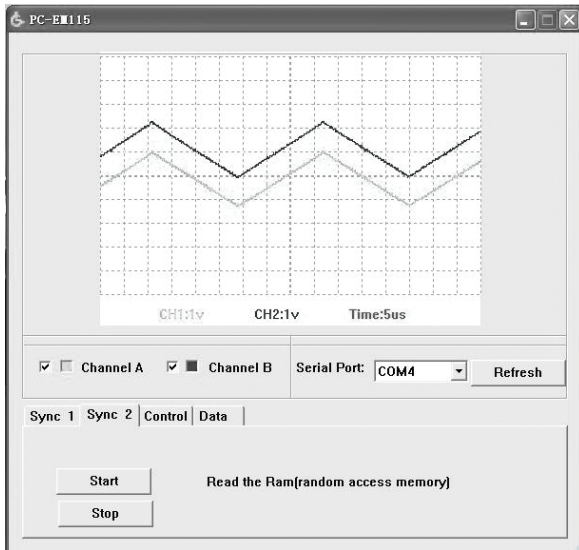
Click the “ **Export** ” button to save the presently displayed waveform in the computer in BMP, CSV, or DAT format.

Click the “ **Import** ” button to open a file of DAT format and display the waveform recorded in this file.



6-2 Synchronous Display and Control

Click the “**Sync 2**” tab name, and then click the “**Start**” button to enable the synchronous display function, or press the “**Stop**” button to disable this function. After enabling the synchronous display function, click the “**Control**” tab name to switch to the “**Control**” tab. Now you can set vertical range, time base, or set the trigger settings. After you finish setting, click the “**OK**” button and the settings will take effect.



Note: 1. If a setting exceeds the oscilloscope's capability, this setting will not take effect.

2. This software instruction assumes that your computer is running under the WINDOWS XP or WINDOWS 7 operating system.

Appendix

Appendix A Main Technical Data

Performance

Performance of Scope	
Bandwidth (-3dB)	50MHz
Sampling Rate	Max. real time sampling rate 200MSa/s
Channel	1
Coupling	AC, DC
Rise Time	≤ 7.6ns
Input Impedance	1MΩ, ≤ 20pF
Max Input Voltage	1x CAT III 300 VAC 10x, 100x CAT III 600 VAC
Vertical Resolution	8 bit
Vertical Sensitivity	10mV/div - 5V/div
Horizontal Resolution	2ns/div
Horizontal Sensitivity	2ns – 5s
Record Length	4K/channel
Memory	6 memory locations
Trigger Mode	Auto, Normal, Single
Trigger Type	Edge trigger
Basic Performance	
Screen	320×240 pixels (RGB), with LED backlight
Communication	USB, PC software
Battery	3.7V lithium polymer battery, 4Ah
Adapter	Input Voltage: 100Vac - 240Vac Output: 5Vdc ± 10%, 2000mA

Operating Environment	Temperature: 0°C - 40°C
	Humidity: ≤ 75%
Storage Environment	Temperature: -10°C - 50°C
	Humidity: ≤ 85%
Operating Altitude	0 - 2000m
Size	218mm × 118mm × 50mm (including holster)
Weight	700g (main body only)
Performance of multimeter	
Display	6000 counts
Input	Max. Input Voltage: 600 Vrms CAT II, 300 Vrms CAT III
Continuity Test	Beeps at < 25Ω, in 600Ω range
Diode Test	If the voltage drop of the diode under test is more than 2V or if the test circuit is open, the display will show " OL ". If the voltage drop is less than 0.25V, the built-in buzzer will sound.
Capacitance Measurement	6.000nF - 6mF
Resistance Measurement	600.0Ω - 60.00MΩ
Voltage Measurement	6.000V - 600V
Waveform output performance	
Amplitude	Output amplitude is adjustable. Output amplitude range: 0 - 2.5V Output amplitude accuracy: ± 2% for amplitudes < 2V ± 5% for amplitudes > 2V
Frequency	There is no frequency setup for dc output. Output frequency range: 26Hz - 50kHz Output frequency accuracy: ± 2%

Specification

Note: Accuracy is guaranteed only if the ambient temperature is at the instrument's calibration temperature $\pm 5^{\circ}\text{C}$ and you wait 10 minutes to allow the instrument to warm up after you turn it on.

Specification of Scope			
Vertical System: channel of Scope			
Bandwidth (-3dB)	50MHz		
Accuracy	10mV/div to 20 mV/div: $\pm 5\%$ full scale		
	50mV/div to 5V/div: $\pm 3\%$ full scale		
Vertical Offset Accuracy (DC)	± 0.2 div $\pm 2\text{mV}$ $\pm 0.5\%$ offset value		
Trigger Sensitivity	DC to 50 MHz: 0.8 div		
Specification of probe			
Rise Time	X1 < 23.3ns		
	X10 < 7.6ns		
Bandwidth	X1 DC - 8MHz		
	X10 DC - 50MHz		
Input Impedance	X10 10M Ω (not including the Scope's input resistance 1M Ω)		
Input Capacitance	X1 46pF (not including the Scope's input capacitance)		
	X10 about 15pF		
Specification of Multimeter			
Function	Range	Frequency, test current, or load voltage	Condition: at calibration temperature $\pm 5^{\circ}\text{C}$, for 1 year
Voltage			
DC Voltage	6.000V		1.0 + 8
	60.00V		0.5 + 8
	600.0V		0.5 + 8
AC Voltage	6.000V – 600.0V	40Hz – 400Hz	1.0 + 10
		400Hz – 2kHz	5.0 + 10

Resistance			
	600.0Ω		1.0 + 5
	6.000kΩ		1.0 + 5
	60.00kΩ		1.0 + 5
	600.0kΩ		1.0 + 5
	6.000MΩ		1.0 + 5
	60.00MΩ		2.0 + 10
Capacitance			
	6.000nF		3.0 + 8
	60.00nF		3.0 + 8
	600.0nF		3.0 + 8
	6.000μF		3.0 + 8
	60.00μF		3.0 + 8
	600.0μF		3.0 + 8
	6.000mF		3.0 + 8
Continuity	Buzzer beeps if the resistance is less then about 25Ω.		
Diode	Buzzer beeps if the forward voltage drop of the diode is < 0.25V.		

Note: Do not make any measurement during charging the built-in battery; otherwise measurement accuracy may be out of the specified accuracy range.

Appendix B Trouble Shooting

1. The oscilloscope can not start up.

The built-in battery may be completely empty. In this case the scilloscope will not start up, even if it is being powered by the charger. To solve this problem, charge the built-in battery for about 15 minutes without turning on the scilloscope. Then try to turn on the scilloscope.

2. The oscilloscope turns off automatically several seconds later after it is turned on.

Maybe the built-in battery is exhausted. Please check the battery charge level indicator on the right-top corner of the screen. Charge the battery if necessary.

3. How to switch between AC Voltage and DC Voltage measurements.

Press **F2** when voltage measurement interface is displayed.

4. In scope mode, the measurement result is 10 times as high or low as the actual value.

Check whether the channel's attenuation factor setting is the same as the switch setting of the test probe; for example, both the two settings are " $\times 10$ " or " $\times 1$ ".

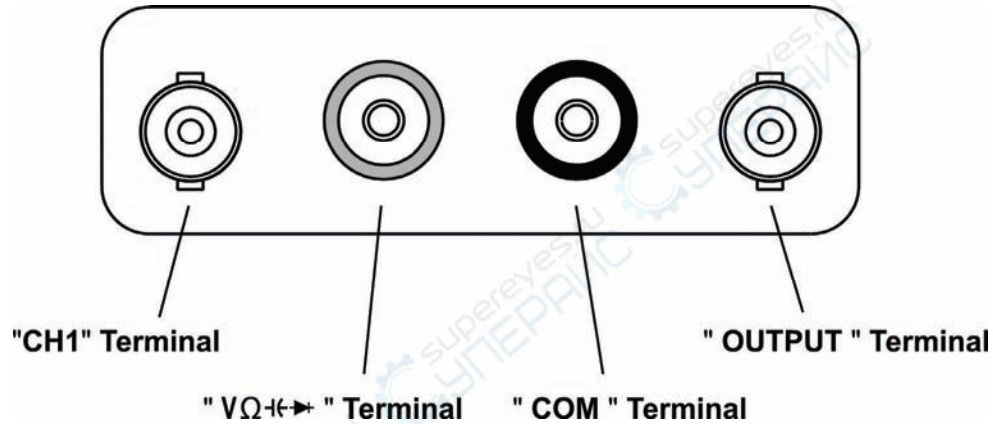
5. In scope mode, a waveform is displayed but it is not stable.

In the trigger setting interface, try the following steps:

1. Check whether HF rejection has been enabled. HF rejection can filter out high frequency noise or components.
2. Try using another trigger mode. (There are three trigger modes for you to select from: Auto, Normal, Single.)

Appendix C How to Use the Terminals

The oscilloscope's terminals are shown in the following figure and marked on the oscilloscope.



“ **CH1** ” **Terminal**: Input terminal of channel 1 (CH1) of the scope.

“ **VΩ-⚡** ” **Terminal**: Plug-in terminal for the red test lead for all multimeter measurements.

“ **COM** ” **Terminal**: Plug-in terminal for the black test lead for all multimeter measurements.

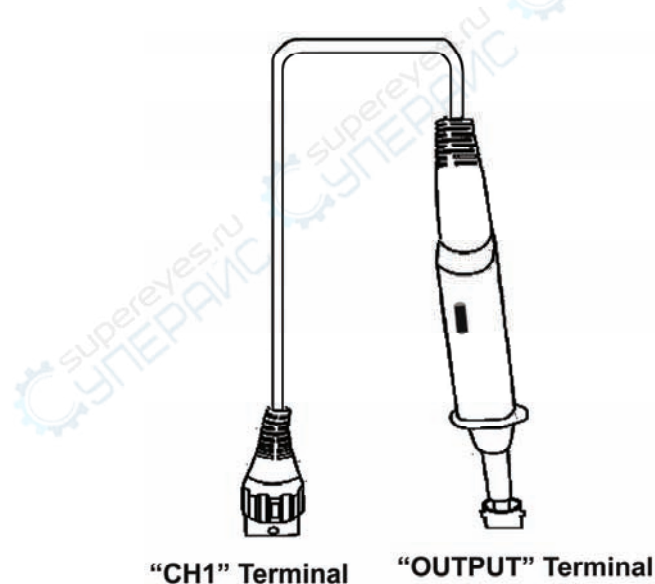
“ **OUTPUT** ” **Terminal**: Waveform output terminal

Appendix D Calibrating the Test Probe

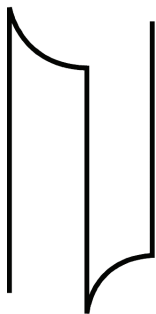
The test probe needs to be set according to the input signal. A signal with large amplitude should be attenuated and a signal with high frequency requires a setting of low input capacitance. The attenuation setting of the test probe must match with the attenuation setting of the oscilloscope in order to obtain correct measurement result.

When you connect the test probe to the oscilloscope for the first time, you must adjust the test probe's compensation capacitance to match the test probe to the input channel of the oscilloscope. If the test probe is not properly adjusted, the measurement results may be inaccurate or incorrect. Use the following procedure to adjust the test probe's compensation capacitance:

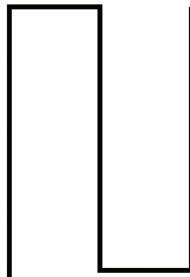
1. Connect the plug of the test probe to the " **CH1** " terminal. Select " **X10** " for the " **ATTENUATION** " item in the CH1 channel setup pull-up menu, and move the switch of the test probe to the " **X10** " position. Then connect the probe to the " **OUTPUT** " terminal, and set the oscilloscope to output 2V 1kHz squarewave.



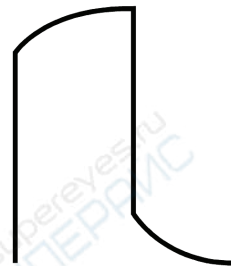
2. Check the shape of the waveform on the display.



Over Compensated



Correctly Compensated



Under Compensated

3. If the waveform shows that it has been over compensated or under compensated, use a non-metallic tool to adjust the trimmer on the test probe for the flattest square wave available.

Appendix E Packing List

#	Item	Amount	Standard Accessory	Optional Accessory
1	Oscilloscope	1 pcs	✓	
2	60M (10:1) test probe	1 pcs	✓	
3	Data Line	1 pcs	✓	
4	CD ROM	1 pcs	✓	
5	Users Manual	1 pcs	✓	
6	Charger	1 pcs	✓	
7	4000mAh lithium battery (built-in)	1 pcs	✓	
8	Test Lead	1 pair	✓	
9	Carrying Bag	1 pcs		✓
10	100:1 test probe	1 pcs		✓

NOTE

1. This manual is subject to change without notice.
2. Our company will not take the other responsibilities for any loss.
3. The contents of this manual can not be used as the reason to use the meter for any special application.

DISPOSAL OF THIS ARTICLE

Dear Customer,

If you at some point intend to dispose of this article, then please keep in mind that many of its components consist of valuable materials, which can be recycled.

Please do not discharge it in the garbage bin, but check with your local council for recycling facilities in your area.



