User Manual

4 Channels PC Oscilloscope

Stock number: 2205864, 2205865, 2205866, 2205867

Content

General Safety Summary

Review the following safety precautions carefully before operate the device to avoid any personal injuries or damages to the device and any products connected to it.
To avoid potential hazards use the device as specified by this user's guide only.

■ **To Avoid Fire or Personal Injury**

■ **Use Proper Power Cord.** Use only the power cord specified for this product and certified for the country of use.

■ **Connect and Disconnect Properly.** Do not connect or disconnect probes or test leads while they are connected to a voltage source.

■ **Connect and Disconnect Properly.** Connect the probe output to the measurement device before connecting the probe to the circuit under test. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement device.

■ **Observe All Terminal Ratings.** To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

■ **Use Proper Probe.** To avoid shock hazard, use a properly rated probe for your measurement.

■ **Avoid Circuit or Wire Exposure.** Do not touch exposed connections and components when power is on.

■ **Do Not Operate With Suspected Failures.** If suspected damage occurs with the device, have it inspected by qualified service personnel before further operations.

■ **Provide Proper Ventilation.** Refer to the installation instructions for proper ventilation of the device.

■ **Do not operate in Wet/Damp Conditions.**

■ **Do not operate in an Explosive Atmosphere.**

■ **Keep Product Surface Clean and Dry.**

Chapter 1 Getting Start

The oscilloscope is small, lightweight, no external power required, portable oscilloscopes! The oscilloscopes is ideal for production test, research and design and all of the applications involving analog circuits test and troubleshooting, as well as education and training.

In addition to the list of general features on the next page, this chapter describes how to do the following tasks:

◆ **System Requirements**

◆ **Install Software**

◆ **Install Driver**

◆ **General Features**

◆ **General Check**

◆ **Function Check**

◆ **Self Calibration**

◆ **Accessories**

1.1 System Requirement

To run the oscilloscope software, the needs of computer configuration are as follows:

Minimum System Requirements

Operating System
Window XP/ Vista/ Win7/ Win8/ Win10

Processor
Upwards of 1.00G processor

Memory
256M byte

Disk Space
500M disk free space

Screen resolution
800 x 600

Recommended Configuration

Operating System
Windows XP SP3 System

Processor
2.4G Processor

Memory
1G Byte Memory

Disk Space
80G Disk Space

Screen resolution
1024 x 768 or 1280 x 1024 resolution

DPI Setting
Normal Size (96DPI)

1.2 Install Software

**Caution:** You must install the software before using the oscilloscope.

1. While in Windows, insert the installation CD into the CD-ROM drive.

2. The installation should start up automatically. Otherwise in Windows Explorer, switch to the CD-ROM drive and run Setup.exe.

3. The software Installation is started. Click 'Next' to continue.
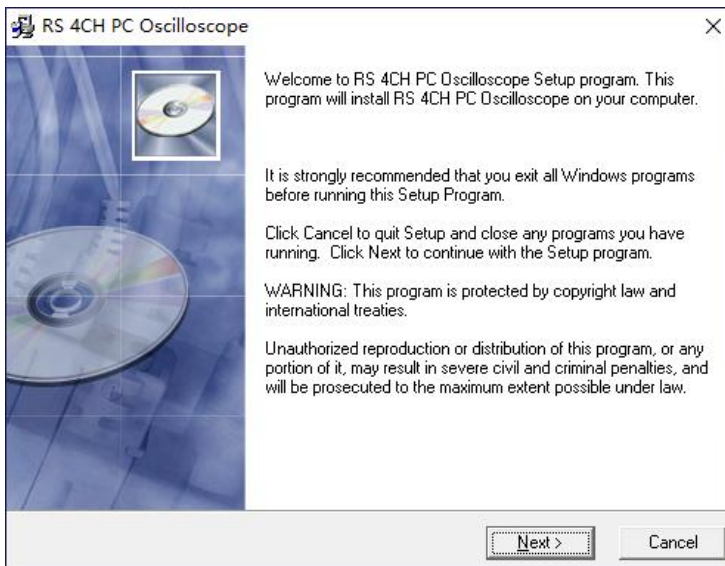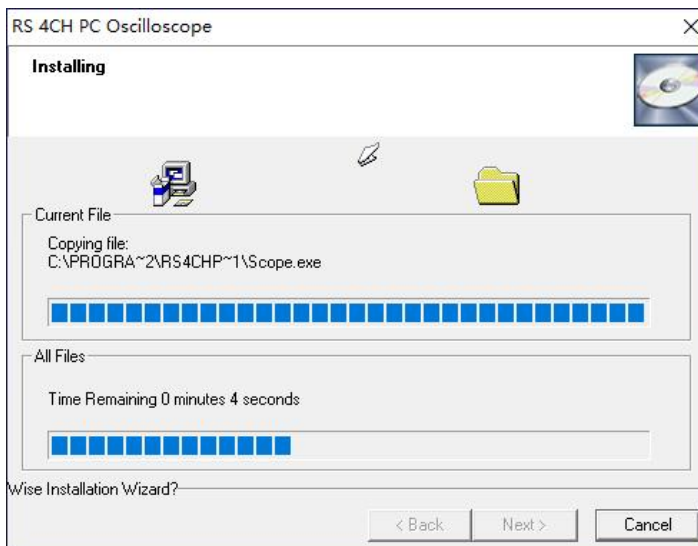

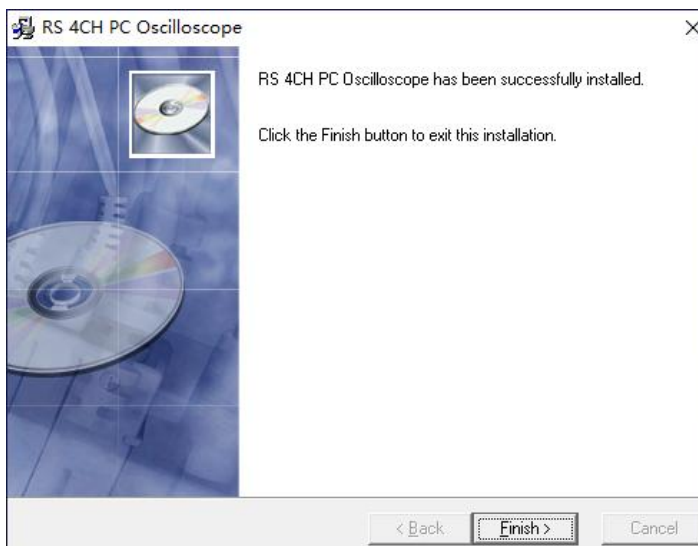4. Choose a destination directory. Click 'Next' to continue.
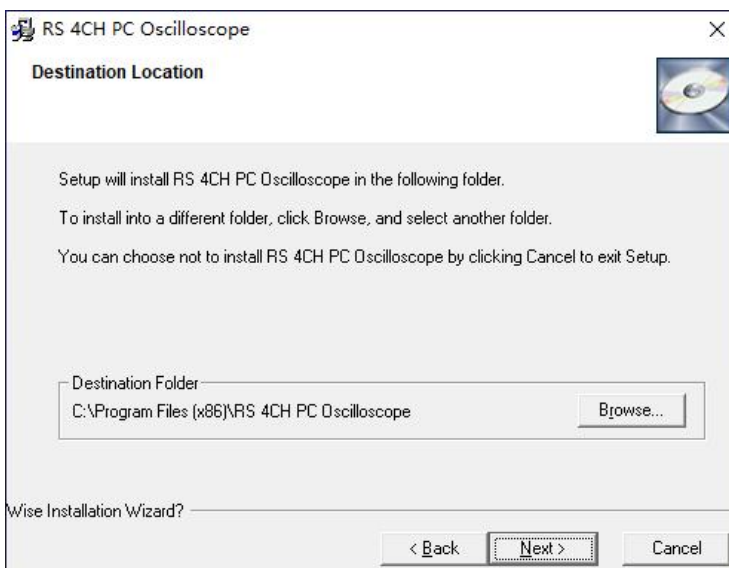
5. Check the setup information. Click Next to start copying of files.
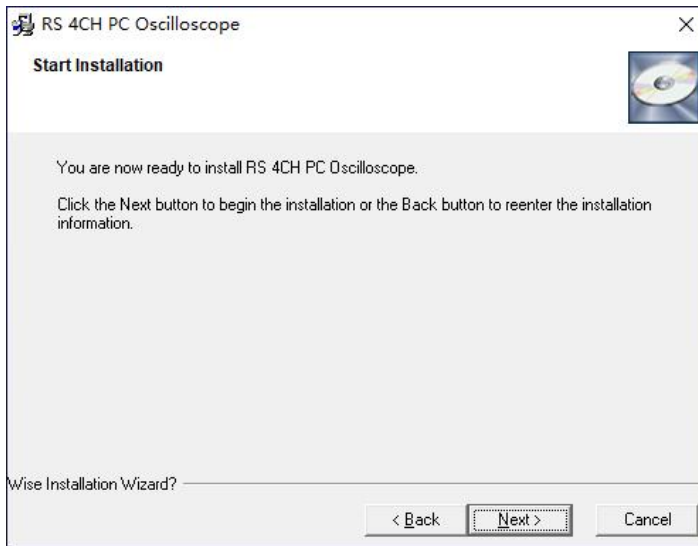
6. This Status dialog is displayed during copying of files.
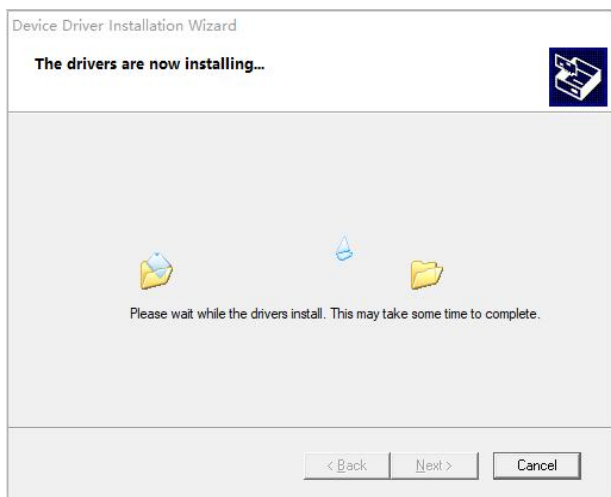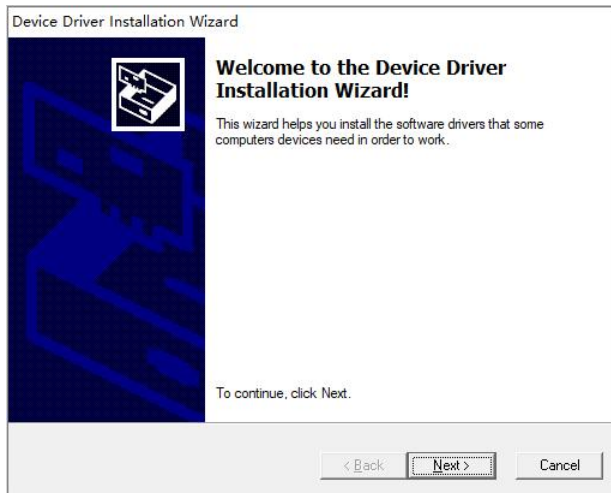

7. The installation is complete.

1.3 Install Driver

After software completed, the driver will be installed automatically in Window 7 or higher operation system.

Please click **Finish** button in the pop-up dialog box.

1.4 General Features

Product   Features:

■ **Four Channels, Max Bandwidth:**

   70 MHz / 100 MHz / 200 MHz / 250MHz

■ **Maximum real-time sample rate:**

   1GSa/s

■ **Memory depth:**

   64K /CH

■ **Automatic setup for ease of use (AUTOSET);**

■ **Built-in Fast Fourier Transform function(FFT);**

■ **20 Automatic measurements;**

■ **Automatic cursor tracking measurements;**

■ **Waveform storage, record and replay dynamic waveforms;**

■ **User selectable fast offset calibration;**

■ **Add, Subtract and Multiply Mathematic Functions;**

■ **Selectable 20 MHz bandwidth limit;**

■ **Waveform average;**

■ **Adjustable waveform intensity, more effective waveform view;**

■ **User interface in several user-selectable languages;**

1.5 General Check

Please check the instrument as following steps after receiving an oscilloscope:

Check the shipping container for damage:
Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically.

Check the accessories:
Accessories supplied with the instrument are listed in "Accessories" in this guide. If the contents are incomplete or damaged, please notify the franchiser.

Check the instrument:
In case there is any mechanical damage or defect, or the instrument does not operate properly or fails performance tests, please notify the franchiser.

Probe Compensation

Perform this function to match the characteristics of the probe and the channel input. This should be performed whenever attaching a probe to any input channel at the first time.

■ From the "Probe" menu, select attenuation to 1:10. Set the switch to "X10" on the probe and connect it to CH1 of the oscilloscope. When using the probe hook-tip, insert the tip onto the probe firmly to ensure a proper connection.

■ Attach the probe tip to the Probe Compensator and the reference lead to the ground connector, select CH1, and then press the "**AUTOSET**" button into the menu or the toolbar.

■ Check the shape of the displayed waveform.
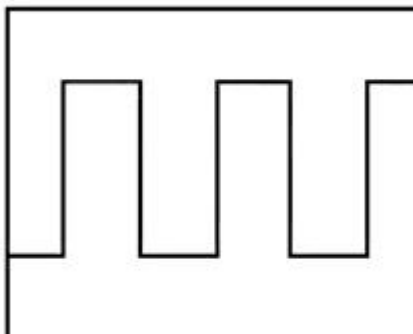
Correctly Compensated
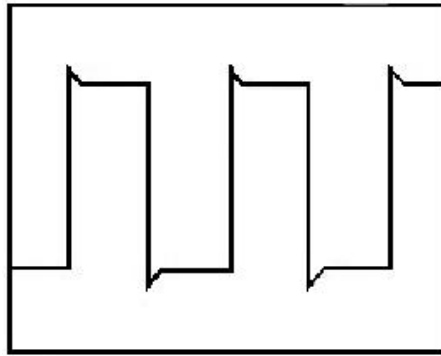
Over Compensated
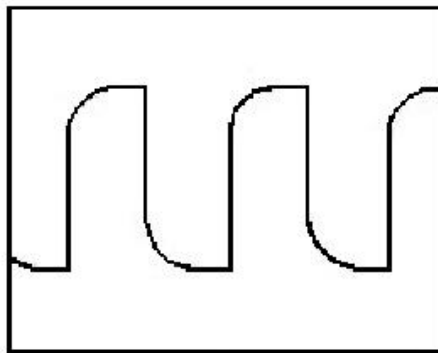
Under Compensated

1. If necessary, use a non-metallic tool to adjust the trimmer capacitor of the probe for the fattest square wave being displayed on the oscilloscope.
2. Repeat if necessary.

WARNNING: To avoid electric shock while using the probe, be sure the perfection of the insulated cable, and do not touch the metallic portions of the probe head while it is connected with a voltage source.

1.6 Function Check

Perform this functional check to verify that your oscilloscope is operating correctly.

■ Connect the oscilloscope
You should connect the A-Type Plug of USB cable to your PC USB port and connect the other A-Type Plug of USB cable to oscilloscope USB port.
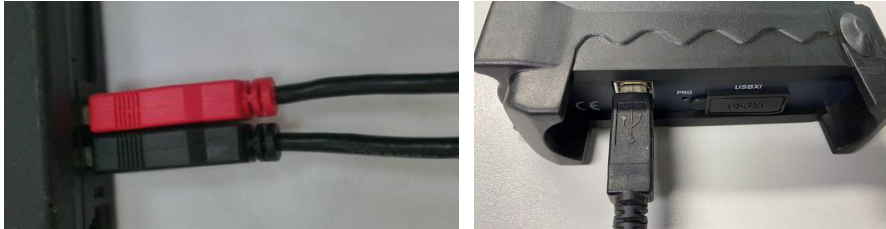
**■ Input a signal to a channel of the oscilloscope**
The oscilloscope is equipped with four channels.

Please input signal in the following steps:

1. Set the attenuation switch on the probe as 10X and connect the probe on the oscilloscope with CH1. Aim the slot in the probe connector at the faucet on BNC of CH1 and insert, then, turn right to lock the probe. Finally, attach the tip of probe and ground nip to the Connector of Probe compensator.

2. Set the CH1 probe attenuation of the oscilloscope to X10. (The default is X1).
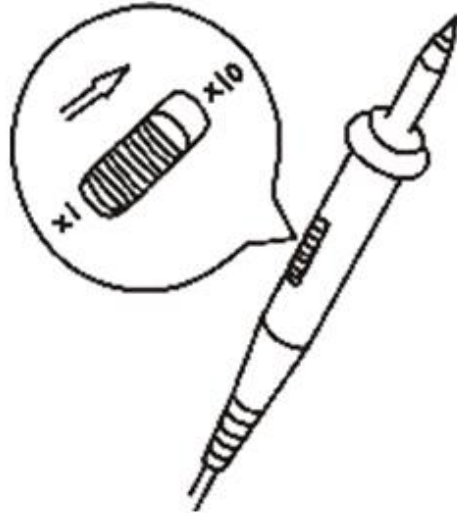
3. Attach the tip of probe and ground nip to the Connector of Probe compensator. Click the
 button. A square wave will be displayed within a several seconds. (Approximately 1 kHz, 2V, peak- to- peak).

4. Inspect CH2, CH3, CH4 with the same method. Repeat steps 2 and 3.

1.7 Self Calibration

The self calibration routine lets you optimize the oscilloscope signal path for maximum measurement accuracy.

You can run the routine at any time but you should always run the routine if the ambient temperature changes by 5v or more. For accurate calibration, power on the oscilloscope and wait twenty minutes to ensure it is warmed up.

To compensate the signal path, disconnect any probes or cables from the input connectors.

Then, access the **"Utility -> Calibration"** option and follow the directions on the screen. The self calibration routine takes about several minutes.

1.8 Accessories

All the accessories listed below are standard accessories for the oscilloscope:

◆ Probe x 2 (1.5m), 1:1(10:1), Passive Probes

◆ Gator Clip Cable x 2

◆ A USB cable

◆ A CD with Software and User Manual

Chapter 2 Operating Basics

◆The User's Interface

◆The Menu System

◆The Vertical System

◆The Horizontal System

◆The Trigger System

◆Input Connectors

2.1 The User's Interface

Click the software icon on the desk after you finished the software setting and equipment connecting. Then a user interface will be showed as follows:
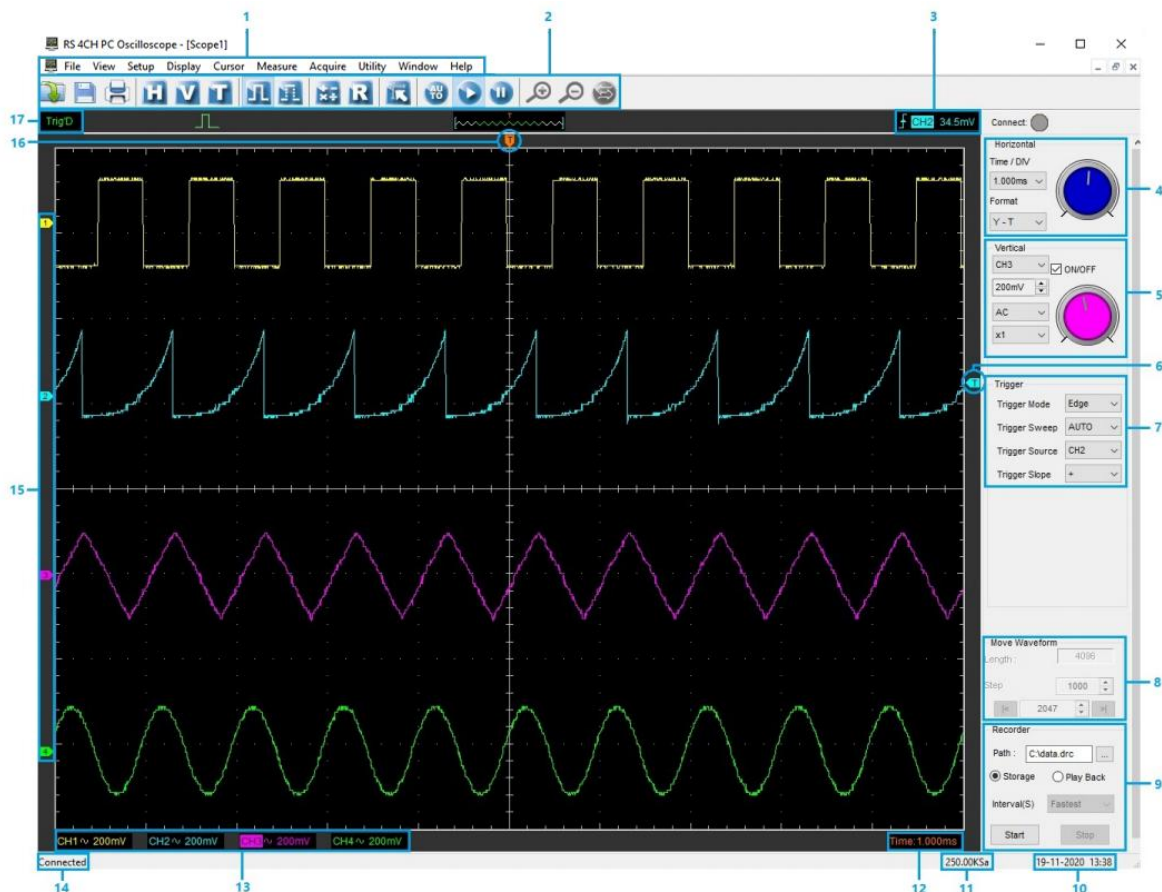
In addition to displaying waveforms, the display area is filled with many details about the waveform and the oscilloscope control settings.

1. **The Main Menu:** All settings can be found in the main menu.

2. **The Toolbar**

3. **Displays the trigger information:** Displays the edge trigger slope, source and level.

4. **The Horizontal Panel:** The user can change Time/Div, format in the panel.

5. **The Vertical Panel:** The user can turn on/off the CH1/CH2/CH3/CH4. Also the user

   can change the CH1/ CH2/CH3/CH4 volt/div, coupling and probe attenuation.

6. **Marker:** shows Edge trigger level.

7. **The Trigger Panel:** In this panel, the user can change the trigger mode, sweep, source and slope.

8. **Move waveform:** To move the waveform when in Stop status.

9. **Recorder:** To save the waveform data to PC, and play the recorded waveforms when need.

10. **Displays the system time.**

11. **Displays the real time sampling rate.**

12. **Displays the main time base setting.**

13. **Displays the CH1/CH2/CH3/CH4 information:**

   Readouts show the coupling of the channels.

   Readouts show the vertical scale factors of the channels.

14. **Connection status.**

15. The markers show the CH1/CH2/CH3/CH4 reference points of the displayed waveforms. If there is no marker, the channel is not displayed.

16. Marker shows horizontal trigger position

17. **Trigger status indicates the following:**

AUTO: The oscilloscope is in auto mode and is acquiring waveforms in the absence of triggers.

Trig'D: The oscilloscope has seen a trigger and is acquiring the post trigger data.

STOP: The oscilloscope has stopped acquiring waveform data.

RUN: The oscilloscope is running.

2.2 The Menu System

The Main Menu:

1. **File**: Load or Save data, setup

2. **View**: Change the user interface
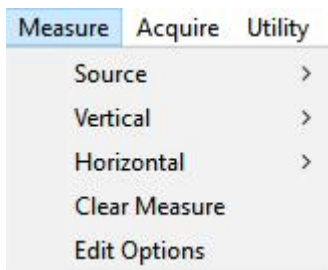

3. **Setup**: Setup setting
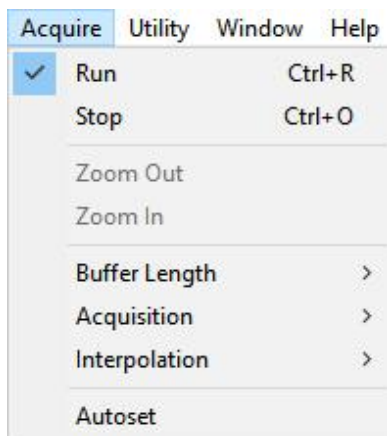
4. **Display**: Change wave display type
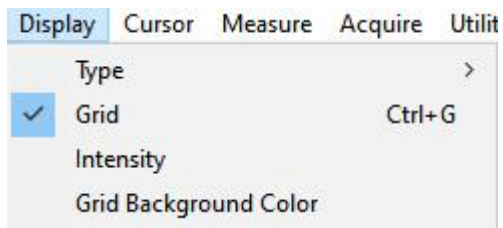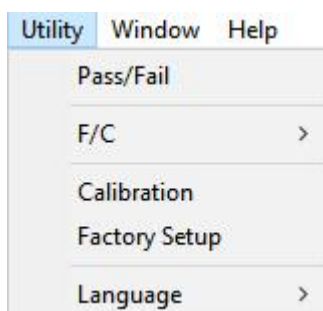

5. **Cursor**: Set Cursor measure type
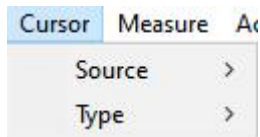
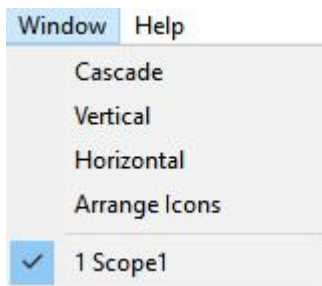6. **Measure**: Set measurement parameters

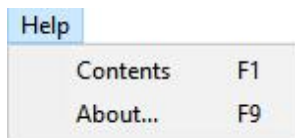7. **Acquire**: Run, Stop or other operation setting

8. **Utility**: Utility setting

9. **Window**: Window setting

11. **Help**: Turn on help file

2.3 The Vertical System

Click **"Setup->Vertical"**

The following figure shows the vertical Setup window. It shows the vertical parameters setting.
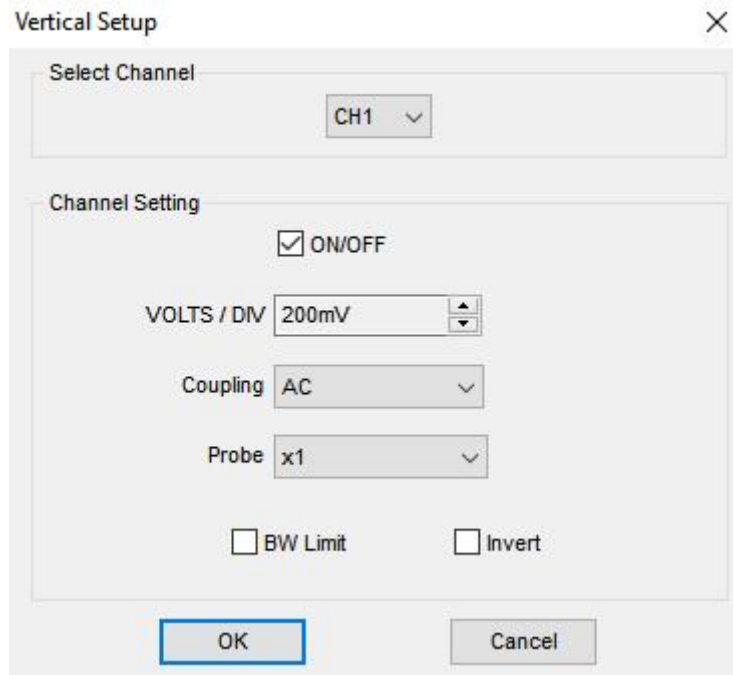
1.Select channel: User can select the channel by clicking the Combo box.
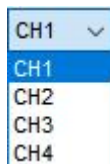
2.Turn on/off the selected channel: Turn on or turn off the selected the channel.
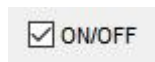
3.VOLTS/DIV: Set the selected channel voltage range.

4.Coupling: Set the selected channel to DC/AC.
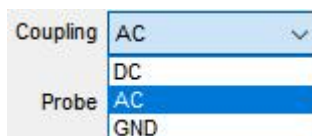
5.Probe: Set the Select one according to the probe attenuation factor to ensure correct vertical scale reading.
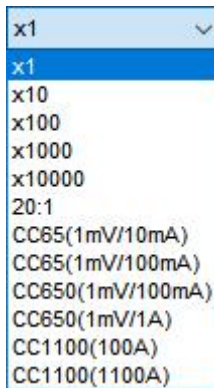
6.BW Limit: Reject the frequency component higher than 20MHz.

7.Invert: Invert the selected wave.

2.4 The Horizontal System

Click **"Setup->Horizontal"**

The following figure shows the Horizontal System window. It shows the horizontal parameters settings.
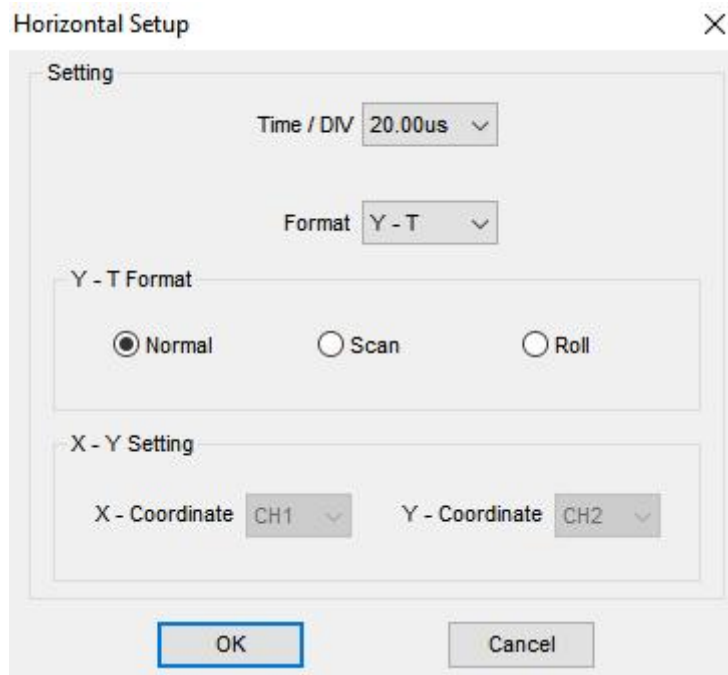
1. **Time/DIV**: leads the setting of the time base parameters
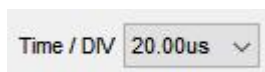
2. **Format**: leads the setting of the horizontal format parameters
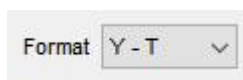
2.5 The Trigger System

Click **"Setup**-> **Trigger"**

The following figure shows the trigger system control.
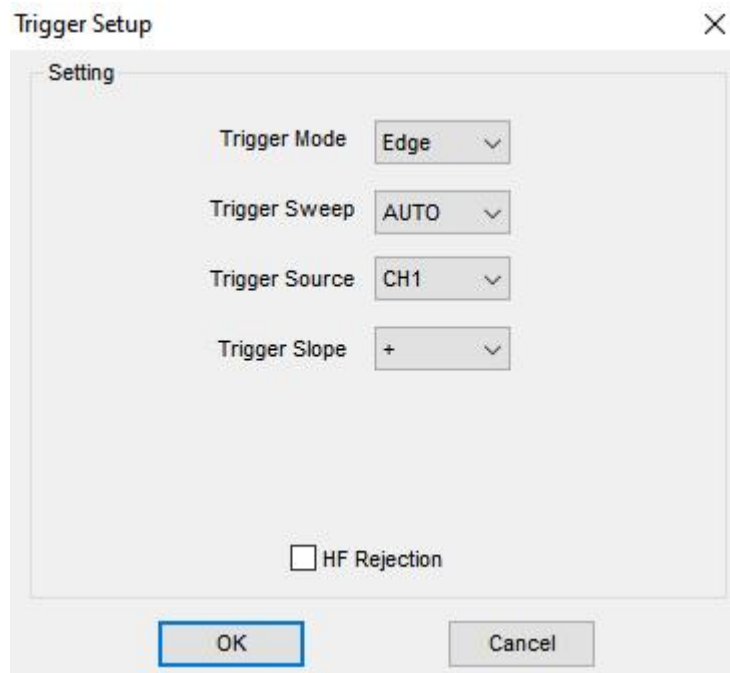
Trigger:

1.**Trigger Mode**: Sets the trigger mode
2.**Trigger Sweep**: Selects the trigger sweep mode to AUTO, NORMAL or SINGLE
3.**Trigger Source**: Selects the trigger source to CH1, CH2, CH3, CH4
4.**Trigger Slope**: Selects the edge trigger slope to Positive or Negative slope

2.6 Input Connector

CH1/CH2/CH3/CH4: Input connectors for waveform display.

Other Connector:

GND: A ground terminal

USB PORT: Connect the USB cable to this port.

CAL: Probe compensation output.

Chapter 3 Oscilloscope Functions

◆**Set Oscilloscope**

◆**Set Vertical System**

◆**Set Horizontal System**

◆**Set Trigger System**

◆**Save/Load**

◆**Utility Function**

◆**Measure Signal**

◆**Zoom In/Out Waveform**

◆**Acquire Signal**

◆**Print**

3.1 Setup the Oscilloscope

Using "AUTOSET" to display a signal automatically.

Auto setup functions one time each time you push the **"AUTOSET**" button. The function obtains a stable waveform display for you. It automatically adjusts the vertical scale, horizontal scale and trigger settings. Auto setup also displays several automatic measurements in the graticule area, depending on the signal type.

Connect a signal to the CH1 input:

1. Connect a signal to the oscilloscope as described above.

2. Click the **"Acquire -> Autoset"** button.

The oscilloscope will change the current settings to display this signal.

Save Setup

The oscilloscope software saves the current setup before you close the oscilloscope software. The oscilloscope recalls this setup the next time you run the software. You can use the **"Save Setup"** menu to permanently save up to several different setups.

Load Setup

The oscilloscope can recall the last setup before the oscilloscope software was running, any saved setups, or the factory setup. You can use the "**Load Setup**" menu to permanently recall a setup.
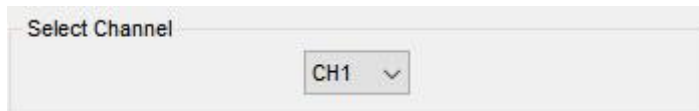
Factory Setup

The oscilloscope software is set up for normal operation when it is shipped from the factory. This is the factory setup. To recall this setup, push the "**Factory Setup**" menu.

3.2 Set Vertical System

Set Channel

Click **"Vertical"** in **"Setup"** menu.

The Channel Selection

The Channel Control Panel in sidebar
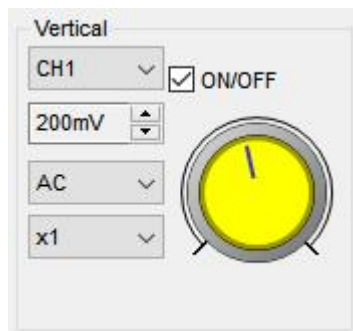
The Vertical function:

Turn ON/OFF: Turn on/off the channel
Volt/DIV: Select the channel voltage/div
Coupling: Select the channel coupling
Probe: Select the channel probe attenuation
Invert: Turn on/off the invert function.

Change Volt/DIV

You can click "volt/Div" in" vertical Setup" window to select the voltage

You can also change the selected channel voltage in sidebar
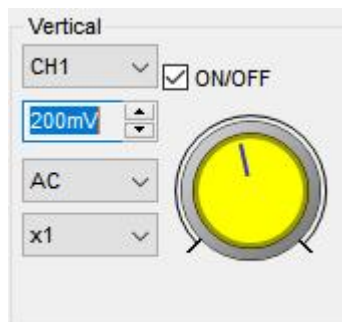
You can left click and drag the mouse on the knob to change the voltage.

Set Channel Coupling

Click **"Coupling"** in **"Vertical Setup"** window
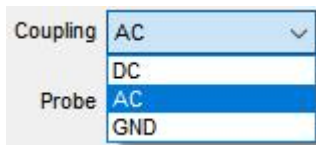
In the sidebar, you can change the channel coupling too.
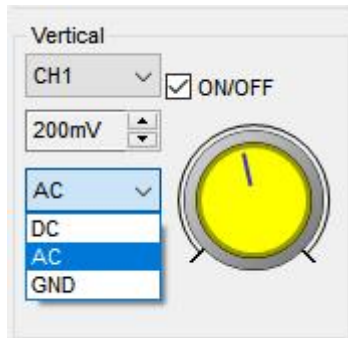
You can set the coupling to **DC**, **AC** or **GND**. If you set the coupling to **DC**, it blocks the **AC** component of the input signal.

Probe Attenuation Setting

Select the attenuation factor for the probe. To check the probe attenuation setting, toggle the probe menu to match the attenuation factor of the probe.

This setting remains in effect before you changed again.

Click **"Probe"** in Vertical Setup window to select the probe attenuation
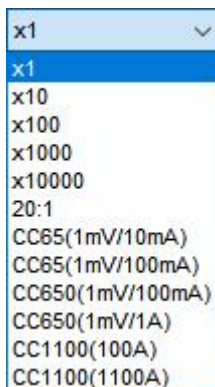
The probe setting window in the sidebar
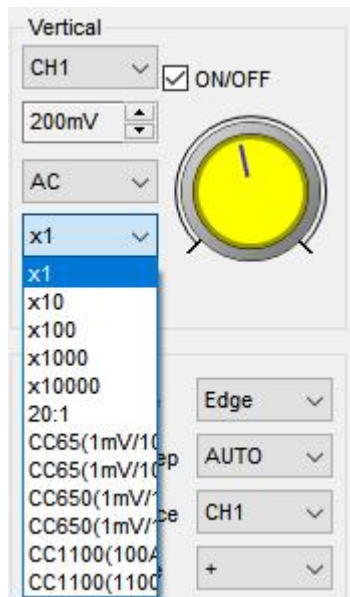
Note: The attenuation factor changes the vertical scale of the oscilloscope so that the measurement results reflect the actual voltage levels at the probe tip.

Set Math

Click **"MATH"** in **Channel** menu to set **MATH** channel.
The **MATH Setup** window:
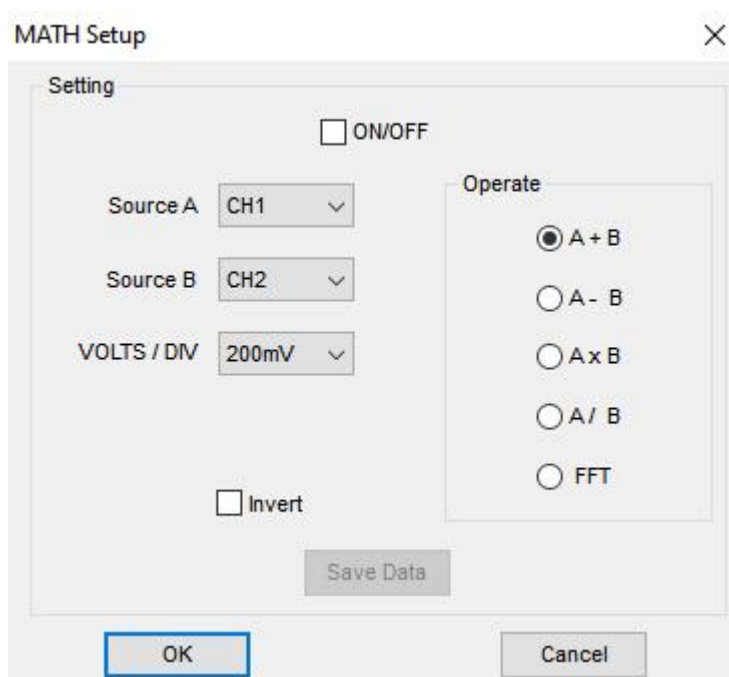
ON/OFF: Turn On/Off the MATH Channel.
Source A/B: Set the sources of the math channel.
Operate: Set operates type of the math channel.
Volt/DIV: Set the resolution of the math channel.
Probe: Set the math channel probe attenuation.
Invert: Turn on/off the invert function
The mathematic functions include addition, subtract, multiply and FFT for CH2.

Source A/B

Source A and Source B Menu
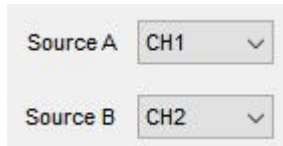
Operate

Four Types:

A + B   Add source A and source B

A - B   Subtract source B from source A

A x B   Multiply source A by source B

A / B   Divide source A by source B

FFT   Convert a time-domain signal into its frequency components (spectrum).

In this function, use the addition, subtraction, multiplication and FFT function to operate and analyze the waveform.

Select the operate type in the **Operate** menu. Select source A and B. Then adjust the vertical scale and offset to view the math channel clearly. The mathematic result can be measured by the measure and the cursor.

The Math Function Display

Fast Fourier Transform Function

To use the FFT mode, you need to click [icon] in Toolbar to open the FFT setup window.

The FFT setup window:

You can select the Source channel, Window algorithm, FFT number, and FFT Zoom factor. It displays only one FFT spectrum at a time.

Source: Selects the channel used as the FFT source
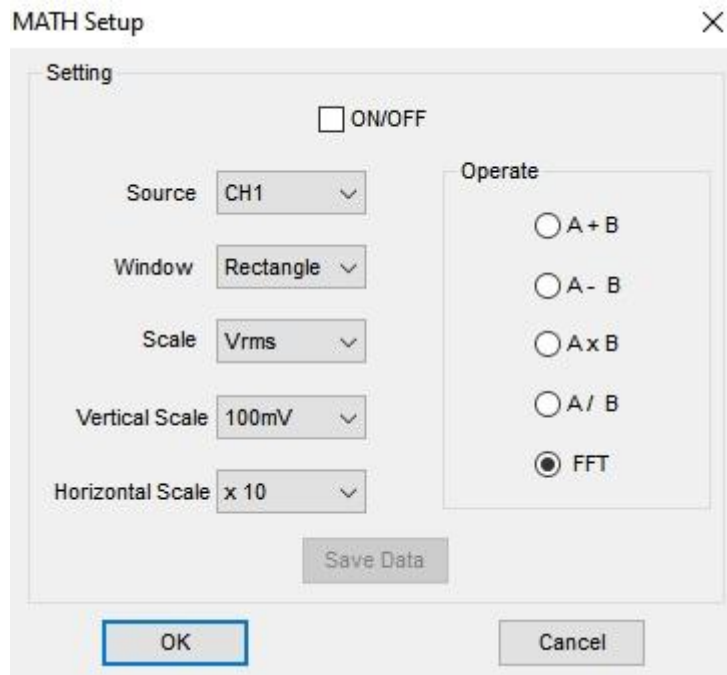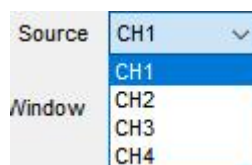

Window: Selects the FFT window type

Window	Measurement	Characteristics
Rectangle	Pulse or Transient Waveform	Special-purpose window applicable to discontinuous waveform. This is actually the same as no windows.
Hanning	Periodic Waveform	Better frequency, poorer amplitude accuracy than Flattop
Hamming	Transient or short pulse	A litter bit better frequency resolution than Hanning.
Blackman	Single frequency signal, search for higher order harmonics.	The best amplitude resolution; the poorest frequency resolution

Scale: Selects the vertical scale units
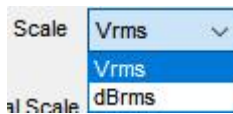
Note: If the FFT waveform is displayed within a large dynamic range, the dBrms vertical scale is recommended. The dB scale should display the vertical amplitude in logarithmic format.

Vertical Scale：Selects the vertical scale
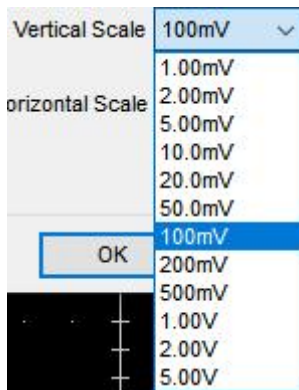
Horizontal Scale: Selects the FFT zoom factor
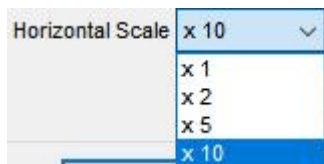
Sets horizontal scale, If the information is more than the quantity displayed to the display window, more information is displayed by using scroll bar.

Invert

The invert function turns the displayed waveform 180 degrees, with respect to the ground level. When the oscilloscope is triggered on the inverted signal, the trigger is also inverted.

Click **"Invert"** in MATH.

☐ Invert

The following picture shows the waveform before inversion:

The following picture shows the waveform of inversion:
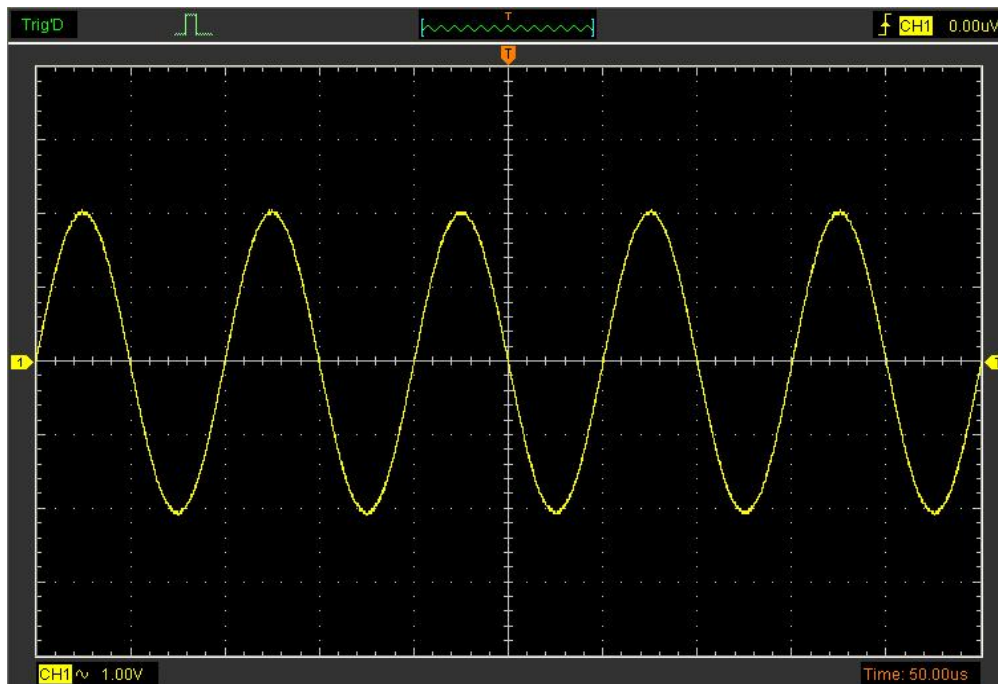
Set Reference

Click **"REF"** in **"Setup"** menu to set REF channel.
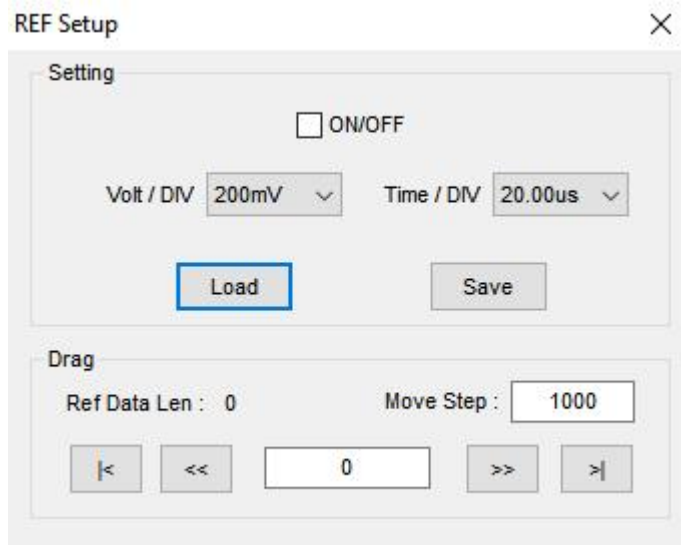
The Reference Channel Function:

On/Off: Turn on/off the reference channel.
Volt/DIV: Channel the resolution of the reference channel.
Load: Load the reference waveform from the ".rfc" file from your computer.
Save: Save the current reference waveform to your computer as ".rfc" format.
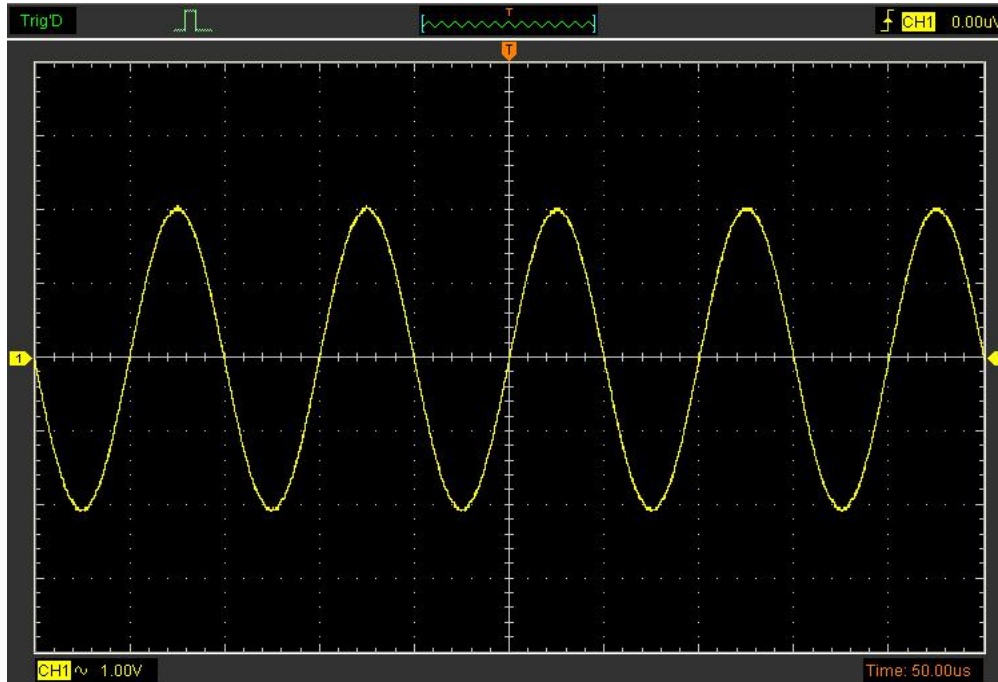**Save Reference**: Save the current reference waveform to your computer as "rfc" format. You can change the vertical scale of a waveform. The waveform display will contract or expand relative to the reference level.

Load

Click **"Load"** to load the "*.rfc" file that was selected. The load file window will appear.

Save

Click **"Save"** to save the waveform to *.rfc file. The saved source window appears.
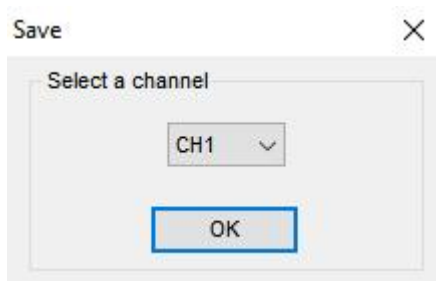
The save file window will appear after you selected the saved source.

The Reference Waveform Display Window:

Note: If you turn on the "Reference" channel, the load file window will appear.

3.3 Setup Horizontal System

Change Time/Div

The **"Time/Div"**

Time / DIV 20.00us ∨

Selects the horizontal **Time/DIV** (scale factor) for the main or the window time base

The Horizontal Panel

Horizontal
Time / DIV
20.00us ∨
Format
Y - T ∨

Click the blue knob can change **Time/Div**.

If the waveform acquisition is stopped, **Time/Div** control expands or compresses the waveform.

Change Format

Click **"Time/Div"** you can set the Time base in Horizontal Setup window.

Time / DIV 20.00us ∨
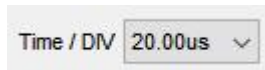
In the **"Format"** item, set the waveform display format (**Y-T**, **X-Y**).
Y -T: Show the relative relation between vertical voltage and horizontal time
X -Y: Show CH1 value at X axis; CH2 value at Y axis

Change Horizontal Position

Double click the channel button to set the trigger point to the horizontal center of the screen.

Horizontal position changes the displayed waveform position, relative to the trigger point.

The user can drag 🛡 on screen to change the horizontal position.

3.4 Set Trigger System

Click **"Setup->Trigger"**, you can configure the trigger.

The user can also click in the toolbar to set Trigger.

1. Set Trigger
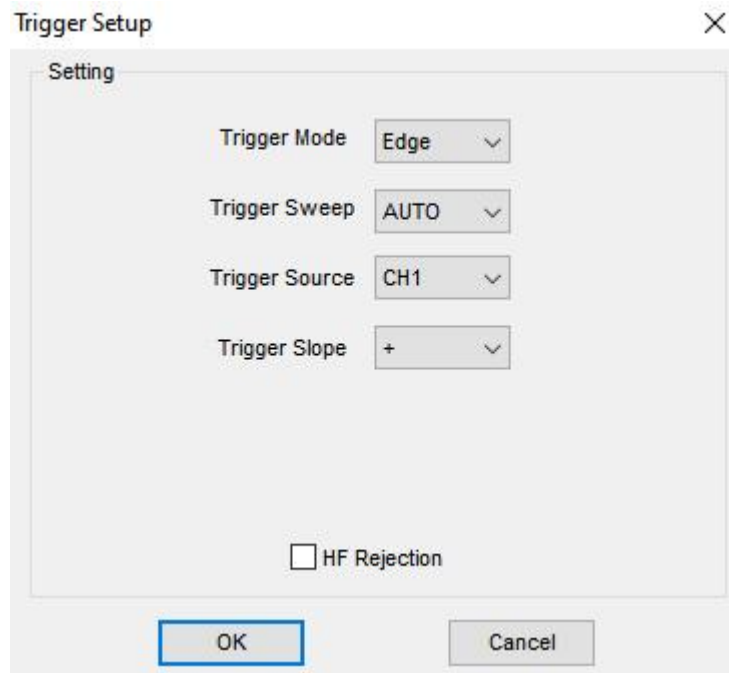
Edge Trigger

The trigger determines when the oscilloscope starts to acquire data and display a waveform. When a trigger is set up properly, it can convert unstable displays or blank screens into meaningful waveforms. If the oscilloscope wants to acquire a waveform, it collects enough data so that it can draw the waveform to the left of the trigger point. The oscilloscope continues to acquire data while waiting for the trigger condition to occur. The oscilloscope continues to acquire enough data so that it can draw the waveform to the right of the trigger point after it detects a trigger.

The **Edge** trigger determines whether the oscilloscope finds the trigger point on the rising or the falling edge of a signal. Select **Edge** trigger mode to trigger on **Rising** edge or **Falling** edge.

Mode: Select the trigger mode.
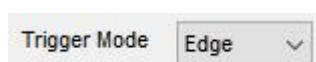
Sweep: Set the sweep mode to **Auto**, **Normal** or **Single**.

Trigger Sweep | AUTO

Auto: Acquire waveform even no trigger occurred
Normal: Acquire waveform when trigger occurred.
Single: Acquire waveform when trigger occurred then stop

Source: You can use the trigger source options to select the signal that the oscilloscope uses as a trigger. The source can be any signal connected to a channel BNC.

Trigger Source | CH1
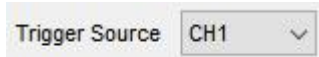
CH1: Select CH1 as trigger signal
CH2: Select CH2 as trigger signal
CH3: Select CH2 as trigger signal
CH4: Select CH2 as trigger signal

Slope: Set the slope to **Rising (+)** or **Falling (-)**.

Trigger Slope | +
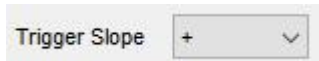
Rising: Trigger on rising edge

Falling: Trigger on falling edge

The user can also change the trigger setting on trigger panel in sidebar.

Trigger
Trigger Mode | Edge
Trigger Sweep | AUTO
Trigger Source | CH1
Trigger Slope | +
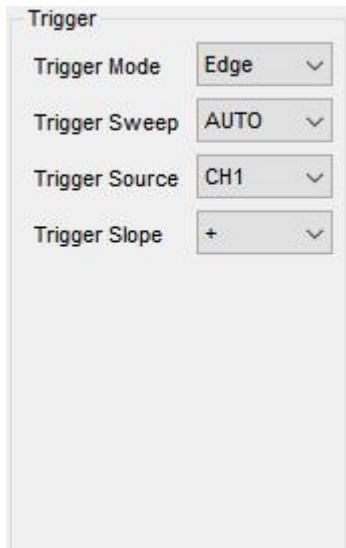
Set Pulse Trigger

Pulse trigger occurs according to the width of pulse. The abnormal signals can be detected through setting up the pulse width condition.

Mode:

Sweep:

Source:

PW Condition:

Pulse Width: The Pulse Width adjust range is 10ns -10s. When the condition is met, it will trigger and acquire the waveform.

The user can also change the trigger setting on trigger panel in sidebar.

When alternative trigger is on, the trigger sources come from two vertical channels. This mode can be used to observe two non-related signals. You can choose two different trigger modes for the four vertical channels.

Options	Settings	Comments
Pulse		With Pulse highlighted, the trigger occurs on pulses that meet the trigger condition (defined by the Source, When and Set Pulse Width options).
Sweep	Auto, Normal, Single	Auto: Acquire waveform even no trigger occurred Normal: Acquire waveform when trigger occurred Single: Acquire waveform when trigger occurred then stop.
Source	CH1 CH2 CH3 CH4	Select the input source as the trigger signal.
PW Condition	+Less +Equal +Unequal +More -Less -Equal -Unequal -More	+Less: +Pulse width less than selecting pulse condition. +Equal: +Pulse width is equal to selecting pulse condition. +Unequal: +Pulse width is not equal to the selecting pulse condition. +More: +Pulse width more than selecting pulse condition. -Less: -Pulse width less than selecting pulse condition. -Equal: -Pulse width is equal to selecting pulse condition. -Unequal: -Pulse width is not equal to the selecting pulse condition. -More: -Pulse width more than selecting pulse condition.
Pulse Width		Set Pulse Width highlighted, including **Time Unit** and **Pulse Width**

Set Video Trigger

Mode: Select the trigger mode.

Sweep:

Source: Set the Trigger Channel to **CH1**,**CH2**,**CH3**,**CH4**.

Trigger Sync:

Trigger Standard:

Options	Settings	Comments
Video		With Video highlighted, an NTSC, PAL or SECAM standard video signal will be triggered. The trigger coupling is preset to AC.
Sweep	Auto Normal Single	Auto: Acquire waveform even no trigger occurred Normal: Acquire waveform when trigger occurred Single: Acquire waveform when trigger occurred then stop.
Source	CH1 CH2 CH3 CH4	Select the input source as the trigger signal.
Sync	All Lines Line Number Odd Field Even Field All Fields	Choose a proper video sync. When selecting Line Number for the Sync option, you may use the User Select knob to specify a line number.
Standard	NTSC PAL/SECAM	Choose a video standard for sync and line number count.

Set ALT System

Mode: Select the trigger mode.

Trigger Channel: Set the Trigger Channel to **CH1**,**CH2**,**CH3**,**CH4**.

Trigger Type: Set the Trigger Type to **Edge**, **Pulse** or **Video**.

PW Condition: Set the PW Condition to the following condition.

    +More: +Pulse width more than selecting pulse condition.

    +Less: +Pulse width less than selecting pulse condition.

    +Equal: +Pulse width equal to selecting pulse condition.

    -More: -Pulse width more than selecting pulse condition.

    -Less: -Pulse width less than selecting pulse condition.

    -Equal: -Pulse width equal to selecting pulse condition.

Pulse Width: The Pulse Width adjust range is 10ns~10s. When the condition is met, it will trigger and acquire the waveform.

Note: Besides the above mentioned trigger type, the user can also change the trigger setting on trigger panel in sidebar for CAN, LIN, UART, SPI, IIC.

Set CAN Trigger

Mode: Select the trigger mode.

Sweep:

Source: Set the Trigger Channel to **CH1**,**CH2**,**CH3**,**CH4**.

Baud Rate:

Trigger Condition:

Set the CAN Trigger to the following condition.
- **Start Bit:** The oscilloscope triggers at the start of a frame.
- **Remote Frame ID:** The oscilloscope triggers on remote frames with the specified ID.

  ID (Hex):
- **Data Frame ID:** The oscilloscope will trigger on data frames matching the specified ID.

- **Frame ID:** The oscilloscope will trigger on data frames on remote frames matching the specified frame data.
- **Data Frame and data:** The oscilloscope will trigger on data frames matching the specified data frame ID and data.
  Data (Hex): It can set hexadecimal data.

Data(Hex) `0`

- **Error Frame:** The oscilloscope will trigger on error frames matching the specified data.
- **All Error:** The oscilloscope will trigger when any form error or active error is encountered. Not include judgment of CRC errors.
- **Ack Error:** The oscilloscope will trigger when the acknowledge is high.
- **Overload Frame:** The oscilloscope will trigger on overload frames.

Idle Level: Set the idle level to High or Low.

Idle `High`

Set LIN Trigger

Mode: Select the trigger mode.

Sweep:

Source: Set the Trigger Channel to **CH1**,**CH2**,**CH3**,**CH4**.

Baud Rate:

Trigger Condition:

Set the LIN Trigger to the following condition.

● **Interval Field:** The oscilloscope triggers when the interval field end.
● **Sync Field:** The oscilloscope triggers when the synchronous field end.
● **ID Field:** The oscilloscope triggers when the ID field end.
● **Sync Code**: The oscilloscope triggers when the synchronous code end.

- **ID:** The oscilloscope triggers when a frame with an ID equal to the selected value is detected.

    ID (Hex): Select the value for the Frame ID.

    ID(Hex)   [0]

- **ID & Data (Frame ID and Data):** The oscilloscope triggers when a frame with an ID and data equal to the selected values is detected.

    Data (Hex): It can set hexadecimal data.

    Data(Hex)   [0]

    ID (Hex): Select the value for the ID.

    ID(Hex)   [0]

Idle Level: Set the idle level to High or Low.

    Idle   [High   ∨]

Set UART Trigger

Mode: Select the trigger mode.

Trigger Mode | UART

Sweep:

Trigger Sweep | AUTO

Source: Set the Trigger Channel to **CH1**,**CH2**,**CH3**,**CH4**.

Trigger Source | CH1

Baud Rate:

BaudRate(bps) | 10K
110
300
600
1.2K
2.4K
4.8K
9.6K
14.4K
19.2K
38.4K
57.6K
115.2K
230.4K
380.4K
460.4K
921.6K

Trigger Condition:

Trigger | StartBit
StartBit
StopBit
Data
ParityErr
RecErr

Set the UART Trigger to the following condition.
● **Start Bit:** The oscilloscope triggers when a start bit occurs.
● **Stop Bit:** Triggers when a stop bit occurs on measured signal. The trigger occurs on the first stop bit.
● **Data:** Triggers on a data byte that you specified.
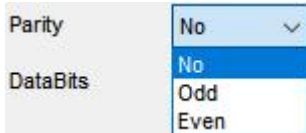   **Data (Hex):** It can set hexadecimal data.

Data(Hex) | 0

- **Parity Error:** The oscilloscope triggers when the parity check is error when there is parity check.
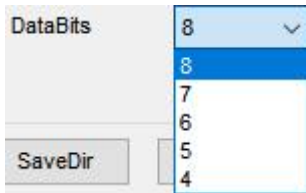- **Rec Error:** The oscilloscope triggers when the received data is error.

Idle Level: Set the idle level to High or Low.
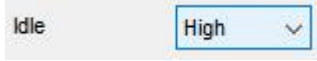
Parity: Parity check. Based on your device under test to select odd, even, or no.

Data Bits: Data Length. Set the number of bits to match your device under test. (selectable from 4-8 bits).

Set SPI Trigger

Mode: Select the trigger mode.

Trigger Mode [SPI ⌄]

Sweep:

Trigger Sweep [AUTO ⌄]

SDL: Set the clock sources of SDL to **CH1**,**CH2**,**CH3**,**CH4**.

SDL [CH1 ⌄]

Slope: Select the desired clock edge.

Trigger Slope [+ ⌄]

Rising: sample the SDA data on the rising edge of the clock.

Falling: sample the SDA data on the falling edge of the clock.

SDA: Set the data sources of SDA to **CH1**,**CH2**,**CH3**,**CH4**.

SDA [CH2 ⌄]

Overtime (Trigger Condition): Set the timeout.

Timeout: the clock (SDL) signal need to maintain a certain idle time before the oscilloscope searches for a trigger. The oscilloscope will trigger on when the data (SDA) satisfying the trigger conditions is found.

OverTime [200]

Data (Hex): It can set hexadecimal data.

Data(Hex) [0]

Data Bits: Data width. Set the number of bits of the serial data character string. The serial data string can be specified to be from 4, 8, 16, 24, 32 bits long.

DataBits [8 ⌄]
4
8
16
24
SaveDir   32

Set IIC Trigger

Mode: Select the trigger mode.

Trigger Mode	IIC ∨

Sweep:

Trigger Sweep	AUTO ∨

SDL (Serial Clock): Set the clock sources of SDL to **CH1**,**CH2**,**CH3**,**CH4**.

SDL	CH1 ∨

Trigger Condition:

Condition	StartBit ∨
SDA	StartBit
	StopBit
	NoAck
	Address
	Restart
	Addr&Data

Set the IIC Trigger to the following condition.
● **Start Bit:** trigger when SDA data transitions from high level to low level while SCL is high level.
● **StopBit:** trigger when SDA data transitions from low level to high level while SCL is high level.
● **No Ack:** trigger when the SDA data is high level during any acknowledgement of SCL clock position.
● **Address:** the trigger searches for the specified address value. When this event occurs, the oscilloscope will trigger on the read/write bit.

Addr (Hex):   Addr(Hex) [0   ]

● **Restart:** trigger when another start condition occurs before a stop condition.
● **Address & Data:** the trigger searches for the specified address and data value on the data line (SDA). When this event occurs, the oscilloscope will trigger on the clock line (SCL) transition edge of the last bit of data.
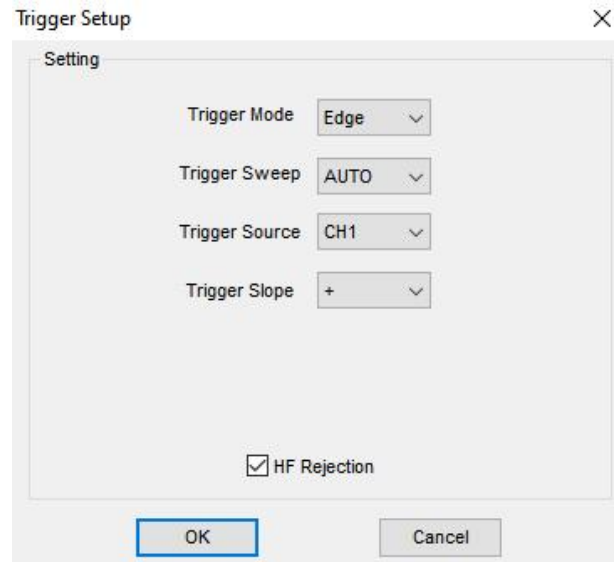
Addr (Hex):   Addr(Hex) [0   ]

SDA (Serial Data): Set the data sources of SDA.

SDA	CH2 ∨

High Frequency Rejection

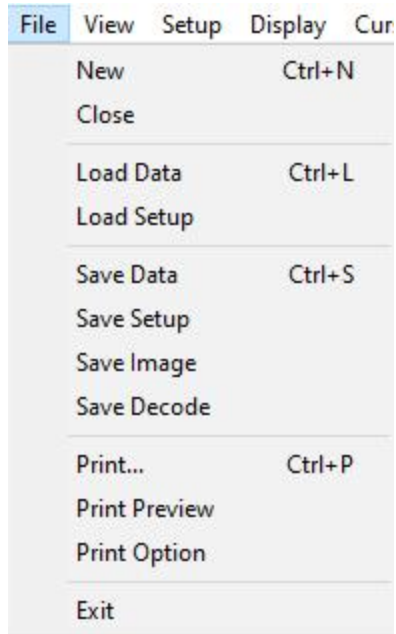Select **"HF Rejection"** in **"Trigger Setup"** window

The user can turn on **"HF Rejection"** to eliminate trigger higher-frequency (20M above)

3.5 Save/Load

Save

Click **"File"** in main menu to save data, setup, image and decode.

1. Save Data

Save waveform data as a type file

2. Save Setup

Save the current oscilloscope setup to file

3. Save Image

Save the software display window as a .bmp or .jpg file

4. Save Decode

Save data as the CSV file.

Load

Click **"File"** in main menu to recall saved waveform data, setup.

1. Load Data

Load the waveform that had saved as a type file

2. Load Setup

Load the instrument that had saved

3.6 Utility Function

3.6.1 Record

The following picture shows the **Record** Interface. The dialog box of record is shown on the lower right corner of the screen.
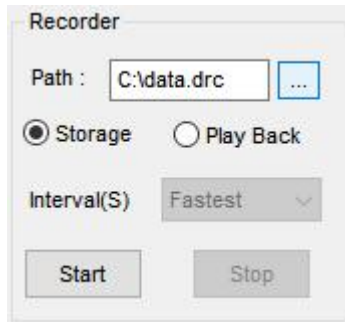
This function can record input waveform form CH1, CH2, CH3, CH4.

Storage: Record waveform and save it as ".drc" file.
"Play Back" button: Click this button to start playing back waveform.
Interval: Setup the interval time of the recorded waveform.

"Start" button: Start to record waveforms.
Click "**Stop**" to stop recording waveforms.

    File Information:
    Writing: Recording data.
    Reading: Playing back data.
    data.0.drf: the name of the recorded file. The Max. length of this file is about 1GB. When recording data length is more than 1GB, it will create next file named data.1.drf, and so on.
    When click **play back** button, it will play back data from the first file (data.0.drf) to the last file. If you want to read an arbitrary file, please delete the data.drf, and then play back.

3.6.2 Pass/Fail

Click **"Pass/Fail"** in **"Utility"** menu.
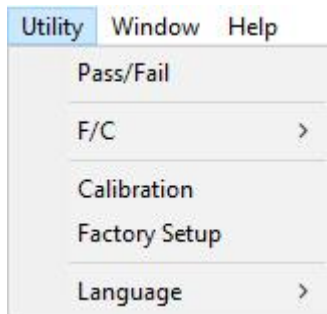
The **Pass/Fail** window appears:
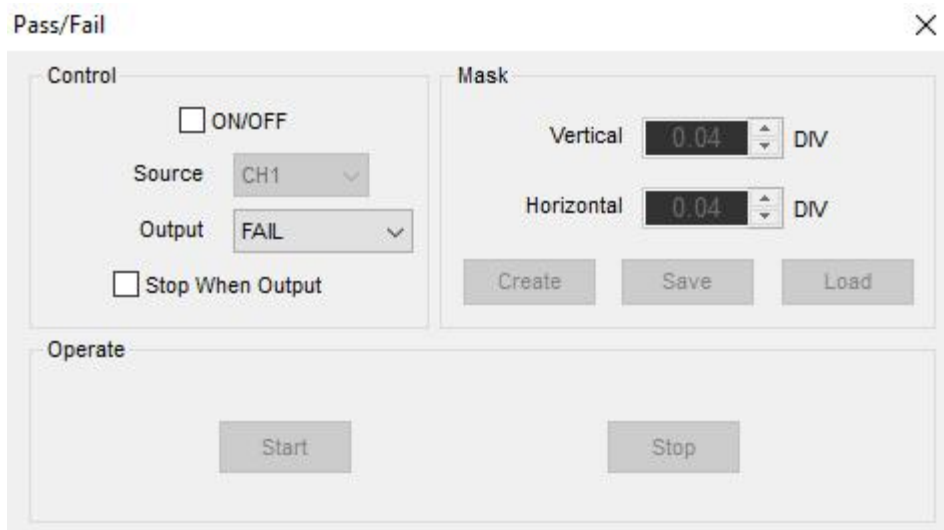
 The **Pass/Fail** function monitors changes of signals and outputs pass or fail signals by comparing the input signal with the pre-created mask.
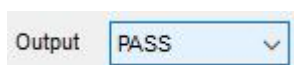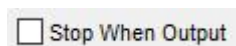
Control Setting
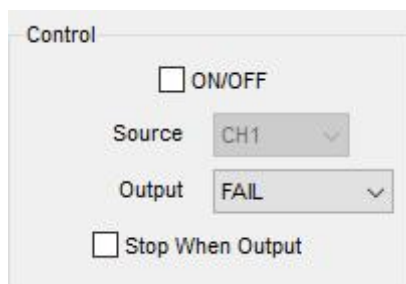
Source: Select the **Pass/Fail** channel
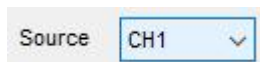
Output: Select the **Pass/Fail** output condition.

Stop When Output: If it was checked, the Pass/Fail will stop when output.

Mask Setting

Vertical: Set the vertical limit range

Horizontal: Set the horizontal limit range

"Create" button: Click this button to create Pass/Fail area according to the mask

"Save" button: Click this button to save the setups to file

"Load" button: Click this button to load the saved setups file

Information Display

Fail: It shows the fail waveform number

Pass: It shows the pass waveform number

Total: It shows the l total **Pass/Fail** waveform number

Operation

Click **"Start"** button to start the **Pass/Fail** test.

Click **"Stop"** button to stop the **Pass/Fail** test.

The Pass/Fail function display
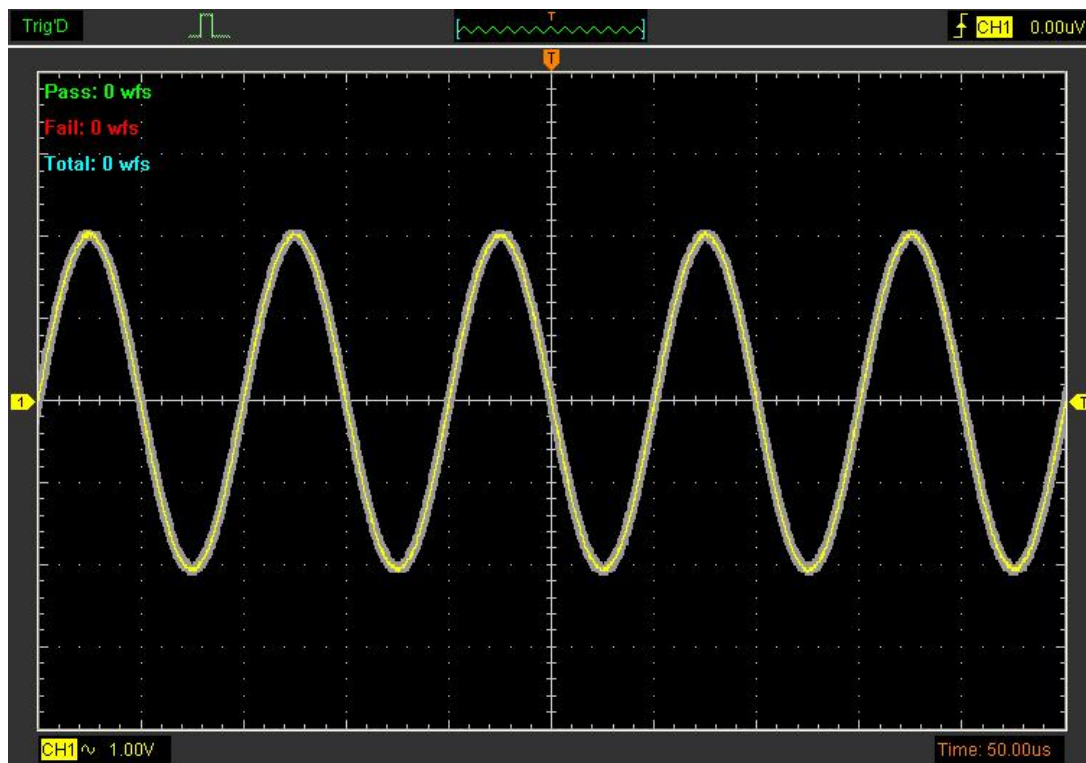
NOTE: **Pass/Fail** function is unavailable in **X-Y** mode.

3.6.3 F/C

Click **F/C** in **Utility** menu to select Frequency and/or Counter function.
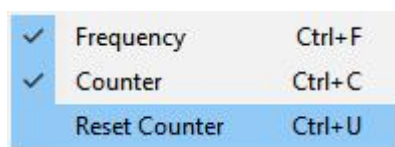

When **Frequency** selected, the input signal's frequency displays on the right upper corner of the screen.
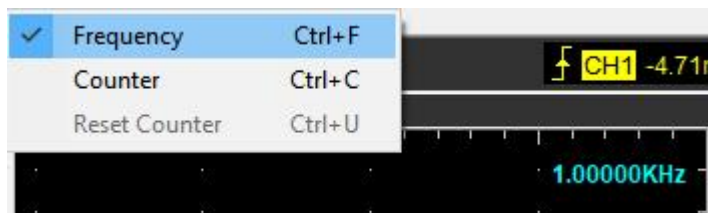
When **Counter** selected, the input signal wave count displays on the right upper corner of the screen.
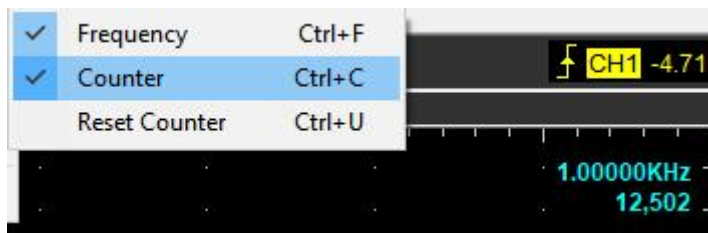

When Counter function selected, **Reset Counter** is active. You can press it to zero the wave count displays and recount the wave.

3.6.4 Calibration

The self calibration routine lets you optimize the oscilloscope signal path for maximum measurement accuracy. You can run the routine at any time but you should always run the routine if the ambient temperature changes by 5v or more. For accurate calibration, power on the oscilloscope and wait twenty minutes to ensure it is warmed up. To compensate the signal path, disconnect any probes or cables from the input connectors. Then, access the **"Utility -> Calibratio**n" option
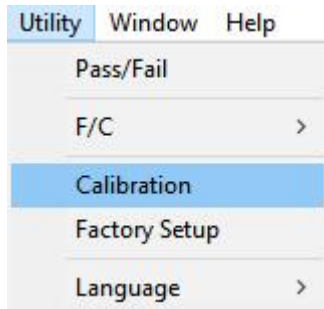
You can just calibrate a single channels only, you can calibrate two, three or all channels at the same time as well.
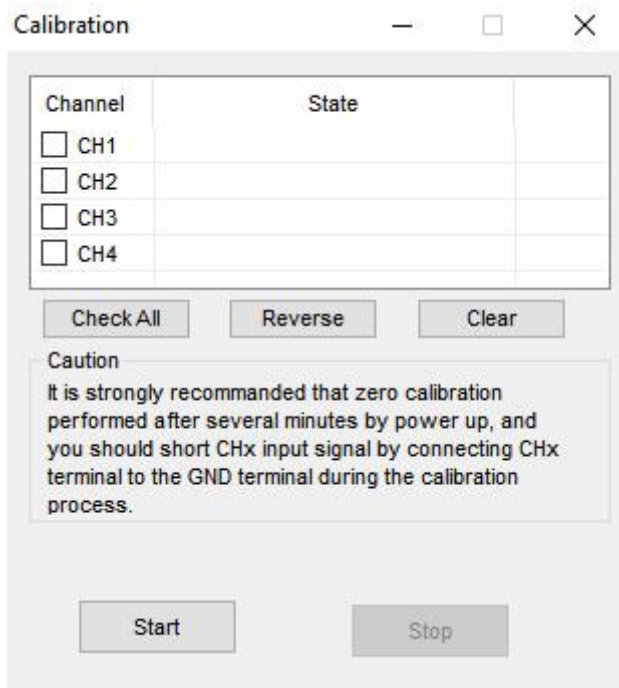
The self calibration routine takes about several minutes.

3.6.5 Factory Setup

Click **"Factory Setup"** in **"Utility"** menu to load default setups

When you click the **Factory Setup** in **Utility** menu, the oscilloscope displays the CH1 and CH2 waveforms and removes all other waveforms.

The oscilloscope set up for normal operation when it is shipped from the factory and can be recalled at anytime by user.
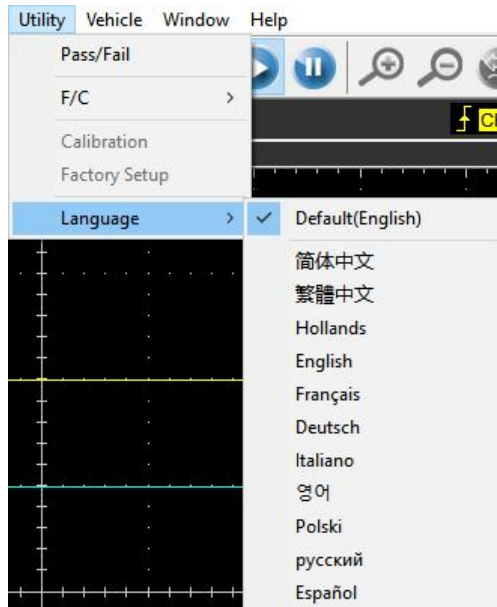
The Factory Setup function does not reset the following settings:

■ Language option
■ Date and time
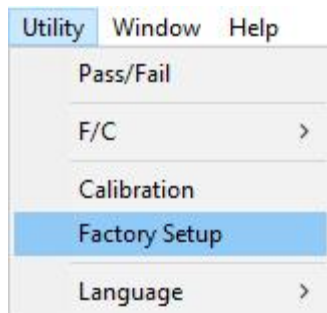
3.6.6 Language

Click **"Language"** in **"Utility"** menu

There are ten languages in **"Language"** menu. The default language is English.
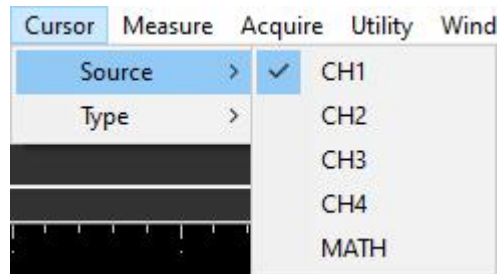
3.7 Measure Signal

3.7.1 Cursor Menu

Click **"Cursor"** in main menu.
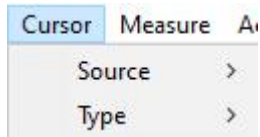
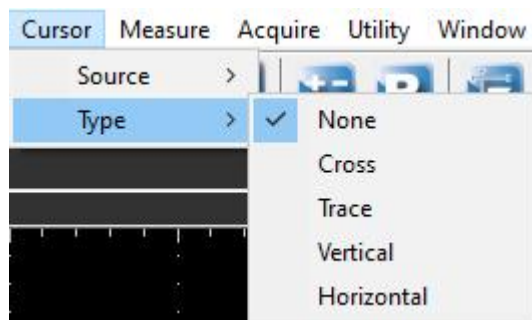This method allows you to take measurements by moving the cursors

1. Source

The user can set the source to **CH1**, **CH2**, **CH3**, **CH4** and **MATH**.
When you use cursors, be sure to set the **Source** to the waveform on the display that you want to measure.
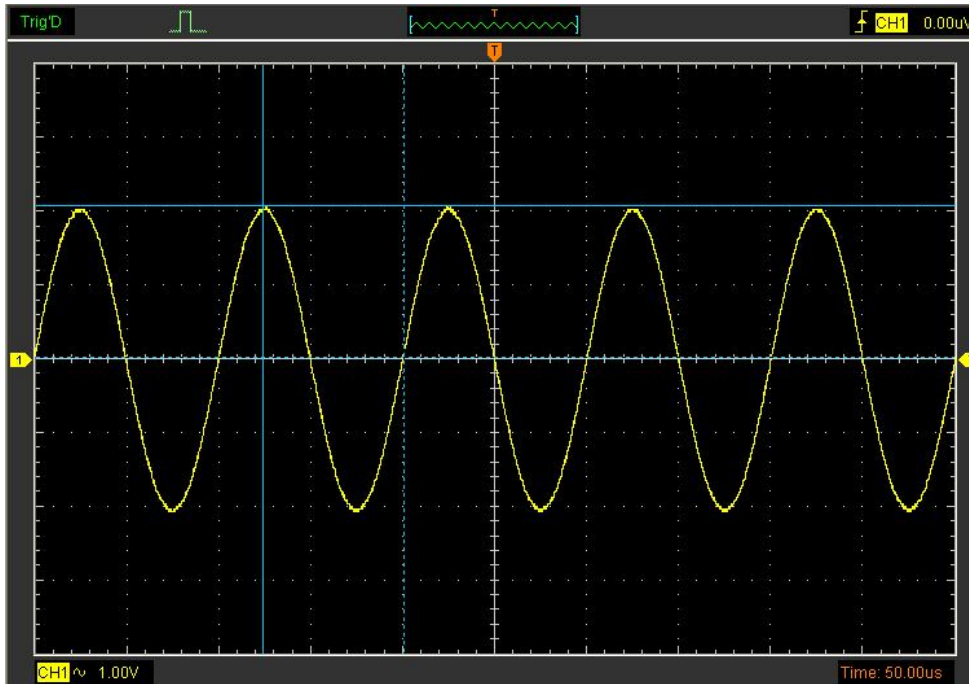
2. Type

There are four types of cursors: **Cross**, **Trace**, **Vertical** and **Horizontal**

1) Cross

The **Cross** cursors appear as cross lines on the display and measure the vertical and horizontal parameters.
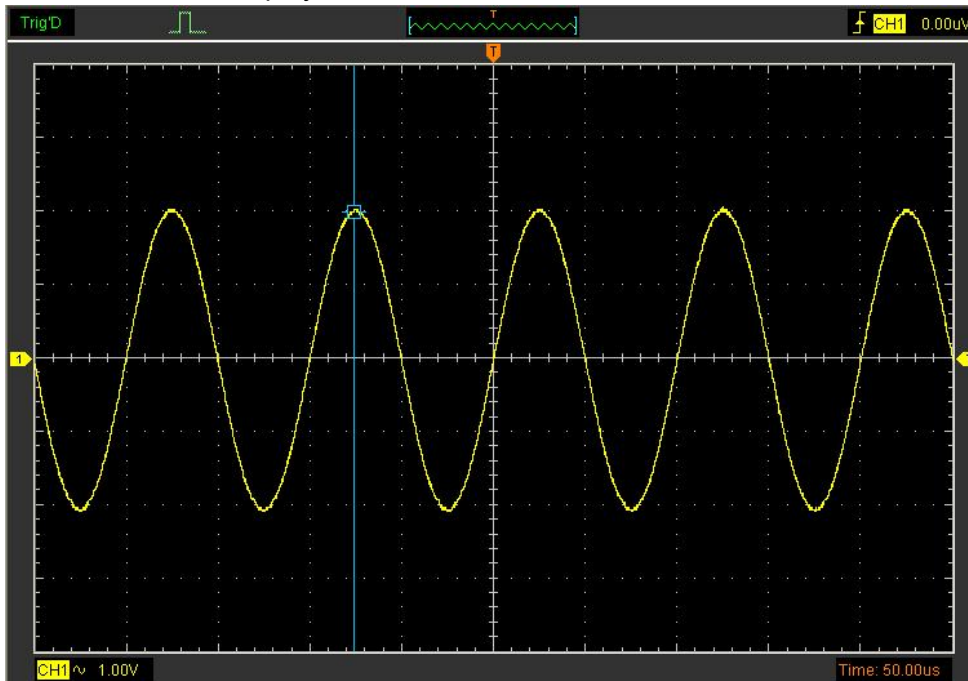
The **Cross** cursor display window:

The **Cross** measure result displays on status bar

| Freq: 1.036KHz | Time: 965uS | Volt: 7.10mV |

2) Trace

The **Trace** cursors appear as vertical lines on the display and measure the waveform amplitude at the point the waveform crosses the cursor.
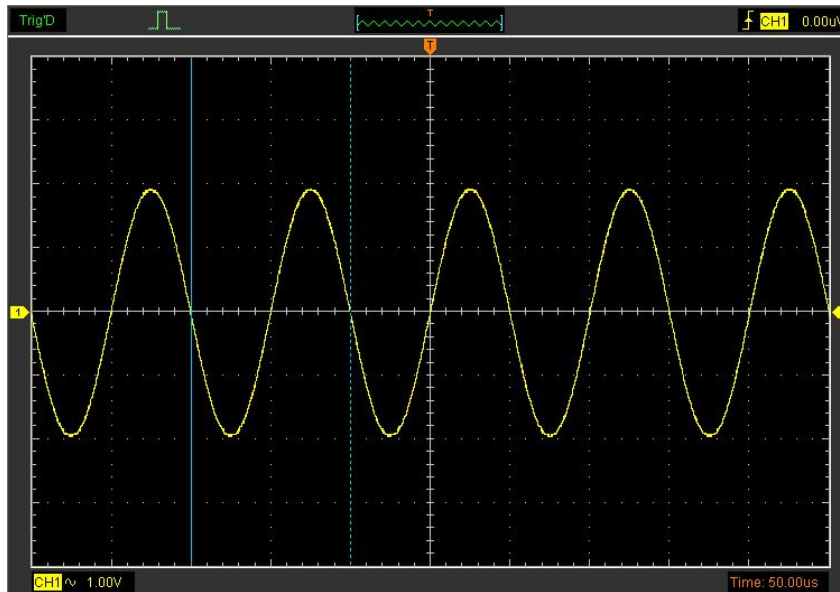
The **Trace** cursor display window

The **Trace** cursor measure result display on status bar

Volt: 976mV

3) Vertical

The **Vertical** cursors appear as vertical lines on the display and measure the vertical parameters.

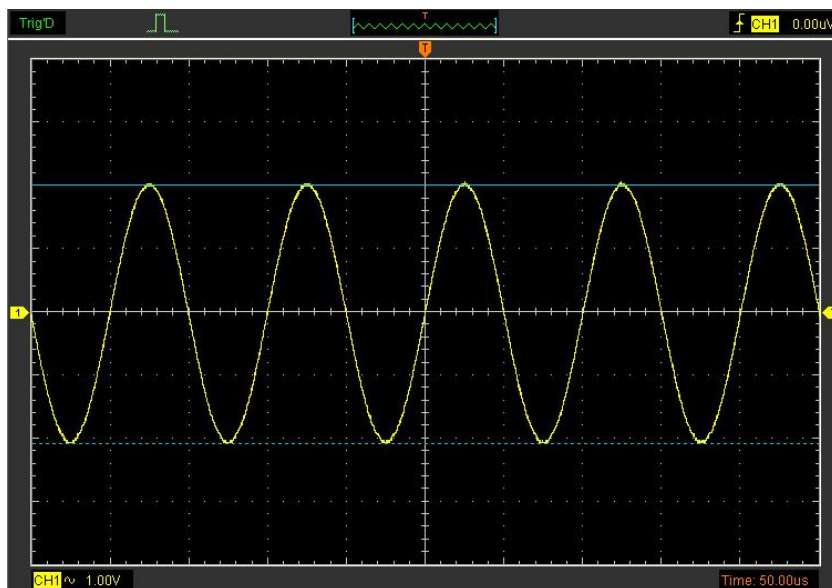The **Vertical** cursor display window:

The **Vertical** cursor measure result display on status bar

Freq: 1.036KHz   Time: 965uS

4)Horizontal

The **Horizontal** cursors appear as horizontal lines on the display and measure the horizontal parameters.
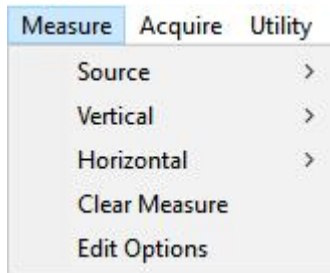
The **Horizontal** cursor display window:

The **Horizontal** cursor measure result display on status bar
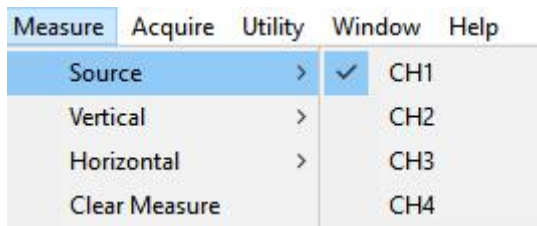
Volt: 7.10mV

3.7.2 Measure Menu

Click **"Measure"** in main menu.

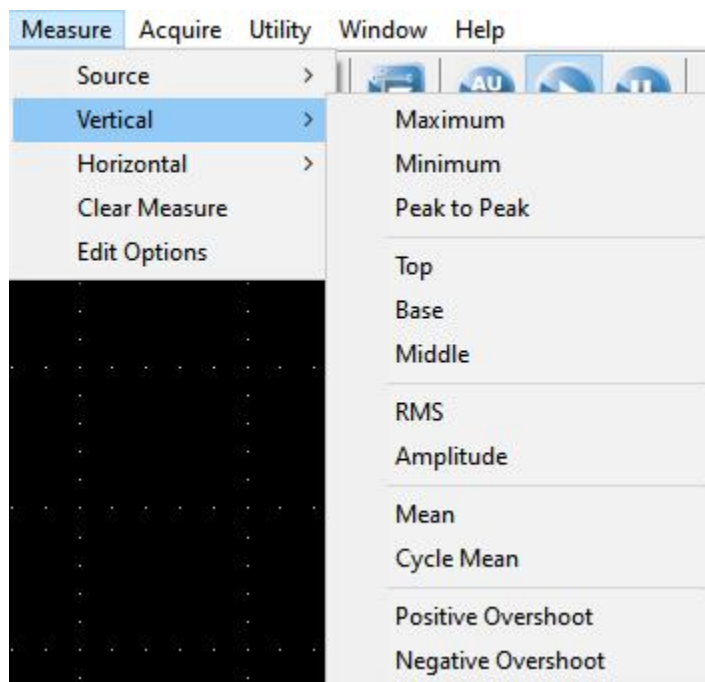The oscilloscope provides 20 parametric auto measurements (12 voltage and 8 time measurements).

1.Source

The user can use the **"Source"** menu to select a measure source.

2. Vertical

Maximum: Voltage of the absolute maximum level, Measured over the entire waveform

Minimum: Voltage of the absolute minimum level, Measured over the entire waveform

Peak To Peak: Peak-to-peak = Max –Min, Measured over the entire waveform

Top: Voltage of the statistical maximum level, Measured over the entire waveform

Base: Voltage of the statistical minimum level, Measured over the entire waveform

Middle: Voltage of the 50% level from base to top

RMS: The Root Mean Square voltage over the entire waveform

Amplitude: Amp = Base - Top, Measured over the entire waveform
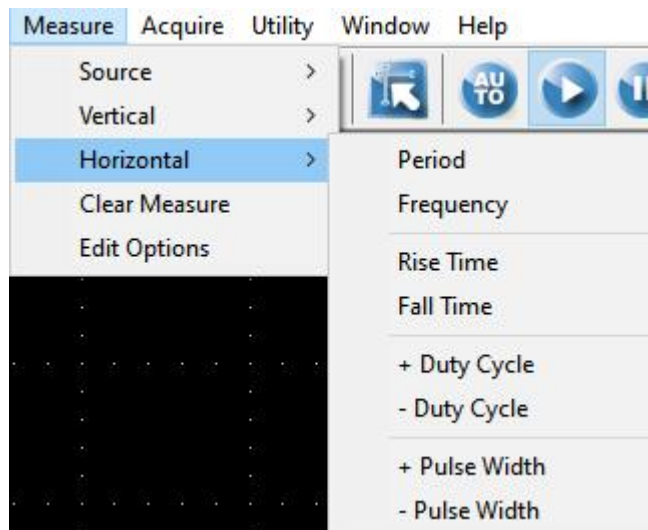
Mean: The arithmetic mean over the entire waveform

Cycle Mean: The arithmetic mean over the first cycle in the waveform

Preshoot: Positive Overshoot = (Max - Top)/Amp x 100 %, Measured over the entire waveform

Overshoot: Negative Overshoot = (Base - Min)/Amp x 100 %, Measured over the entire waveform.

3.Horizontal

Period: Time to take for the first signal cycle to complete in the waveform

Frequency: Reciprocal of the period of the first cycle to complete in the waveform

Rise Time: Time taken from lower threshold to upper threshold

Fall Time: Time taken from upper threshold to lower threshold

+Duty Cycle: Positive Duty Cycle = (Positive Pulse Width)/Period x 100%, Measured of the first cycle in waveform.

-Duty Cycle: Negative Duty Cycle = (Negative Pulse Width)/Period x 100%, Measured of the first waveform.
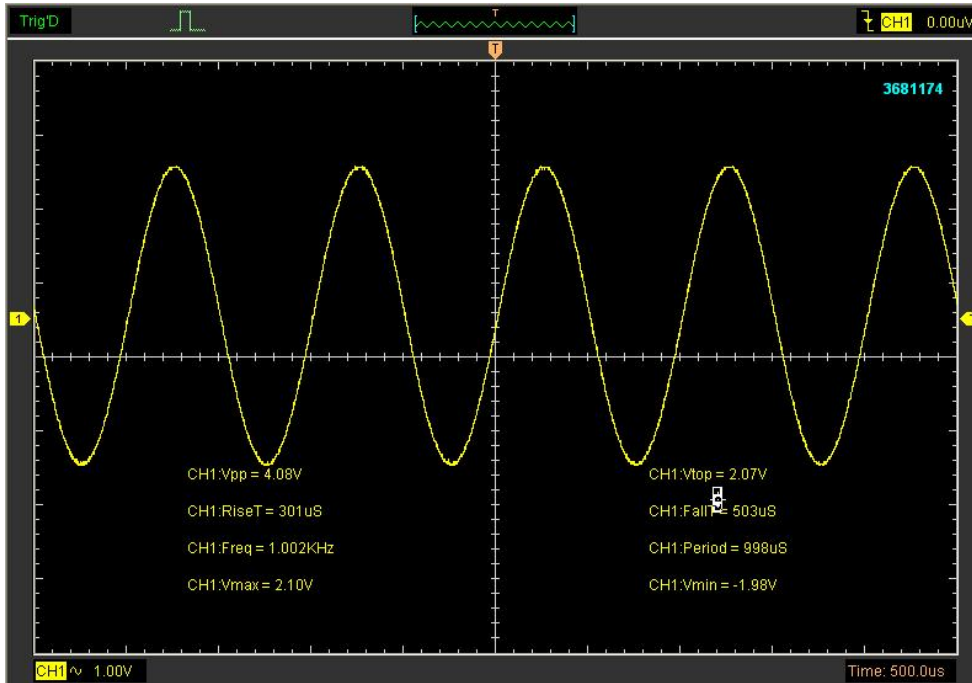
+Pulse Width: Measured of the first positive pulse in the waveform. The time between the 50% amplitude points

-Pulse Width: Measured of the first negative pulse in the waveform. The time between the 50% amplitude points

4. Clear Measure

Clear all measure items on display screen.

The **Measure** Display Window:

Note: The results of the automatic measurements will be displayed on the bottom of the screen. Maximum 8 results could be displayed at the same time. When there is no room, the next new measurement result will make the previous results moving left, out of screen.

5. Edit Measure
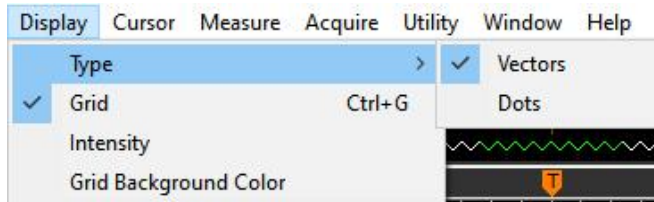
Click "**Measure->Edit Measure**".
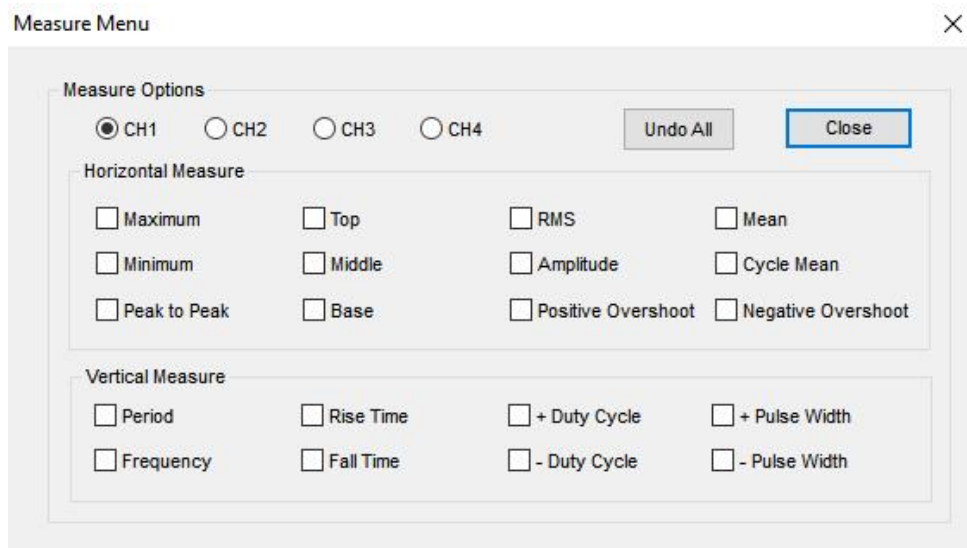
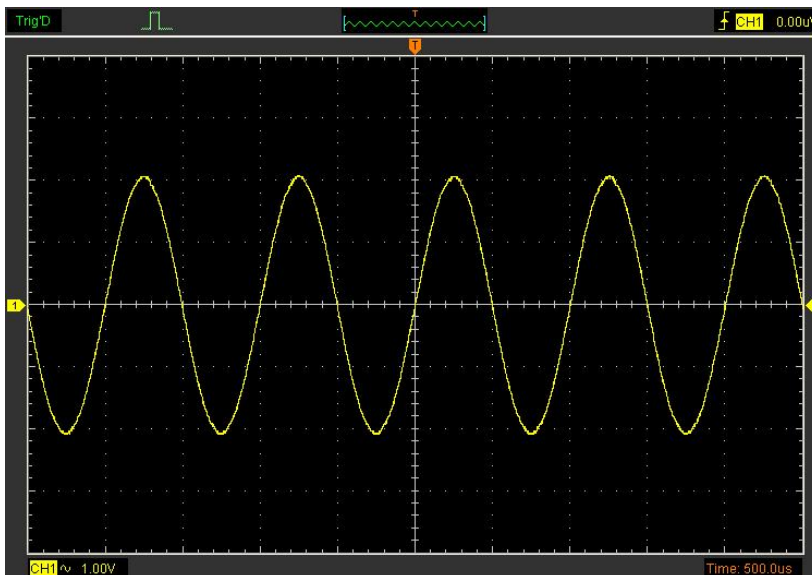User can select Maximum 8 measure options to measure.

3.8 The Display System

3.8.1 Display Type

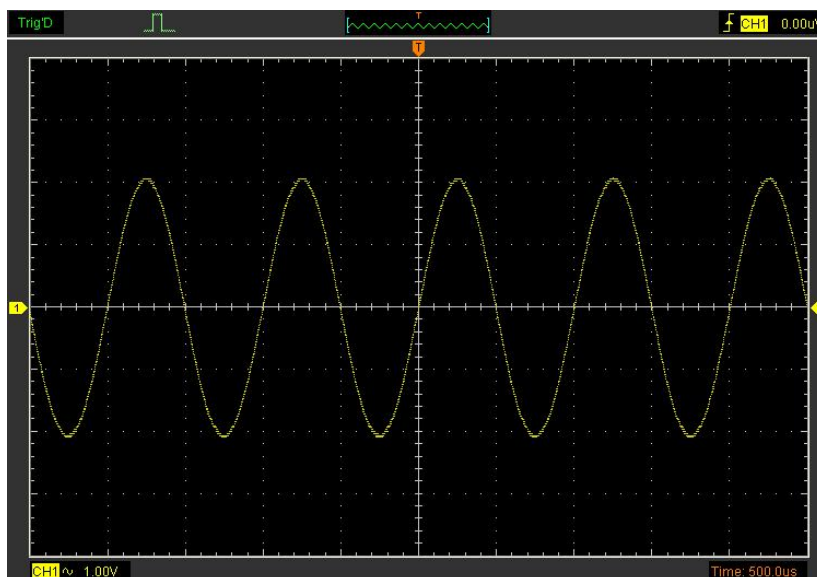Click **"Type"** in **"Display"** menu.

The following figure shows the type parameters setting.

If the **Vectors** type mode is selected, the waveform will be displayed as following figure.
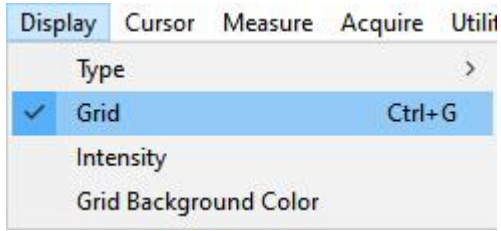

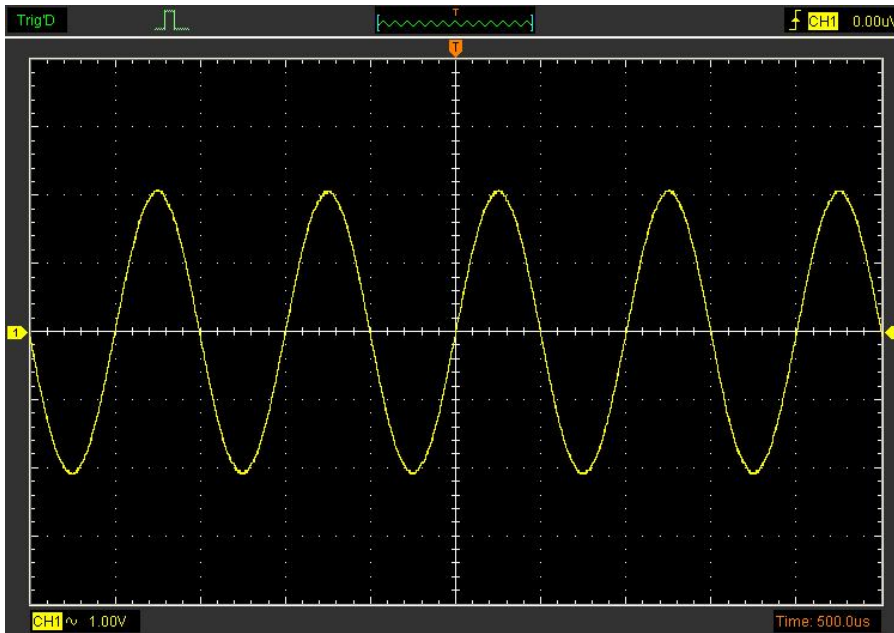If the **Dots** type mode is selected, the waveform will be displayed as following figure.
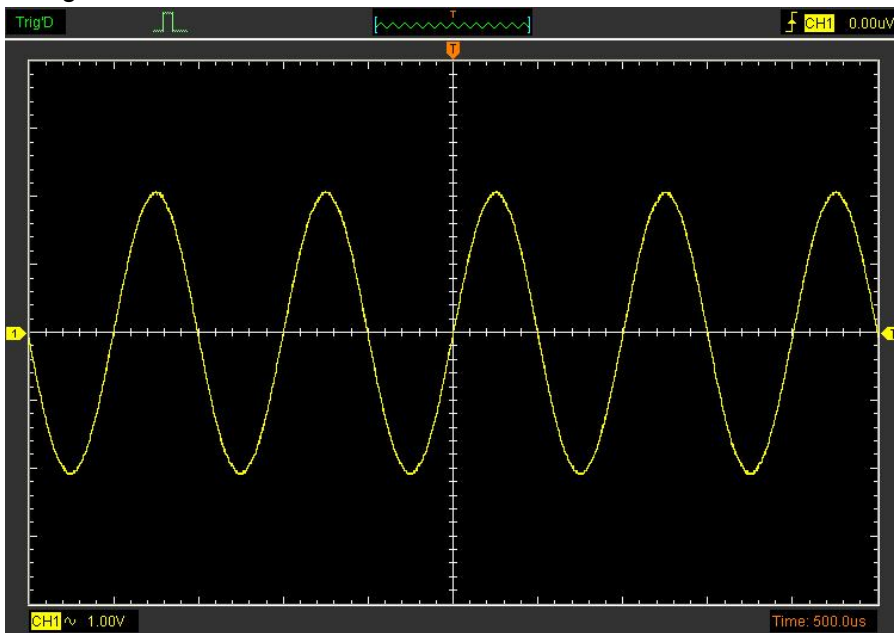
3.8.2 Display Grid

Click **"Display"** in main menu
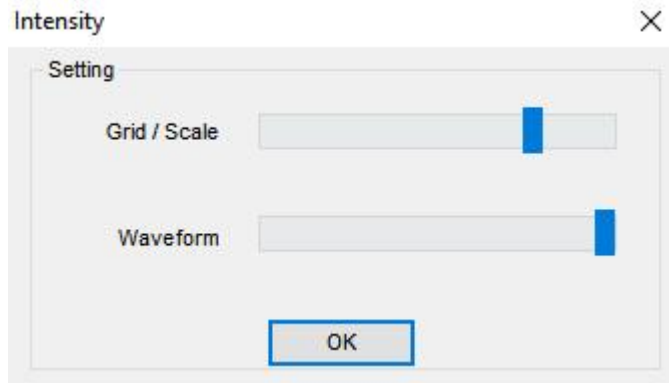

The grid shows:

The grid not shows:

3.8.3 Intensity

Click **"Display->Intensity"** in main menu.

The following figure shows the intensity dialog. It shows the display parameters setting.

You can change the grid and waveform color intensity in this dialog.
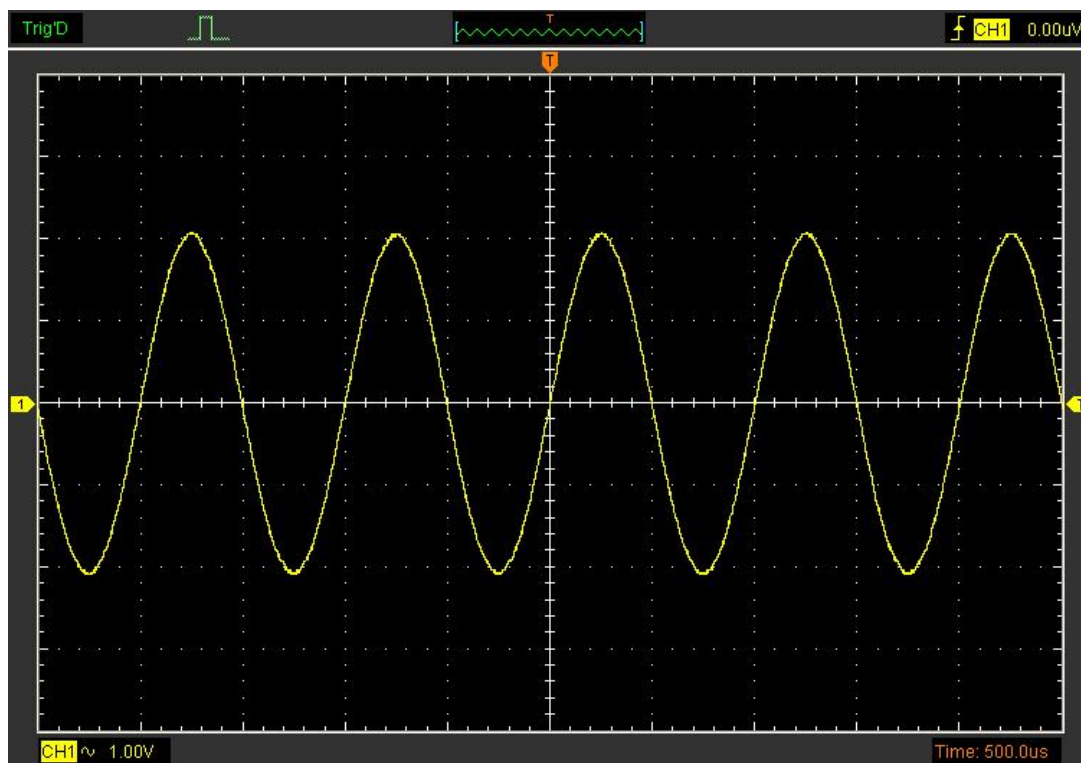
3.8.4 Grid Background Color

Click "**Display->Grid Background Color**" in main menu.
The following figure shows the grid background color dialog.

You can change the grid background color in this dialog.

Click the color bar to select the background color.

Example: changed the background color into blue.

3.9 Zoom In/Out and Drag Waveforms

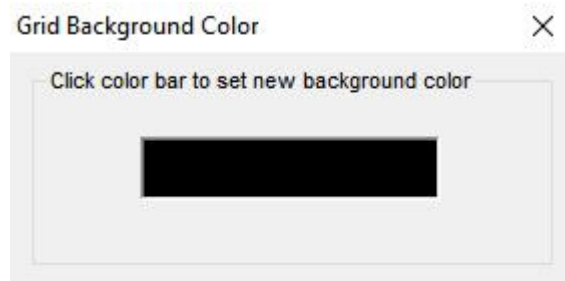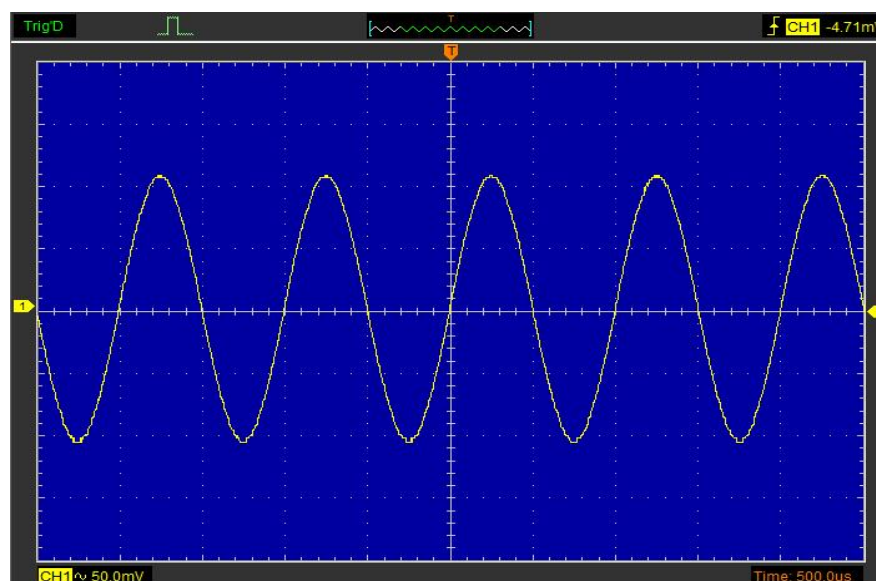The software will stop updating waveform after the user clicked **"Stop"** button.
The user can change the waveform display by adjusting the scale and position.
When you change the scale, the waveform display will increase or decrease in size.
When you change the position, the waveform will move up, down, right, or left.
The channel reference indicator identifies each waveform on the display. The indicator points to the reference level of the waveform record.
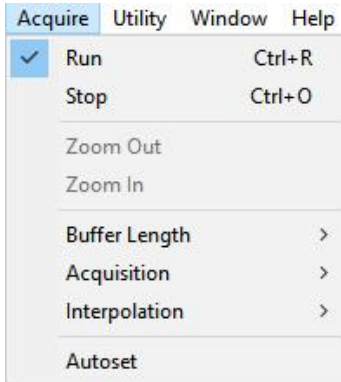
Zoom In/Out

The user can click **"Zoom In/Ou**t**"** in **"Acquire"** menu, then left or right click the mouse button on display screen to **zoom in/out** the waveform. Also the user can change **Time/Div** in **Horizontal** menu or in **Horizontal** panel to zoom in/out the waveform.

Drag

The user can modify the waveform position after clicked **"Stop"** in **"Acquire"** menu and

clicked in tool bar following the following steps.
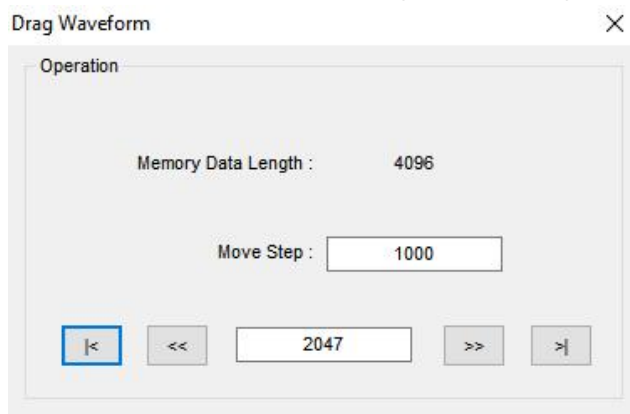
1.Memory Data Length:

2.Set the Move Step:

3.Change the waveform position:

3.10 Interpolation

At the time base 40ns/div or faster, user can use the 3 different interpolation mode to get waveforms of different smoothness.

The **Step** Interpolation:

The **Linear** Interpolation:

The **Sin(x)/x** Interpolation:

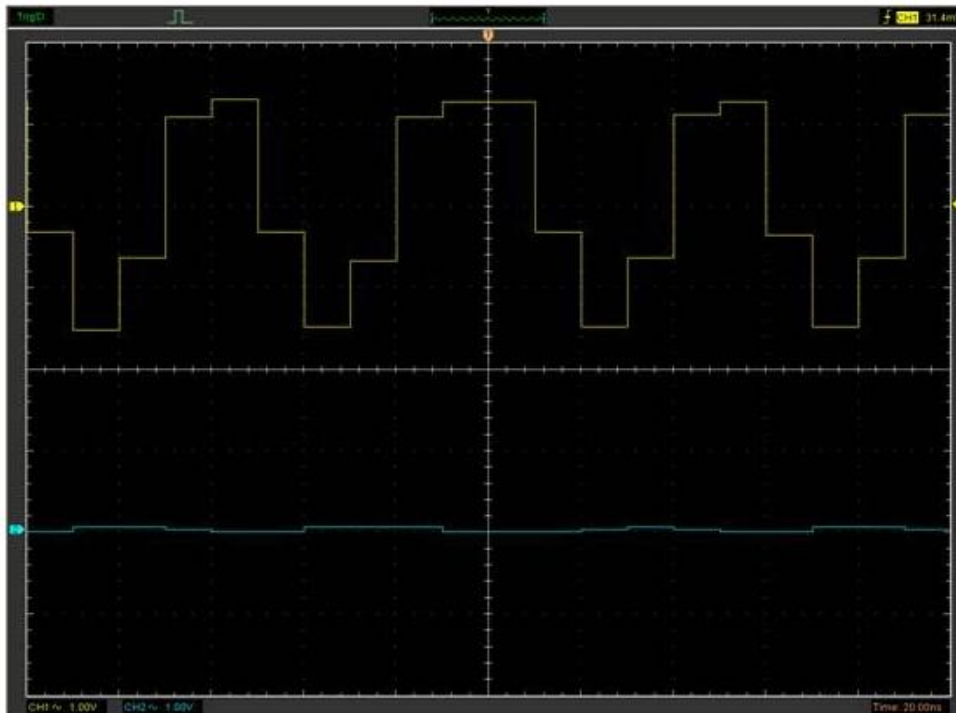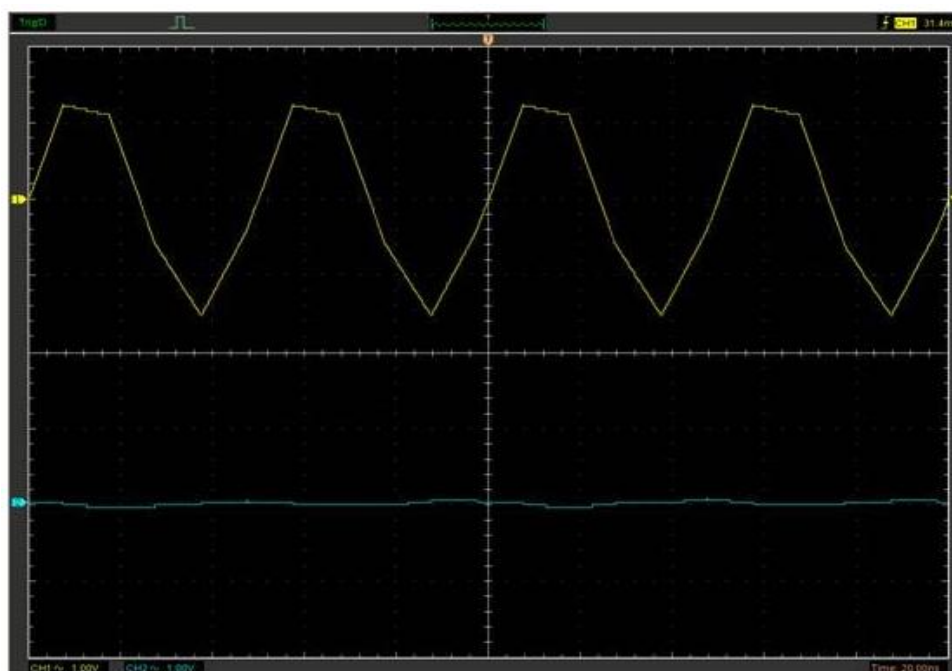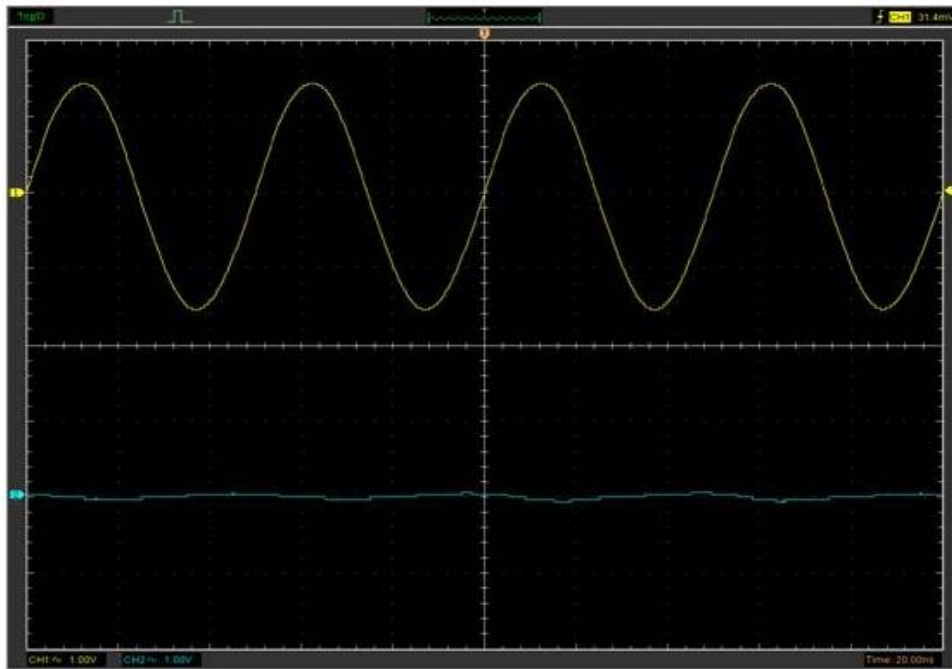**Note**: The default interpolation mode is Sin(x)/x.

3.11 Acquisition Modes

Acquisition

When you acquire a signal, the oscilloscope converts it into a digital form and displays a waveform. The acquisition mode defines how the signal is digitized and the time base setting affects the time span and level of detail in the acquisition.

There are three acquisition modes: Normal, Average and Peak Detect.
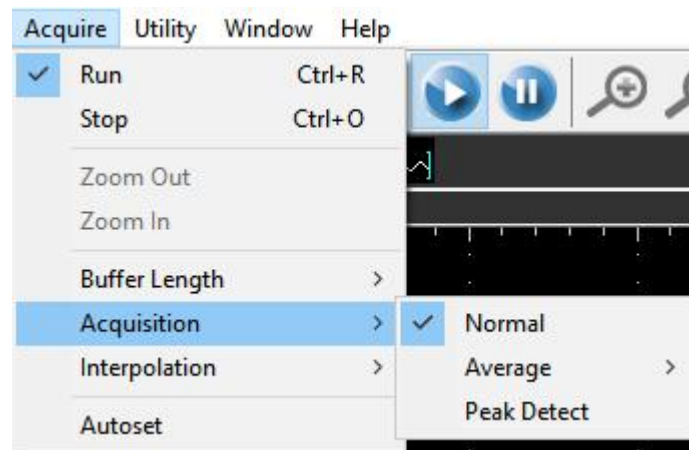
Normal: In this acquisition mode, the oscilloscope samples the signal in evenly spaced intervals to construct the waveform.

Average: In this acquisition mode, the oscilloscope acquires several waveforms, averages them, and displays the resulting waveform. You can use this mode to reduce random noise.

Peak Detect: In this acquisition mode, the oscilloscope finds the maximum and the minimum in every sampling interval, and use these values to show waveform.

3.12 Print And Print Preview

1. Click **"Print"** in **"File"** menu to set the printer to print the current waveform.

2. Click the **"PrintPreview"** in **"File"** menu to get into the Preview window.
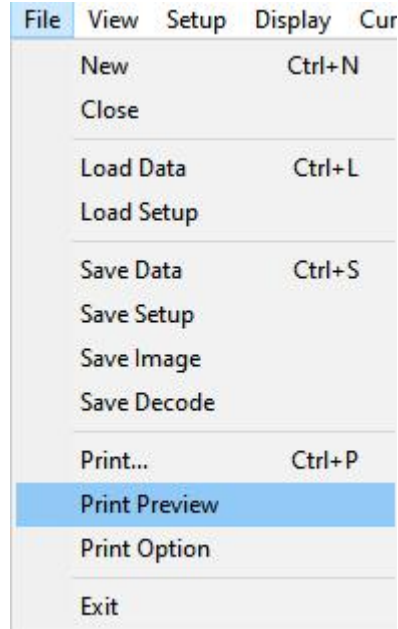
In **"PrintPreview"** window, use the **"Zoom In"** button and the **"Zoom Out"** button to change the size of the waveform graph. Click the **"Close"** button to turn this window off and click the **"Print"** button to print the report.

The Print report:
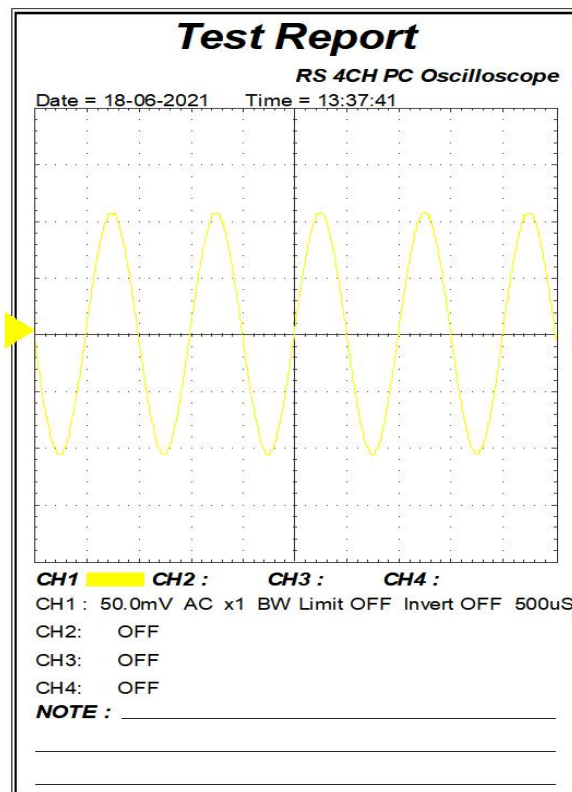
Chapter 4 Application Example

◆Simple Measurement

◆ Pass/Fail Test

◆Capturing a Single-Shot Signal

◆The Application of the X-Y

◆Reduce the noise on the signal

◆Taking Cursor Measurement

4.1 Simple Measurement

To acquire and display a signal, please do the steps as follows:

1. Connect signal to **CH1** by using probe

2. Click the   button on toolbar or **"Acquire -> Auto Setup"** on menu.

The DSO set the vertical, horizontal, and triggers controls at the best status automatically. Also, you can adjust the controls to meet your measurement to optimize the waveform display.

To measure the frequency and "**Vpp**", you can do these steps as follows:

1. Click the **"Measure->Horizontal->Frequency"** button, the frequency of the signal display on the bottom of the waveform interface.

2. Click the **"Measure->Vertical->Peak-to-Peak"** button, the "**Vpp**" of the signal will also display on the bottom of the waveform interface.
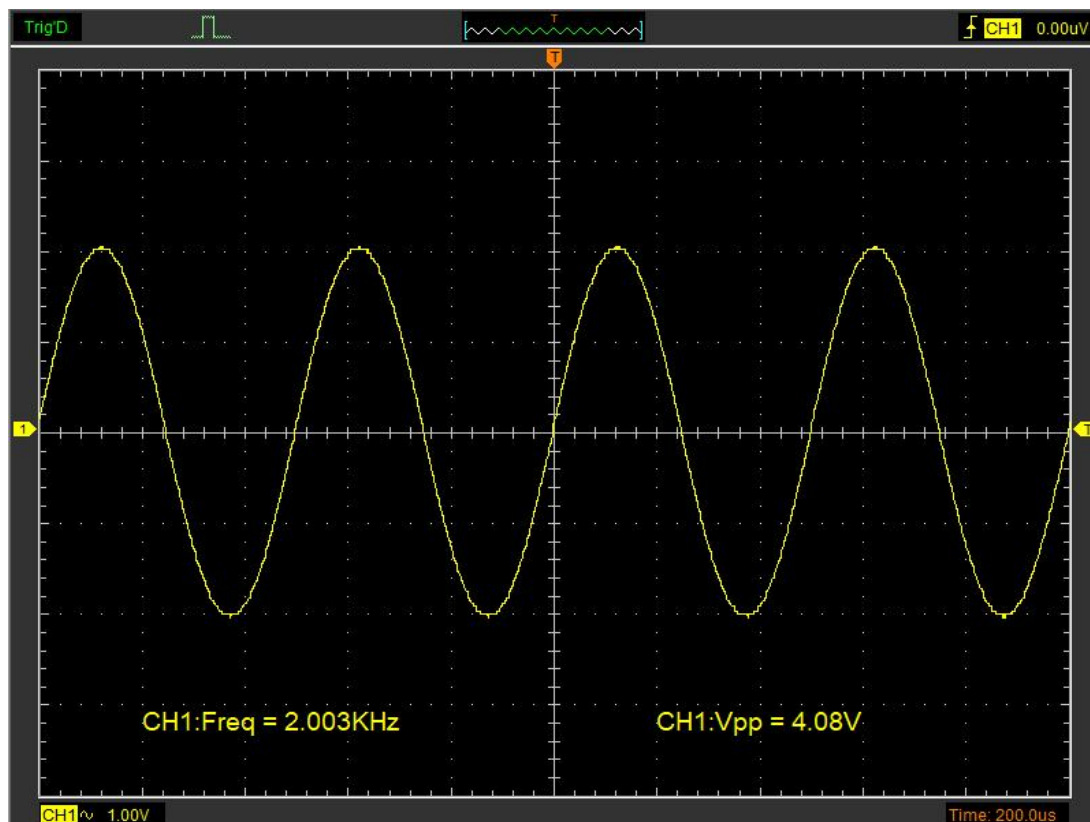
To clear the measurement on the waveform interface, click the "**Measure->Clear Measure**" button.
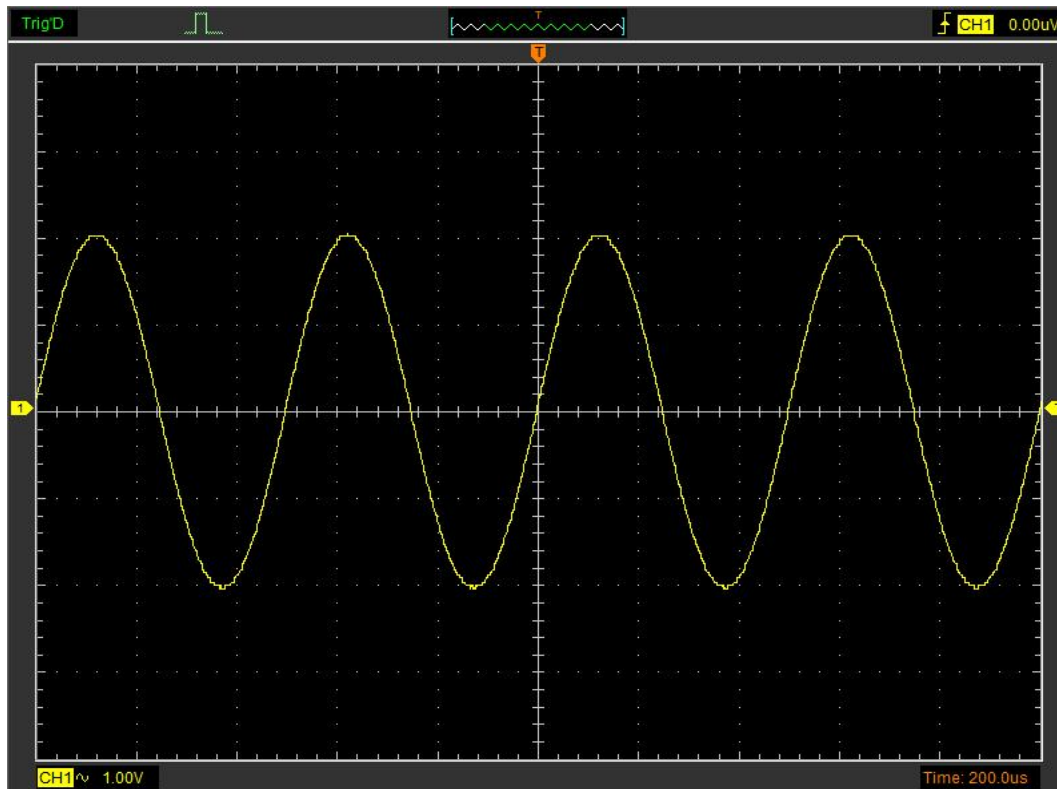
4.2 Pass/Fail Test

The **Pass/Fail** function monitors changes of signals and outputs pass or fail signals by comparing the input signal with the pre-created mask.

Click **"Pass/Fail"** in **"Utility"** menu to display Pass/Fail window.
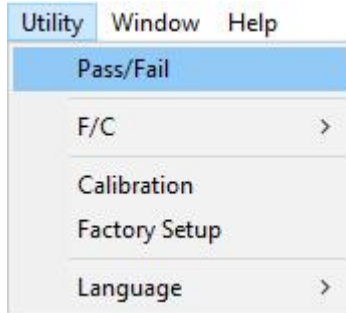
Turn on the **Pass/Fail** function by ticking ON/OFF check box.
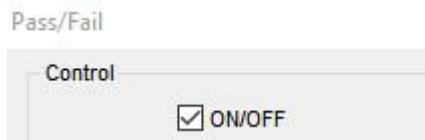
And the Pass Fail data will display on the left upper corner of the screen.
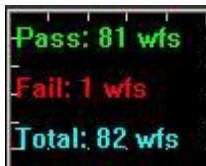
Fail: It shows the fail waveform number
Pass: It shows the pass waveform number
Total: It shows the total **Pass/Fail** waveform number

You can select the **Pass/Fail** source channel, output condition, and enable **Stop When Output** function on the **Control** panel.
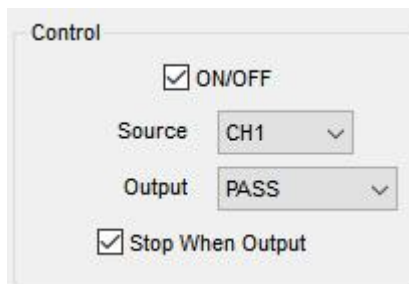
Note: If the **Stop When Output** was checked, the Pass/Fail will stop when output.

Setup the mask's vertical and horizontal limit range (0.04div-4div) on the **Mask** panel, and click **Create** button to create Pass/Fail area according to the mask, and click **Save** button to save the settings to file, and click **Load** button to load the saved settings file.
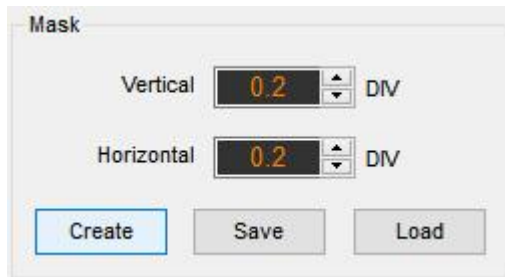
When click **Create** button, the created Pass/Fail area of the selected channel will display on the screen.
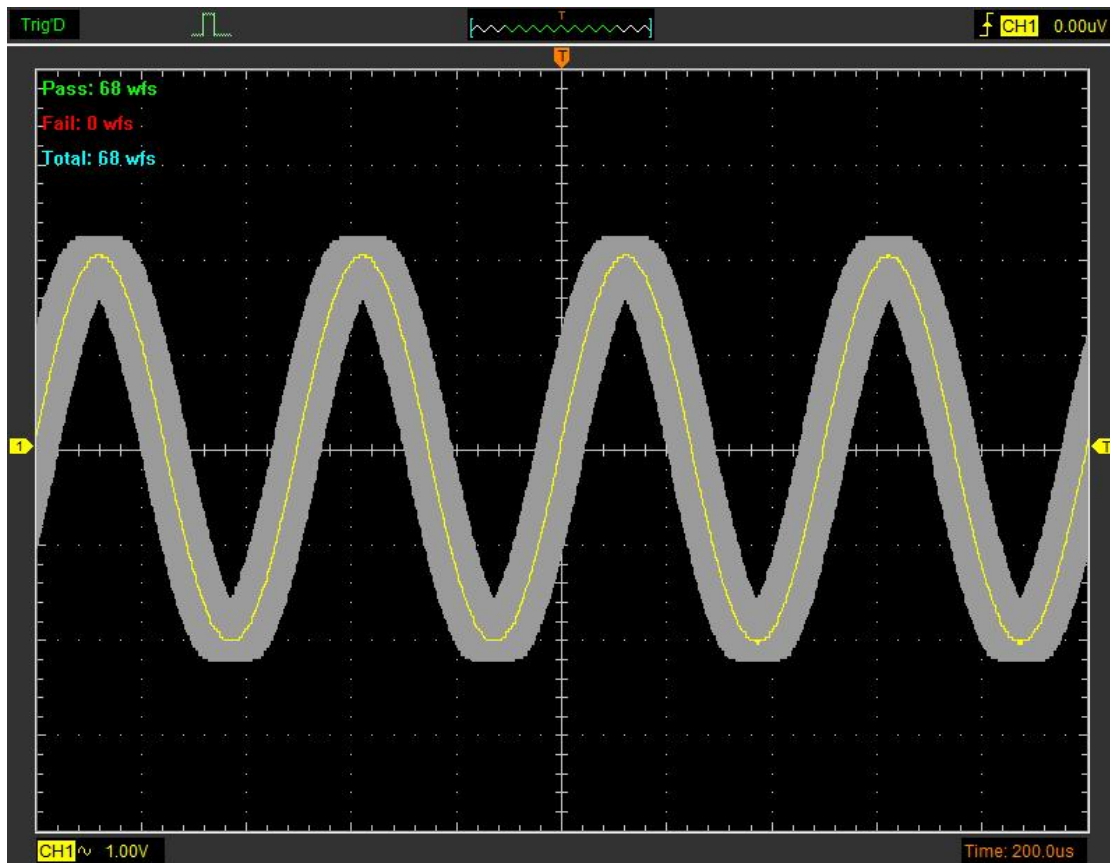
On the **Operate** panel, you can click **Start** button to start the **Pass/Fail** test, and click **Stop** button to stop the **Pass/Fail** test.
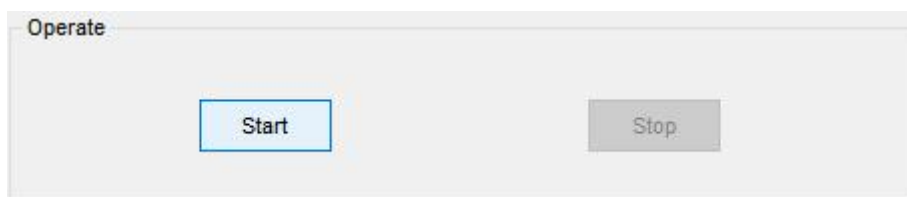
4.3 Capturing a Single-Shot Signal

To capture a single event, it needs to gather some pre-test knowledge of the signal in order to set up the trigger level and slope correctly. For example, if the event is derived from 3.3V COMS logic, a trigger level of 1.2 or higher Volts should work on a rising edge. Do these steps as follows:

1. Set the probe and the channel attenuation to X 10.

2. Set up the trigger in the Trigger Menu, or in the Trigger Setting window.

1) Adjust the Trigger Mode to Edge.

2) Set the Trigger Sweep to Single.

3) Set the Trigger Source to CH1.

4) Set the Trigger Slope to "+" which means you select the rising edge.

5) Adjust the Volts/Div and the time base in a proper range for the signal.

6) Drag the trigger level sign on the waveform display screen to proper position. It ally higher a little above the normal level.

7) Click **START** button to start capturing. When the trigger conditions are met, data appears on the display representing the data points that the oscilloscope obtained with one acquisition.

This function helps to capture the signal occurrence easily, such as the noise with large amplitude; set the trigger level higher a little above the normal level and press and wait. When noise occurs, the instrument will record the waveform before and after the trigger.

4.4 The Application of the X-Y Operation

X-Y Plot acts to analyze correlation of data of two channels. Lissajous diagram is displayed in the screen when you use **X-Y** Plot, which enables to compare frequencies, amplitudes and phases of counterpart waveform against the reference waveform. This makes it possible to compare and analyze frequency, amplitude and phase between input and output.

Do these steps as follows:

1. Set the probe attenuation to "**x10**" Set the switch to "**x10**" on the probes.

2. Connect the CH1 probe to the input of the circuit, and connect the CH2 probe to the output of the circuit.

3. Click [AUTO] button.

4. Adjust the vertical scale and offset to display approximately the same amplitude signals on each channel.

5. Select X-Y format at Horizontal window. The oscilloscope will displays a Lissajous pattern representing the input and the output characteristics of the circuit.

6. Adjust the scale and offset of the horizontal and vertical to a desirable waveform display. The following picture shows a typical example.

7. Apply the Ellipse Method to observe the phase difference between the two channels.

Signal in X-Y Format:
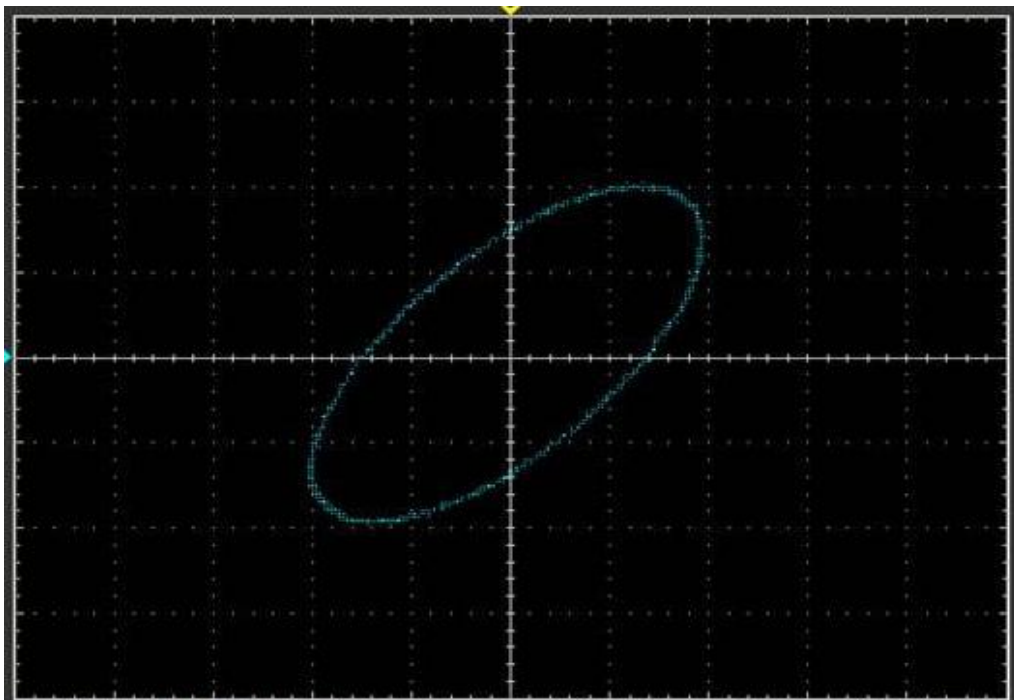
Instruction of the Ellipse Method
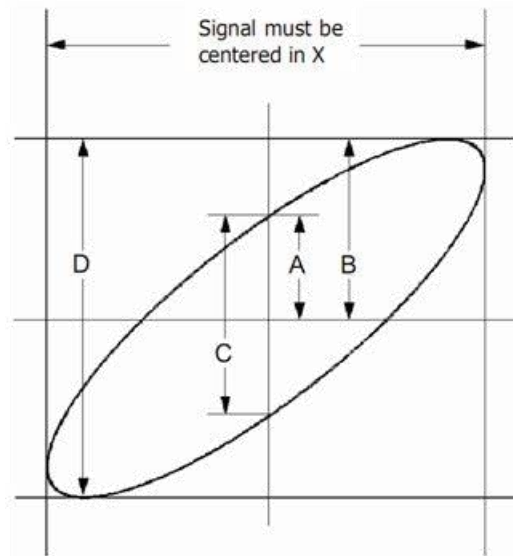
Sinθ = A/B or C/D, where θ = phase shift (in degrees) between the two signals.

From the formula above:
θ **= _arcsine (A/B) or _arcsine (C/D)**

θ must be in the range of (0~π/2) or (3π/2~2π) if the main axis of the ellipse is between I and III quadrant, . If the main axis is at II and IV quadrant, θ must be in the range of (π/2~π) or (π~3π/2).

4.5 Reduce the noise on the signal

To reduce the noise by setting the acquisition type and adjust the waveform intensity.

Signal With Random Noise:
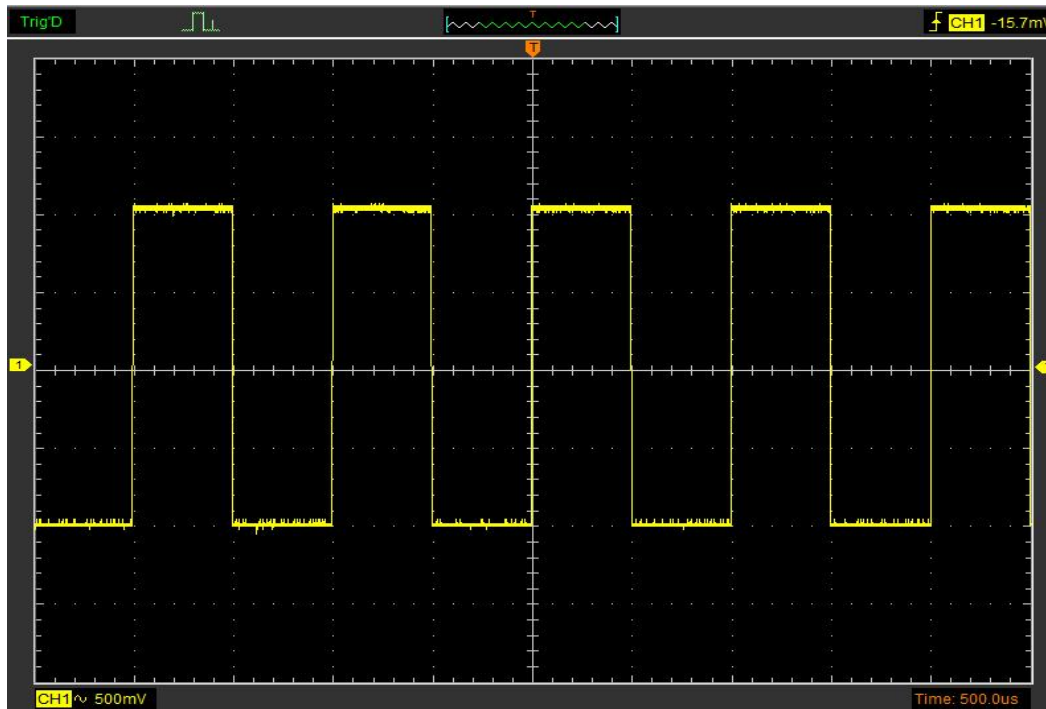
Do these steps as follows:

1.   Set the probe and the channel attenuation to "**x10**".

2.   Connect a signal to the oscilloscope and obtain a stable display.

3.   To reduce the noise by setting the acquisition type and adjust the waveform intensity.

If there is noise within the signal and the waveform looks too wide, in this case, choose average acquisition. In this mode the waveform will be thin and easy to observe and measure.

1) To use average follow these steps.
   Click the "**Menu->Acquire->Acquisition->Average**" buttons.
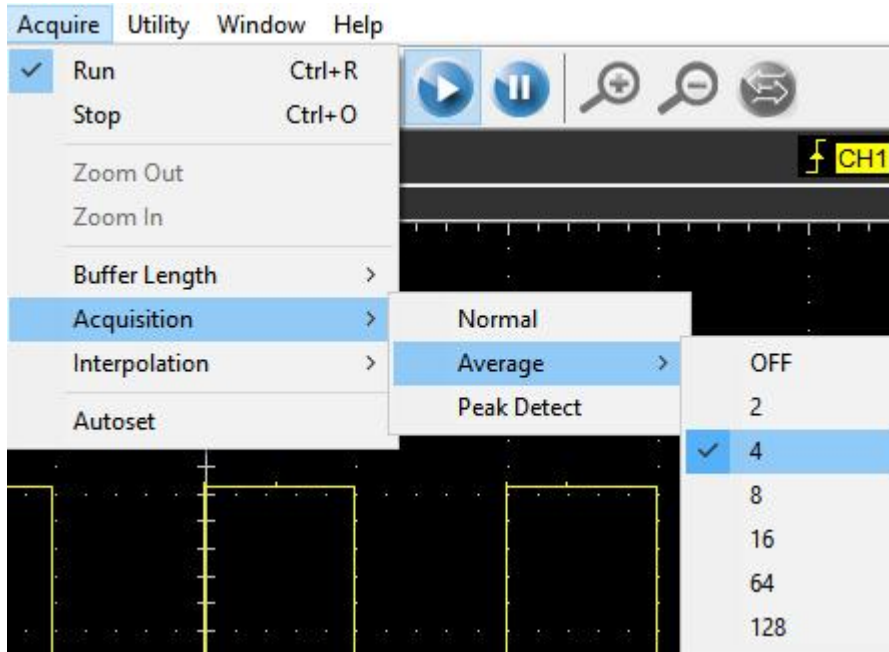
Signal After Reducing Random Noise:
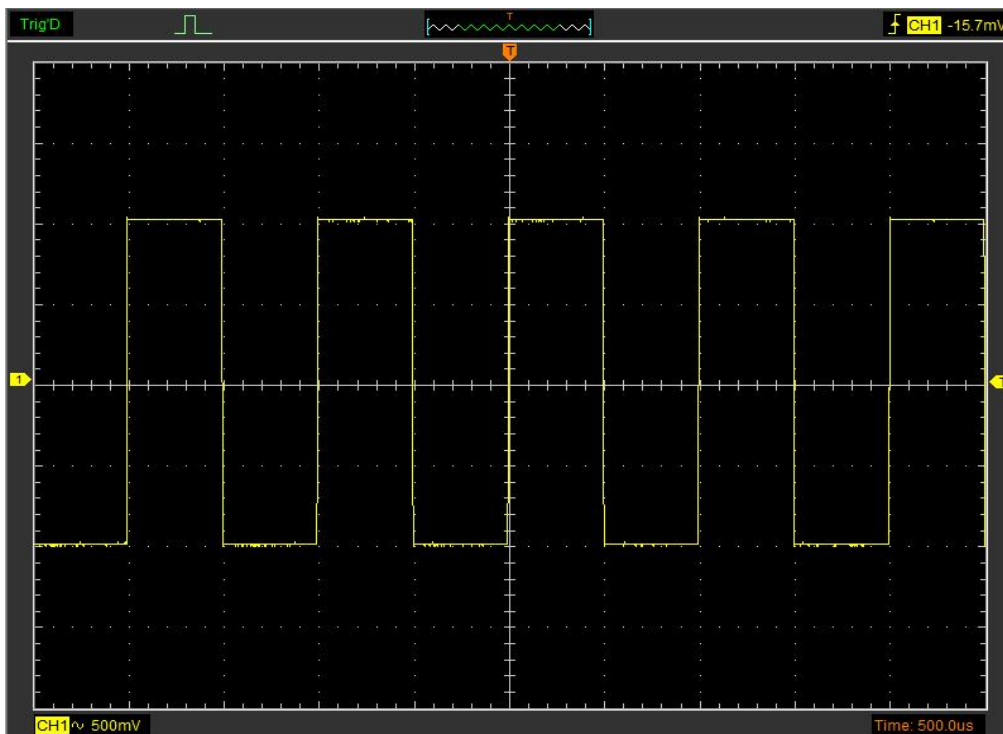
2) To reduce the noisy it can also be achieved by reducing the intensity of the waveform.

Note: It is normal that the waveform update rate will slow down when the average figure bigger than 1.

4.6 Taking Cursor Measurements

Use cursors to make time and amplitude measurements on a waveform quickly.

Measure the Peak Frequency or Time of the First Sine Waveform

Do these steps:

1. Click **"Cursor->Source"**, select CH1 (select CH2 if you want measure CH2).

2. Click **"Cursor->Type"**, select Vertical.

3. Push left mouse button, and the vertical lines appear.

4. Drag the mouse button to the point you want to measure.

5. Release the left mouse button, the frequency difference and time difference will be shown at the status bar.

Measure the Frequency and Time:
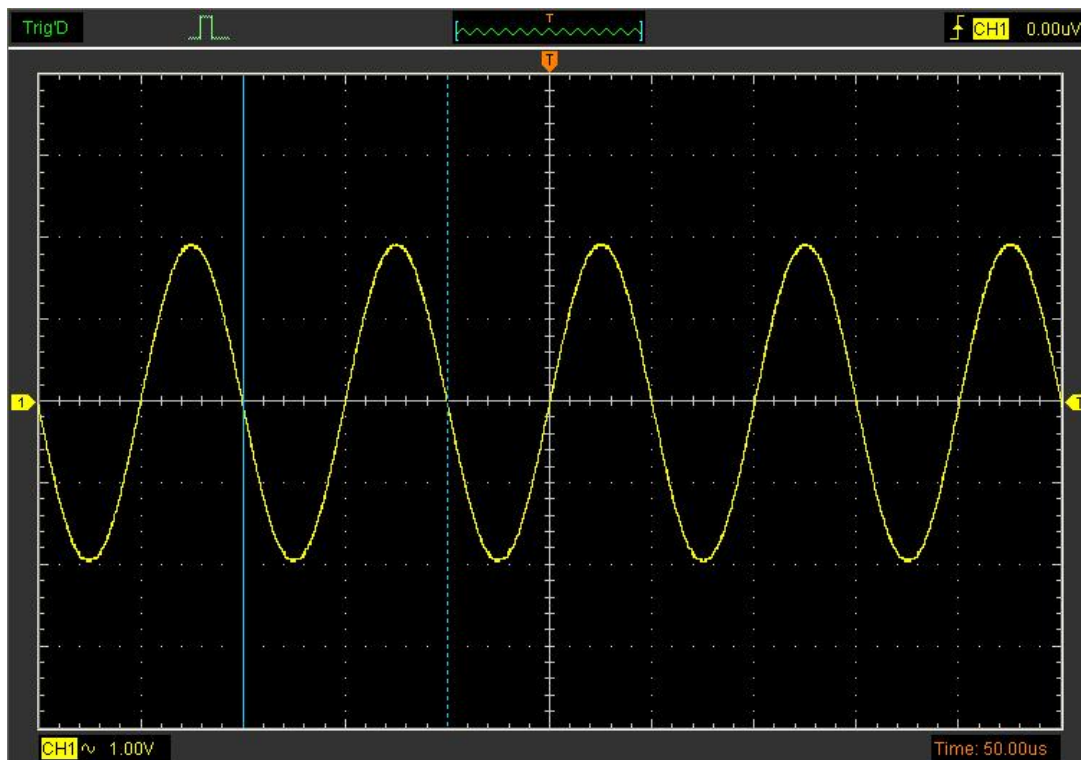
Read the details showing in the status bar.

Freq: 1.036KHz   Time: 965uS

Measure the Amplitude of the First Waveform Peak of the Waveform

Do these steps:

1. Click "**Cursor->Source**", select CH1 (select CH2 if you want measure CH2).

2. Click "**Cursor->Type**", select Horizontal.

3. Push left mouse button, and the Horizontal lines appear.

4. Drag the mouse button to the point you want to measure.

5. Release the left mouse button, the voltage difference will be shown at the status bar.

Measure the Amplitude:
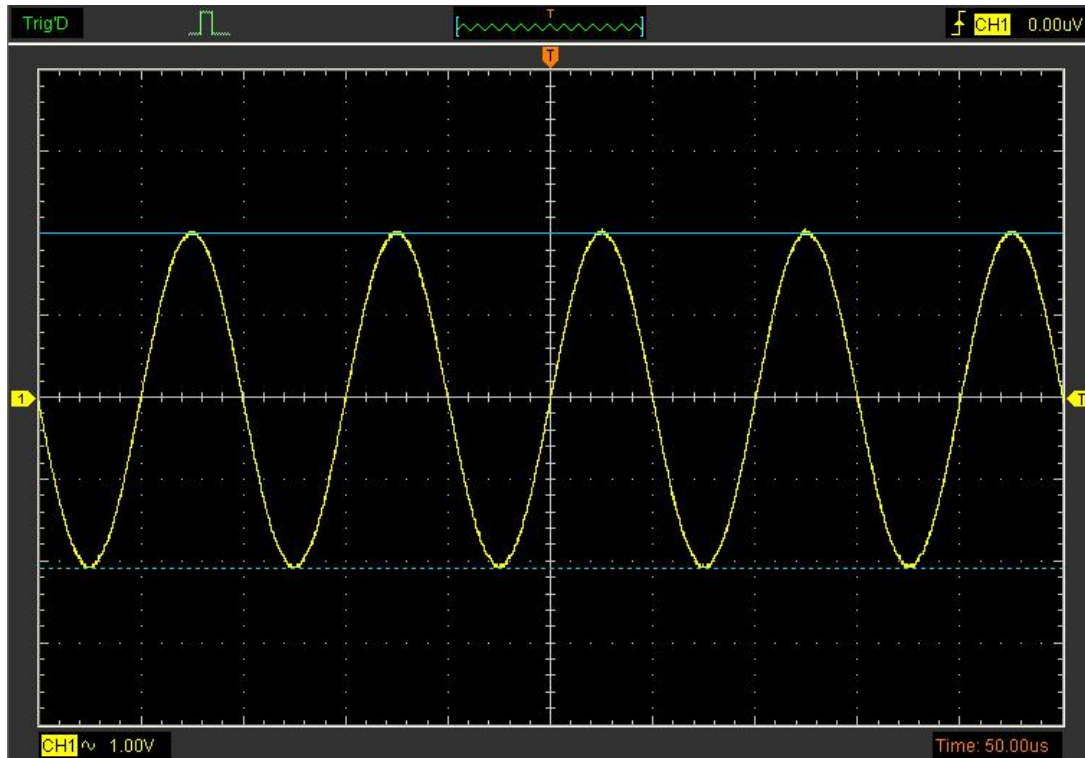
Read the details showing in the status bar.

Volt: 976mV

Trace the Amplitude of a fixed position on X-axis in a Waveform

Do these steps:

1. Click "**Cursor->Source**", select CH1 (select CH2 if you want trace CH2).

2. Click "**Cursor->Type**", select Trace.

3. Click the cursor at the position that you want traced of the wave in the waveform window.

Trace the Amplitude:
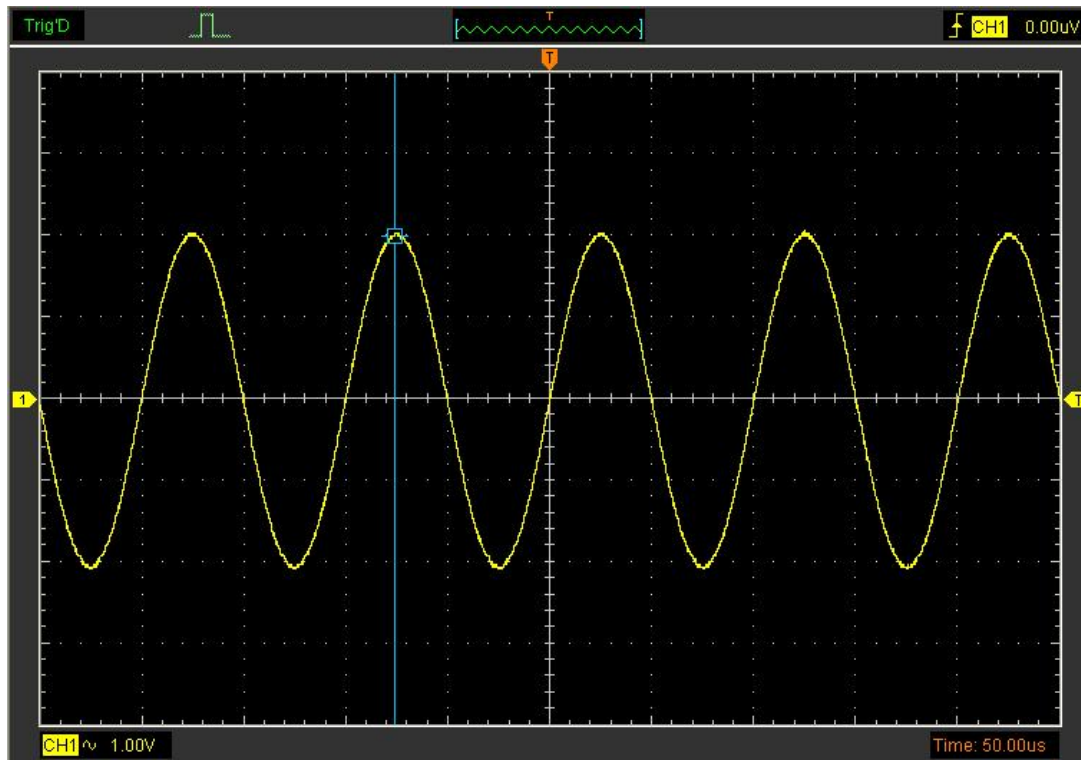
Read the details showing in the status bar.

Volt: 7.10mV

Note: Click "**Cursor->Type**", select "**Cross**", you can measure time and amplitude at one time.

Chapter 5 Appendix

◆ **Appendix A: Specification**

◆ **Appendix B: Accessories**

◆ **Appendix C: General Maintenance**

Appendix A: Specification

Vertical				
Model	2205864	2205865	2205866	2205867
Bandwidth (-3dB)	70 MHz	100 MHz	200 MHz	250MHz
Analog Channels	4			
Input Impedance	Resistance: 1MΩ ; Capacitance: 25 pF±3pF			
Input Sensitivity	2mV/div to 10V/div			
Input Coupling	AC/DC/GND			
Vertical Resolution	8 bits			
Memory Depth	64K/CH,32K/2CH,16K/4CH,			
Maximum Input Protection	400V (DC+AC Peak)			
Horizontal				
Real-Time Sampling Rate	1GS/s			
Time Base Range	2ns/div to 1000s/div(1-2-5 sequences)			
Time Base Precision	±50ppm			
Trigger				
Source	CH1, CH2, CH3, CH4			
Mode	Edge, Pulse, Video, Alternative, CAN, LIN, UART, SPI, IIC			
X-Y mode				
X-Axis Input	CH1			
Y-Axis Input	CH2			
Phrase Shift	Max.3 degree			
Cursor				
Cursor Measurement	Cross mode: voltage difference between cursors △V time difference between cursors △T frequency (reciprocal of △T in Hz 1/△T)			
	Trace mode: voltage at the waveform point			
	Vertical mode: time difference between cursors △T frequency (reciprocal of △T in Hz 1/△T)			
	Horizontal mode: voltage difference between cursors △V			
Measurement				
Voltage Measurement	Vpp, Vamp, Vmax, Vmin, Vtop, Vmid, Vbase, Vavg, Vrms, Vcrms, Preshoot, Overshoot			
Time Measurement	Frequency, Period, Rise Time, Fall Time, Positive Width, Negative Width, Duty Cycle			
Math				
Waveform Signal Process	+,- , x,÷, FFT, Invert			
FFT Window	Rectangular, Hanning, Hamming, Blackman Window			

Voltage Range	
Vertical sensitivity	10mV to 10V/div @ x 1 probe
	100mV to 100V/div @ x 10 probe
	1V to 1000V/div @ x 100 probe
	10V to 10000V/div @ x 1000 probe
	100V to 100000V/div @ x 10000 probe
Others	
AUTOSET	Yes (≥ 30Hz)
Interface	USB 2.0
Power Source	Dual port USB
Dimension	206 x 120 x 35 (mm)
Weight	457g

Appendix B: Accessories

	X1, X10 two passive probes. The passive probes have a 6MHz bandwidth (rated 100Vrms CAT III) when the switch is in the X1 position, and a maximum bandwidth (rated 300Vrms CAT II) when the switch is in the X10 position. Each probe consists of all necessary fittings.
	Two Gator Clip Cable. It's about 1 meter in length with a red clip and a black clip. It can be plugged into the 4 mm connectors at the end of the cable.
	A USB line, used to connect external devices with USB interface like a printer or to establish communications between PC and the oscilloscope.
	A software installation CD and it contains the user manual for the oscilloscopes.

Appendix C: General Maintenance

General Care

Do not store or leave the oscilloscope where the device will be exposed to direct sunlight for long periods of time.

Caution

To avoid damages to the device or probes, do not expose them to sprays, liquids or solvents.

To avoid damages to the surface of the device or probes not use any abrasive or chemical cleaning agents.

Cleaning

Inspect the device and probes as often as operating conditions require. Make sure the device disconnect form all power sources.

To clean the exterior surface, perform the following steps:

1. Remove loose dust on the outside of the oscilloscope and probes with a lint-free cloth. Use care to avoid scratching the clear glass display filter.

2. Use a soft cloth dampened with water to clean the device.

INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT.
These symbols indicate that separate collection of Waste Electrical and Electronic Equipment (WEEE) or waste batteries is required. Do not dispose of these items with general household waste. Separate for the treatment, recovery and recycling of the materials used. Waste batteries can be returned to any waste battery recycling point which are provided by most battery retailers. Contact your local authority for details of the battery and WEEE recycling schemes available in your area.