User's Manual and Installation Instructions of Communication Control and Waveform Analysis Software of Digital Storage Oscilloscope

Contents

Chapter 1: Installation of communication control and waveform analysis software of digital storage Oscilloscope

1.1 Hardware requirements

Device requirements	Minimum requirements
Oscilloscope	UTD2000M digital storage oscilloscope
Computer	Windows 2000/XP/Vista system, 128 megabytes of RAM, 16X CD-ROM or better (see corresponding hardware requirements of the Vista system), a 1024*768 or better resolution
Connecting line	USB/HOST interface lines at two ends

1.2 Installation of software

A piece of communication control and waveform analysis software of digital storage oscilloscope (“software” for short) will be provided with the UTD2000M digital storage oscilloscope (“oscilloscope” for short) you buy (the software is on the CD provided with the oscilloscope).
Software name: UTD2000M digital storage oscilloscope real-time monitoring software

Installation steps:

Step 1: Insert the CD provided with the oscilloscope into the CD-ROM of a computer that will read content of the CD. Find the software (Fig.1-1).

Fig.1-1

Notes:
1. It is the installation package of the software downloaded from the website. It shall be decompressed before use.
2. The software supports the Windows 2000 system, the Windows XP system and the Vista system; however, it supports the USB2.0 communication protocol on the Vista system only.

Step 2: Please according to prompts to install, each page of the dialog box and click NEXT, until the end of the installation.

1.3 Installation of software driver

To realize communication control between the oscilloscope USB interface and the software after the software is installed, it is necessary to install a USB driver.

1.3.1 Manual pre-installation

Steps:

Step 1: Insert the CD provided with the oscilloscope into the CD-ROM of a computer that will read content of the CD. Find the DSO_USB interface driver (Fig.1-7).

Fig.1-7

Execute DSO New Driver (Cy68013) in the folder for driver installation (Fig.1-8).

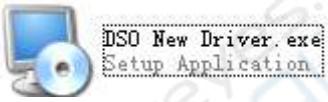

Fig.1-8

Step 2: Double click DSO New Driver to run it. An installation prompt (Fig.1-9) will then pop up. Click NEXT to enter the automatic program installation interface.

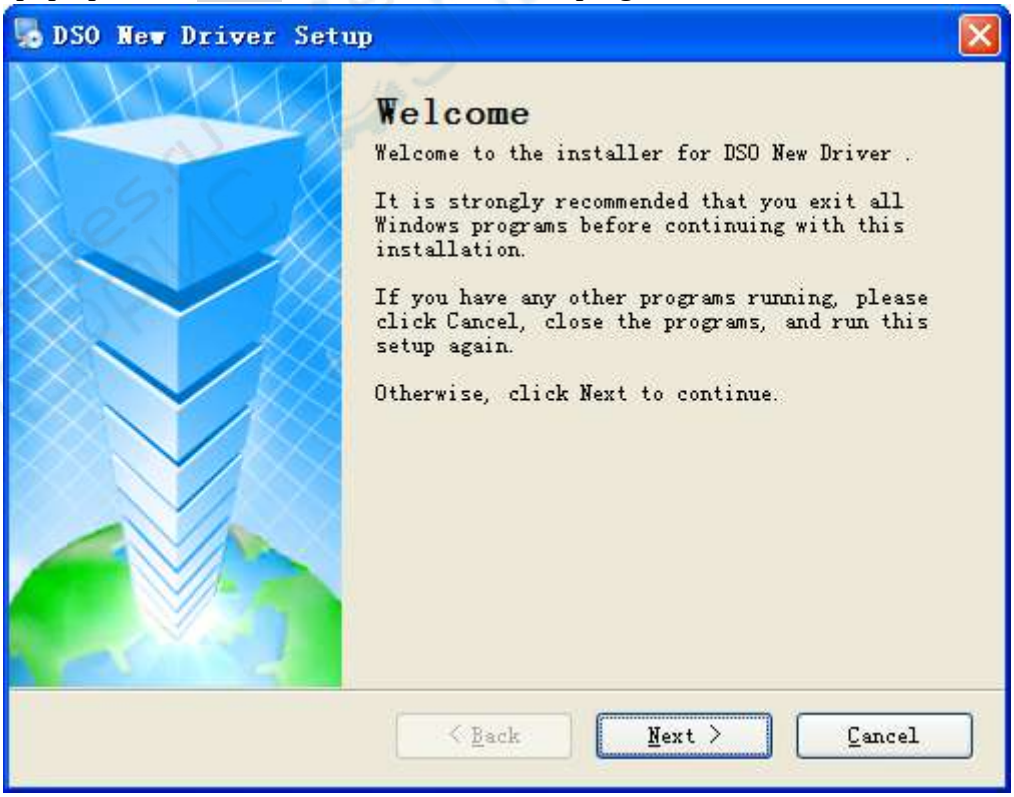

Fig.1-9

Step 3: After automatic program installation, an interface as shown in Fig.1-10 will pop up. Click Finish (F) to finish installation of the USB driver on the computer.

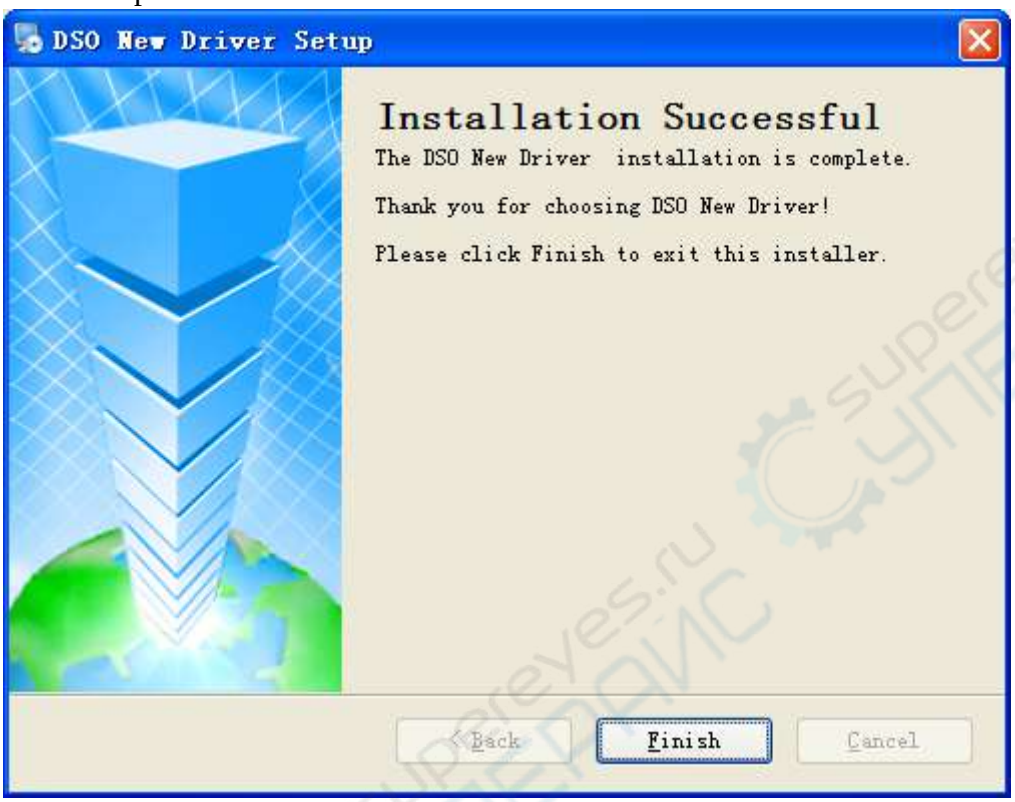

Fig.1-10

Chapter 2: Preliminary understanding of structure of the software

2.1 Overview of panel of the software

After the software is started, a display panel similar to user interface of the oscilloscope and called virtual oscilloscope panel will pop up. During data transmission, you can observe current waveform of the oscilloscope through virtual display of the virtual oscilloscope panel and view such information of the waveform and the channels as parameters through menus and controls of the user interface. Specific use will be introduced in detail below.

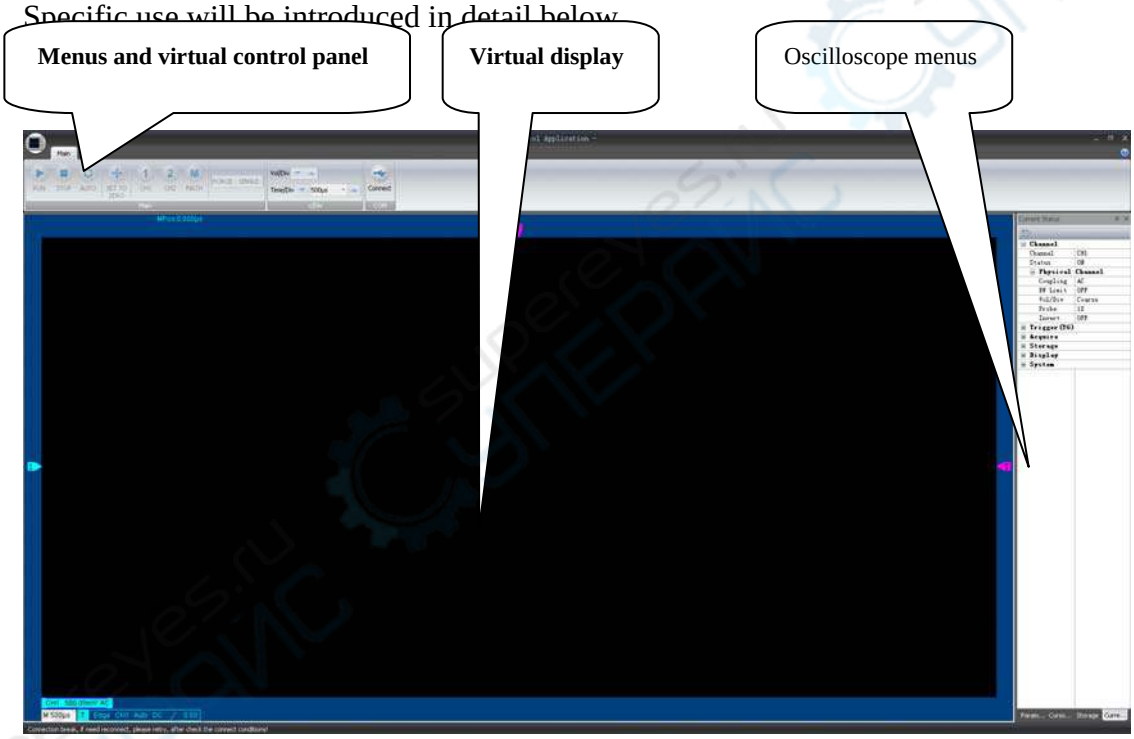

Fig.2-1

2.2 Menu description

You can start and exit the software through the menus on upper left of the display in Fig.2-1. There are two menus in all, including Home and View. The two menus are described as below.

2.2.1 Home

General control buttons and knobs of the oscilloscope are saved under the Home menu. The Connect button is used for establishing correct communication

between a computer and the oscilloscope.

2.2.2 View

After the check boxes in front of Parameter Measurement, Current State, and Save are ticked, relevant menus will pop up on corresponding positions of the display and be displayed in a list according to the three categories above. The menus may be placed in any positions of the display. If some menus are stratified, labels for menu category change will be automatically generated below the stratified menus. See Fig.2-2.

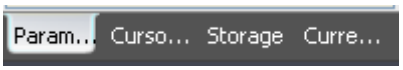

Fig.2-2

The oscilloscope can be operated through the software. In a remote monitoring mode, the software shows the oscilloscope menus through a list for quick parameter setup. Corresponding shortcuts of some general buttons and knobs have been placed under the Home menu.

Each option in the menu list corresponds to a menu option on the oscilloscope. User may move the mouse to the corresponding menu, click or double click the "▾" sign on its right side and choose relevant parameter from the list appearing after that to execute the corresponding function. For good control of this sort, user must be familiar with each menu and the current state. The waveform on the virtual display is updated in real time and is synchronous with the waveform displayed on the oscilloscope.

Chapter 3: Operation guide for software

3.1 Start the upper computer program and connect the lower computers

3.1.1 Establish the hardware environment

Power on the lower computers and connect the computer with the DSO by a USB cable corresponding to the model.

3.1.2 Start the software

After the software is installed, it may be started on your computer in either way below.

1. After the software is installed, a shortcut icon (Fig.1-11) for it will be automatically generated on the computer desktop. The software can be started by means of double left click on the shortcut icon.

Fig.3-1

2. The software can also be started by clicking Start, Program, DSO, and DSO Real-time Monitoring in order. See Fig.1-12.

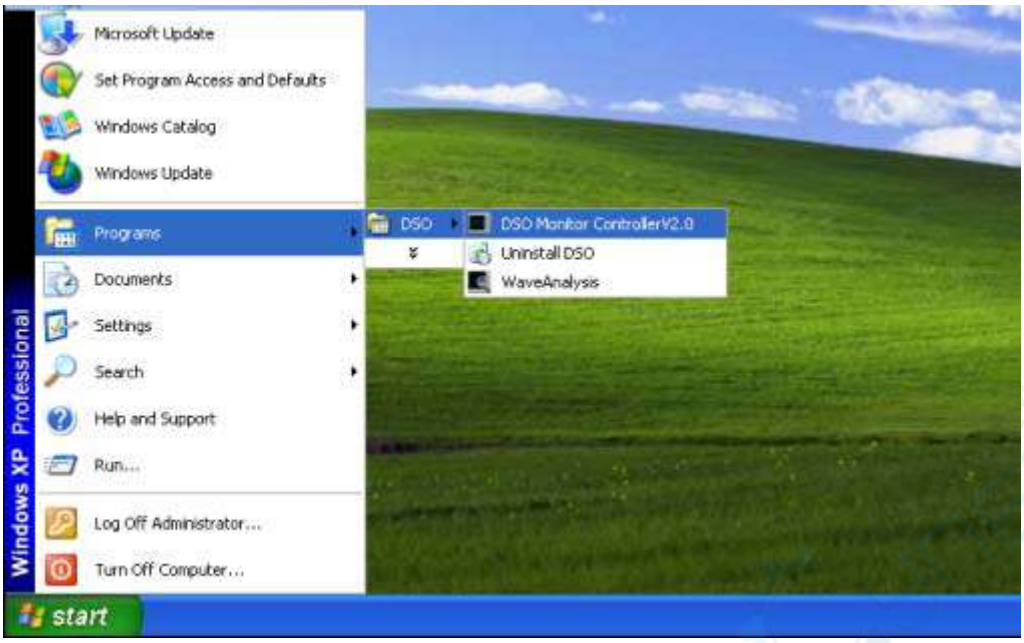

Fig.3-2

3. Choose the corresponding model of your oscilloscope from the dialog box and click OK to enter the upper computer interface (Fig.3-3).

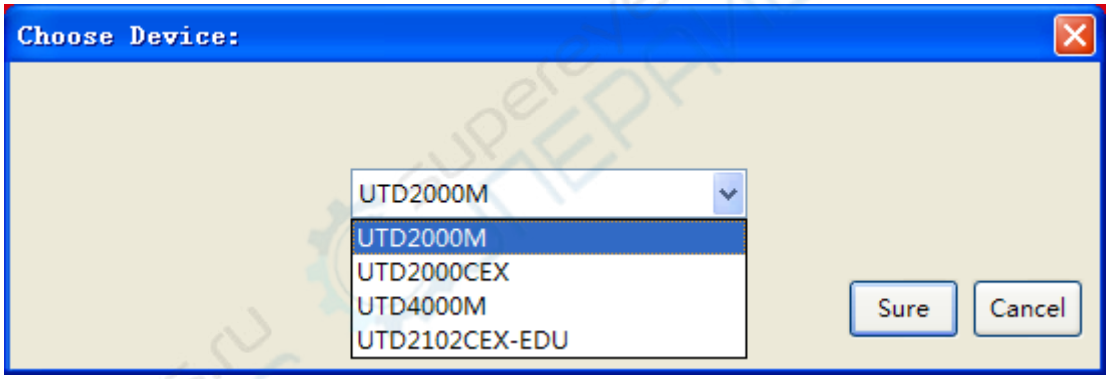

Fig.3-3

4. When the software is started, the oscilloscope will be connected automatically. If the connection fails, check and make sure the oscilloscope and the computer are correctly connected and the oscilloscope has been powered on and click Connect on the software. The correct connection is shown in Fig.3-4.

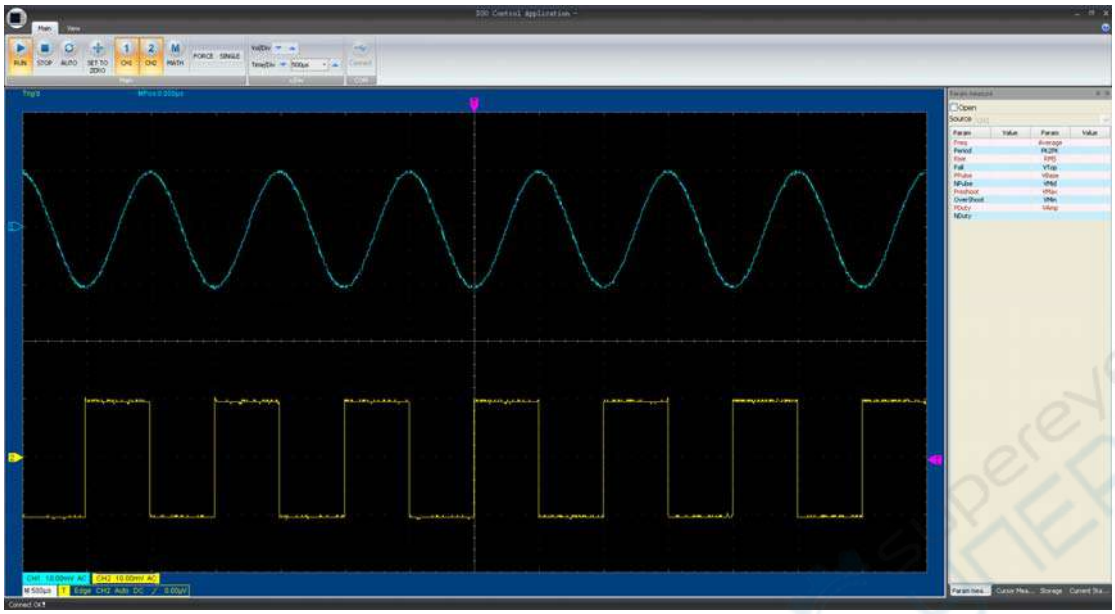

Fig.3-3

3.2 Functions of software

3.2.1 Function of the Home menu

General control buttons and knobs of the oscilloscope are saved under the Home menu. The Connect button is used for establishing correct communication between a computer and the oscilloscope. See Fig.3-4.

Fig.3-4

3.2.1.1 Basic control

1. RUN

Function: Corresponding to the Run button of the oscilloscope, it is used for setting a running status for the oscilloscope.

2. STOP

Function: Corresponding to the Stop button of the oscilloscope, it is used for setting a stop status for the oscilloscope.

3. AUTO

Function: Corresponding to the Auto button of the oscilloscope, it is used for setting an automatic setting status for the oscilloscope.

4. CH1
Function: CH1 shortcut
5. CH2
Function: CH2 shortcut
6. MATH
Function: MATH shortcut
7. FORCE
Function: It is the FORCE button that is a forced trigger button.
8. SINGLE
Function: It is the FORCE button that is a shortcut for single trigger.

3.2.1.2 Return-to-zero shortcut

1. Pre-trigger return-to-zero
Function: It makes pre-trigger returns to zero quickly.
2. Trigger level return-to-zero
Function: It makes the trigger level returns to zero quickly.
3. CH1 vertical return-to-zero
Function: It makes the CH1 vertical position returns to zero quickly.
4. CH2 vertical return-to-zero
Function: It makes the CH2 vertical position returns to zero quickly.

3.2.1.3 Gear control

1. Volt/div gear control
Function: It increases or decreases the volt/div gear.
2. Time base gear increase/decrease control
Function: It increases or decreases the time base gear.

3.2.1.4 Communication connection

Function: When a lower computer is not connected with the upper computer, click this button to connect it.

3.3.2 Functions of the View menu

After the check boxes in front of Parameter Measurement, Current State, and Save are ticked under the View menu (Fig.3-5), relevant menus will pop up on corresponding positions of the display and be displayed in a list according to the three categories above. The menus may be placed in any positions of the display. If some menus are

stratified, labels for menu category change will be automatically generated below the stratified menus. See Fig.3-6.

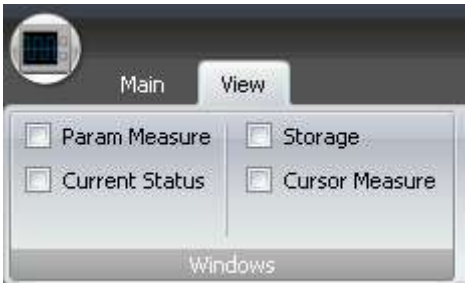

Fig.3-5

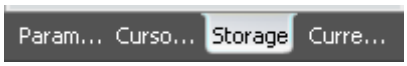

Fig.3-6

3.3.2.1 Current status

Function: If the Current Status option is ticked, a current status window (Fig.3-7) will pop up.

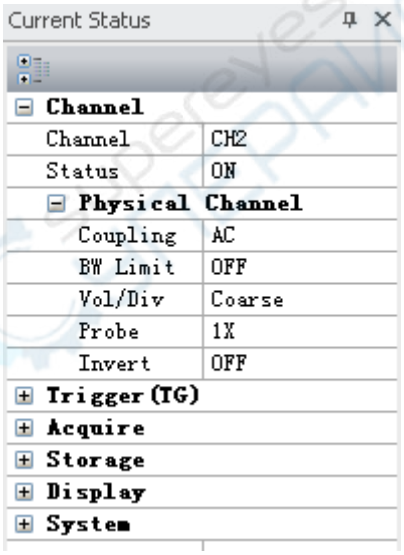

Fig.3-7

In the window, all setting operations consistent with the lower computers can be done.

3.3.2.2 Parameter measurement

Function: If the Parameter Measurement option is ticked, a parameter measurement window (Fig.3-8) will pop up.

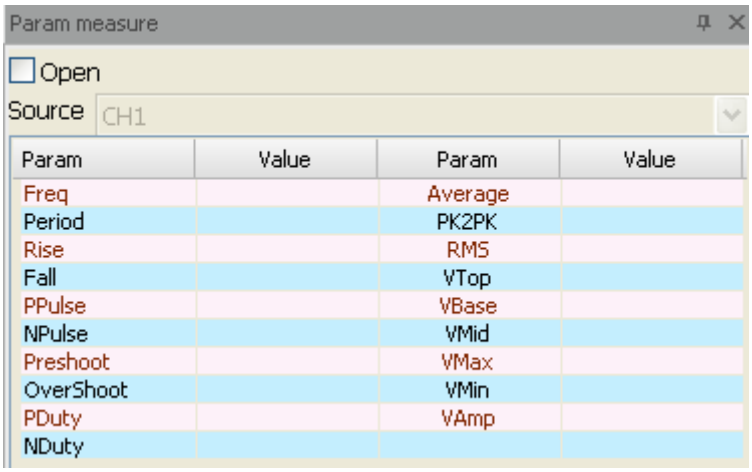

Fig.3-8

If the Open option is ticked, the parameter measurement function will be enabled and various measured parameter values will be obtained in real time. See Fig.3-9.

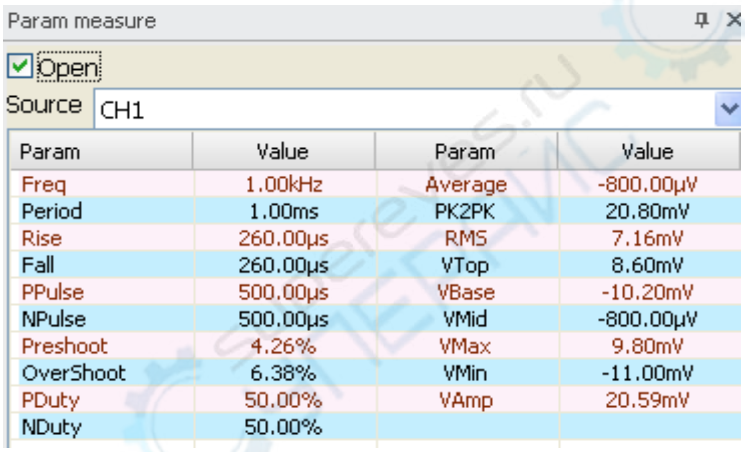

Fig.3-9

If the Advanced Parameter button is clicked, an advanced parameter measurement window (Fig.3-10) will pop up.

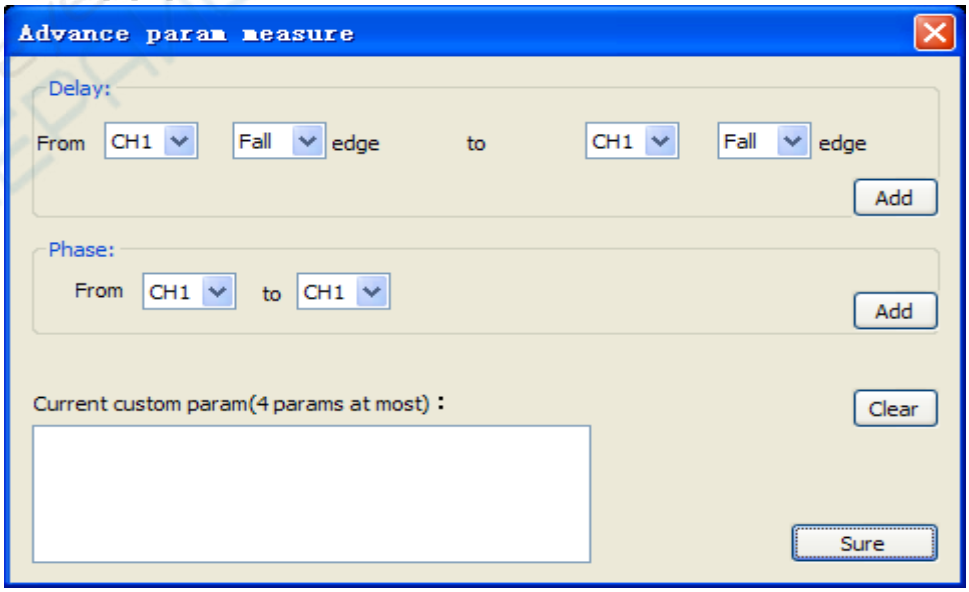

Fig.3-10

In the window, real-time measurement of the delay parameter and the phase parameter can be set and at most four parameters can be set. See Fig.3-11.

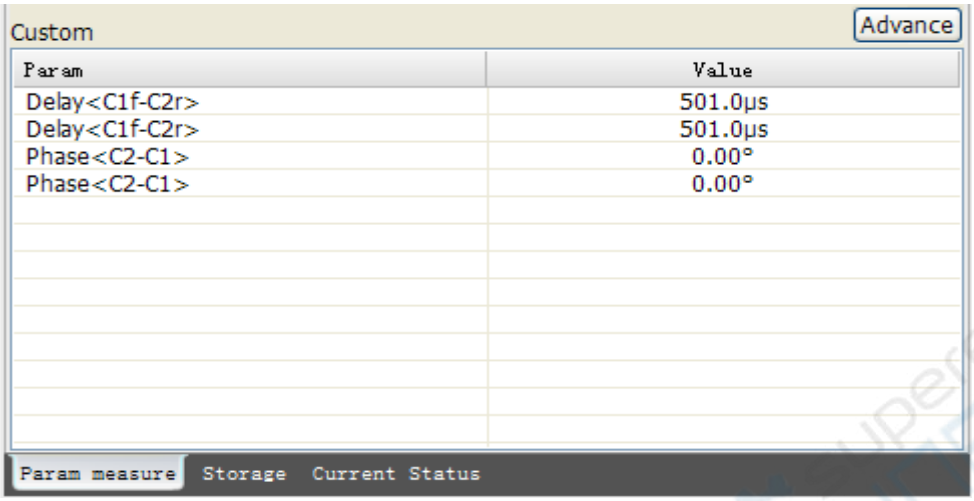

Fig.3-11

3.3.2.3 Save

Function: If Save is ticked, a saving window (Fig.3-12) will pop up.

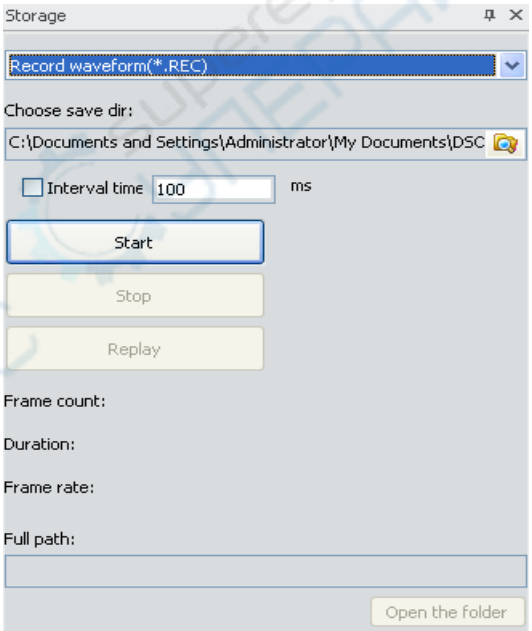

Fig.3-12

In the window, there are three saving types (Fig.3-13) for choosing.

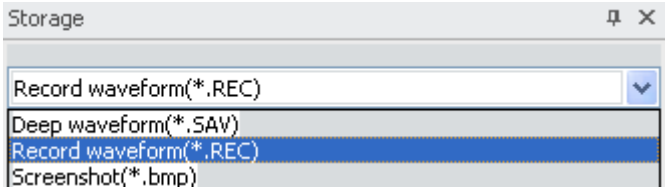

Fig.3-13

3.3.3.1 Record waveform

Function: It can record the waveform in the current status for analysis. See Fig.3-14.

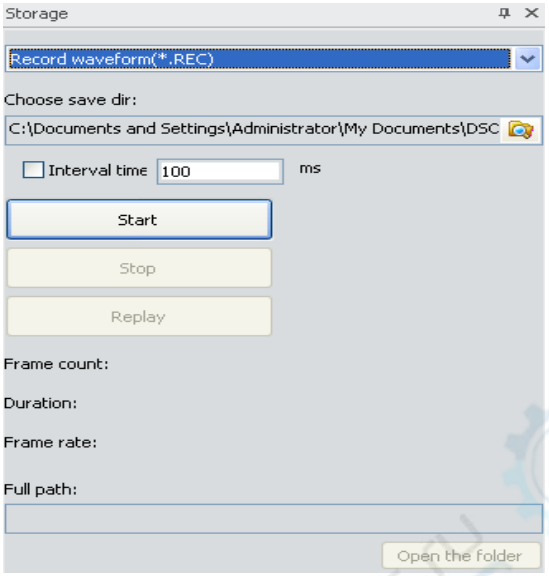

Fig.3-14

Choose the saving path: Saving position of the waveform data recorded can be set here.

Time interval: The time interval of waveform recording, i.e. the time interval of frame recording, can be set here.

After both the saving path and the time interval are set, click Start to start recording the waveform as set. Information such as the frames recorded, the duration of recording, the frame rate and the complete path of the file will be displayed in real time below. See Fig.3-15.

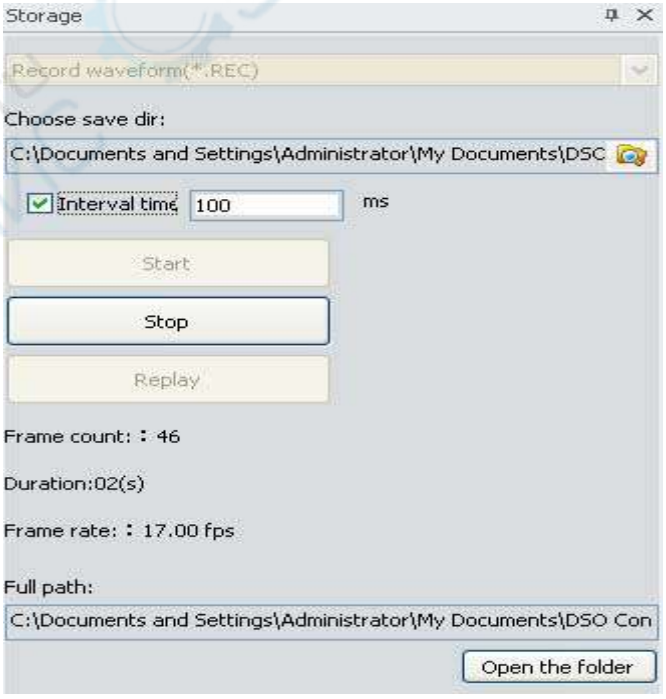

Fig.3-15

If Stop is clicked, waveform recording will stop.

If Playback is clicked, the software will be started for playback of the waveform recorded. For more details, see function description of the software.

3.3.3.2 Screen capture

Function:

If Screen Capture is chosen, you can set a saving path for the screen captured and then click Save. After that, a prompt reading “Saving completed” will appear. See Fig.3-16 and Fig.3-17.

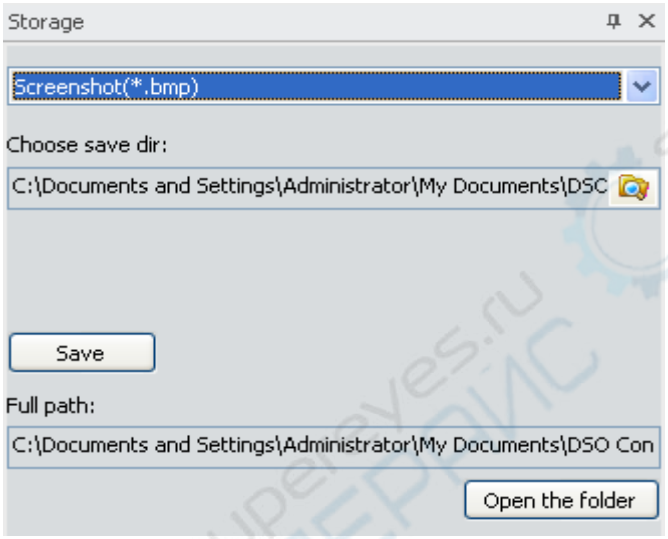

Fig.3-16

Fig.3-17

The designated position where the bitmap is saved can be opened after “**Open the folder**” is clicked. See Fig.3-18.

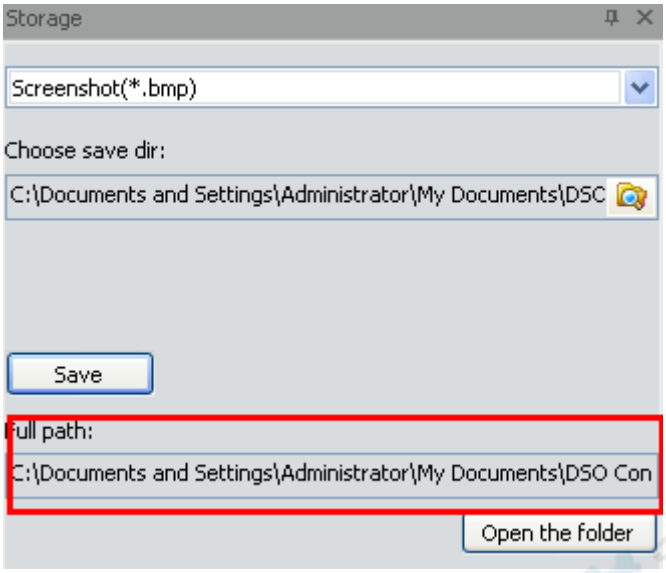

Fig.3-18

3.3.3.3 Save waveform data

Function: It is used for saving waveform data in the current status of the oscilloscope.

If the saving path is changed, the waveform of "*SAV" format can be saved to a designated position. See Fig.3-19.

If Save is clicked, the waveform data file of "*SAV" format will be saved to a designated position.

If Open is clicked, the software will be started. In the software, detailed information of the waveform is available.

If "Open the folder" is clicked, specific position of the waveform data file of "*SAV" format will be opened.

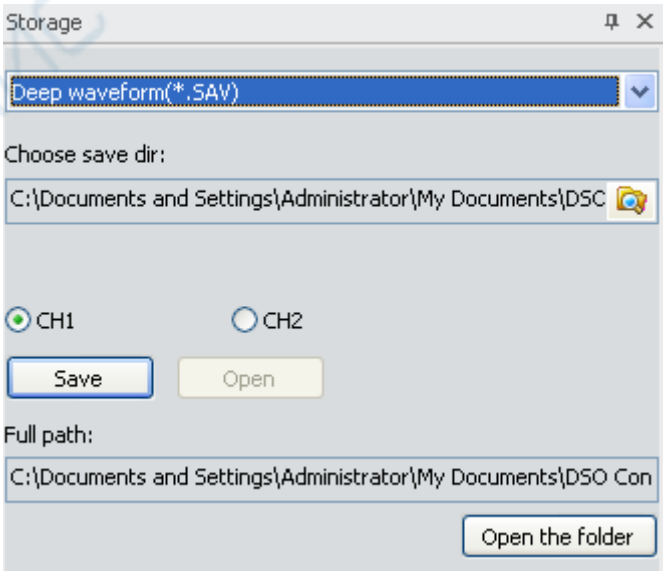

Fig.3-19

Chapter 4: Operation guide of software

The software is mainly used for saving the waveform acquired by the oscilloscope onto a computer for analysis and processing. It has functions such as cursor measurement, waveform zooming and data point export, making it convenient for user to process the waveform later.

After the software is started, a display panel called virtual display will pop up. After the data are opened, user can observe and analyze the waveform saved by the oscilloscope through the virtual display.

The software supports the files of SAV or REC format.

Note: The files of "* SAV" format show the single-frame waveform data information saved by the oscilloscope; the files of "* REC" format are the multi-frame waveform data files recorded by the oscilloscope.

The software can realize detailed parameter analysis, mathematical operation and zooming for the waveform of SAV format and looped playback, stop, pause and single-frame playback for the waveform of REC format.

4.1 Start of software

After the software is installed, it may be started on a computer in any of the following three ways.

1. After the software is installed, a shortcut icon (Fig.4-1) for it will be automatically generated on the computer desktop. The software can be started by means of double left click on the shortcut icon.

Fig.4-1

2. The software can also be started by clicking Start, Program, DSO, and Waveform Analysis in order. See Fig.4-2.

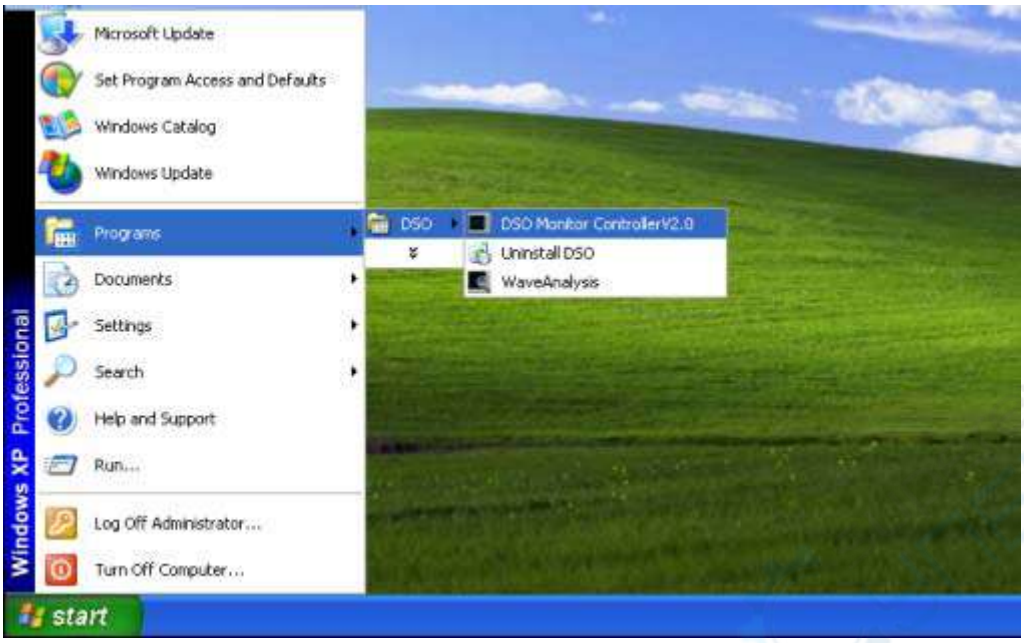

Fig.4-2

3. The software can also be started by clicking “Start the waveform analysis program” in the menu on upper left of the software interface. See Fig.4-3.

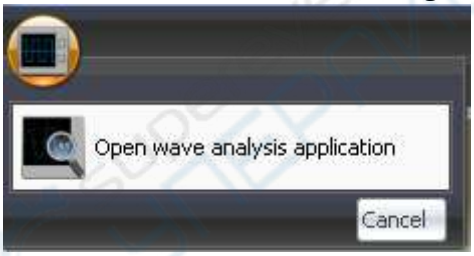

Fig.4-3

Fig.4-4 shows the software interface.

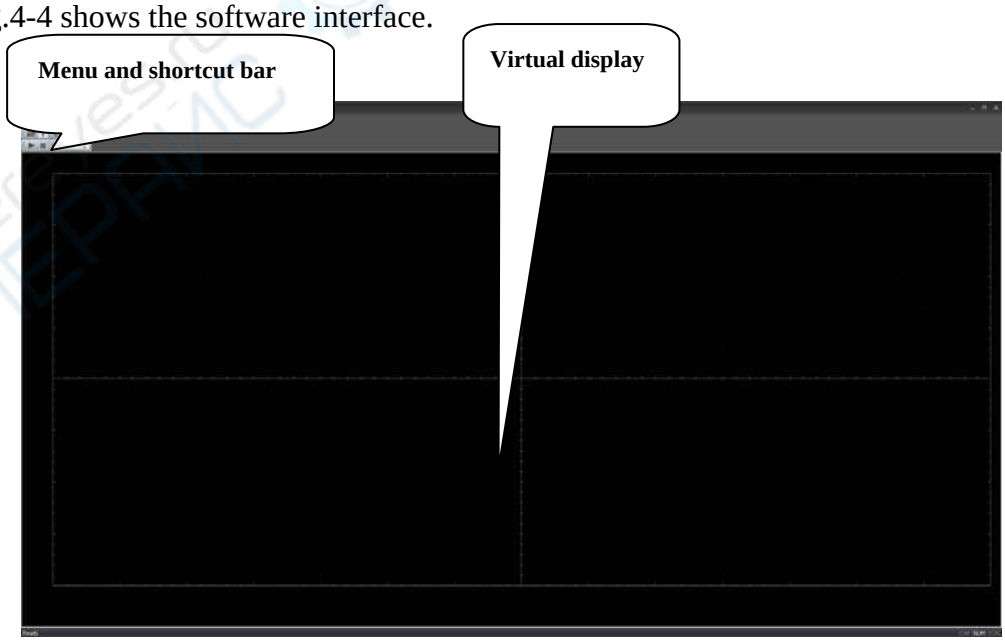

Fig.4-4

4.2 Menus of software

In Fig.4-4, the main menu on upper left of the display includes five submenus including File, View, Analyze, Playback and Help. The five submenus are introduced below.

4.2.1 File

Open: It is used for reading the waveform file saved on a computer hard disk or another storage medium to the software. Choose “File” and “Open” in order to upload a file of “*.sav” or “*.rec” format to the software.

File information: Through the file information bar, statuses of the oscilloscope during waveform saving can be clearly seen so that the conditions during waveform saving can be reproduced easily. See Fig.4-5.

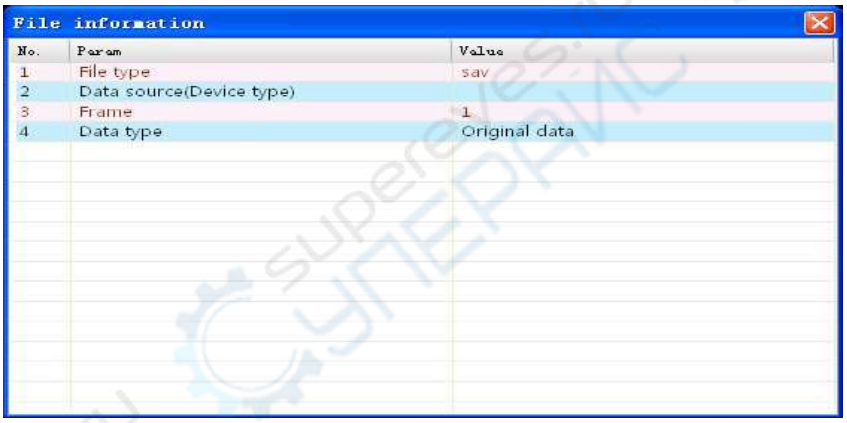

Fig.4-5

Export data: It is used for exporting the current data of “*.CSV” format on the software to a computer hard disk or another storage medium. See Fig.4-6.

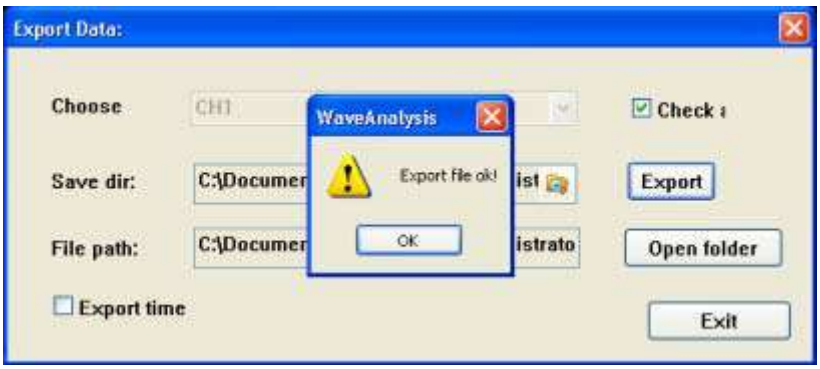

Fig.4-6

Exit: It is used for exiting from the software.

4.2.2 View

For the imported data of "*.rec" format, there are only a tool bar and a status bar under the View menu.

Original: It displays the most original data of "*.sav" format recorded from the oscilloscope.

Filter (contrastive /separate): Only when the imported waveform has been filtered under the "Analyze" menu can this function be enabled to display the waveform filtered in a separate or contrastive (to the original waveform) way.

FFT: Only when FFT operation has been done for the imported waveform under the "Analyze" menu can this function be enabled to display the waveform once receiving FFT operation.

Zooming mode: It is used for zooming in the waveform on the virtual display along different axial directions. To zoom in the waveform along the X axis, press and hold the left mouse button in the waveform display area, transversely drag the mouse to choose the area for zooming in and release the left mouse button to zoom in the chosen area along the X axis.

Measurement mode: The time difference (Δt) and amplitude difference (ΔV) of two cursors can be measured through the cursor function. Move the mouse to a cursor, press and hold the left mouse button while dragging the cursor, read difference of the coordinate axes and calculate the time difference (Δt=|x1-x2|) and the amplitude difference (ΔV=|y1-y2|).

Too bar: If "Standard" and "Playback" in the tool bar are ticked, a shortcut bar will be displayed below the menu bar.

Status bar: If the mouse is moved to a shortcut icon or menu, relevant information currently indicated by the mouse will be displayed in the status bar on lower left of the virtual display. The display can be closed here.

4.2.3 Analyze (effective for the data of "*.SAV" format)

测量：测量已导入波形的幅度、频率、脉宽、占空比等参数，如图 4－7 所示：

Measure: It is used for measuring such parameters of the imported waveform as amplitude, frequency, pulse width and duty ratio. See Fig.4-7.

Fig.4-7

FFT: It is used for realizing Fourier transformation for the imported waveform. The window functions for choosing including Blackman, Hamming, Hanning and Rectangle. See Fig.4-8.

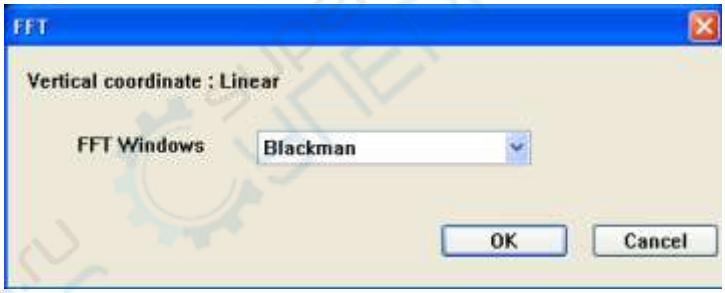

Fig.4-8

After an appropriate window function is chosen, click OK. The original waveform data will be then transformed into FFT waveform data. See Fig.4-9.

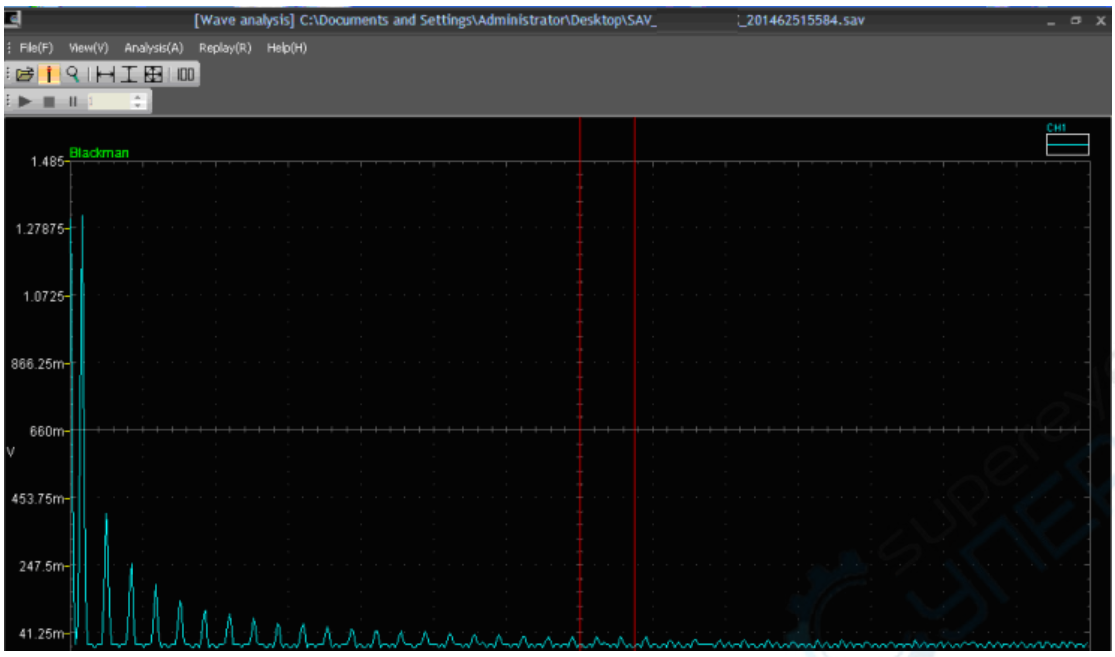

Fig.4-9

To restore the original waveform data, click the Original option under the View menu. See Fig.4-10.

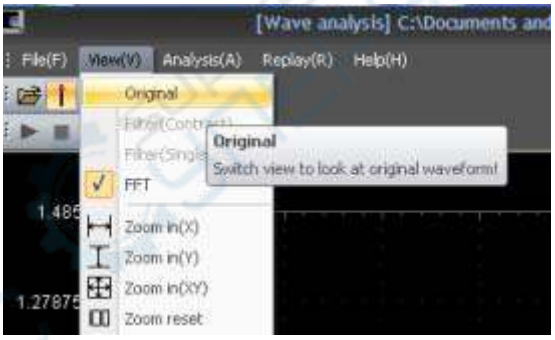

Fig.4-10

Filter: It is used for filtering the imported waveform to filter the signals beyond the cutoff frequency band. There are three filtering types including band-pass, high-pass and low-pass for choosing. See Fig.4-11.

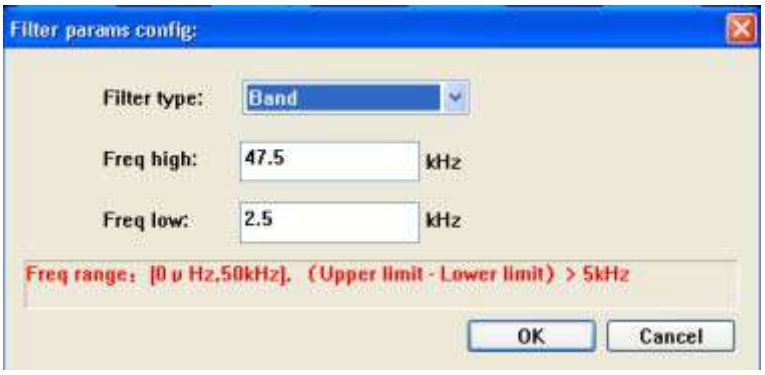

Fig.4-11

After the filtering type, the upper frequency limit and the lower frequency limit are set, click OK. The waveform data obtained after filtering will be displayed in the software. See Fig.4-12.

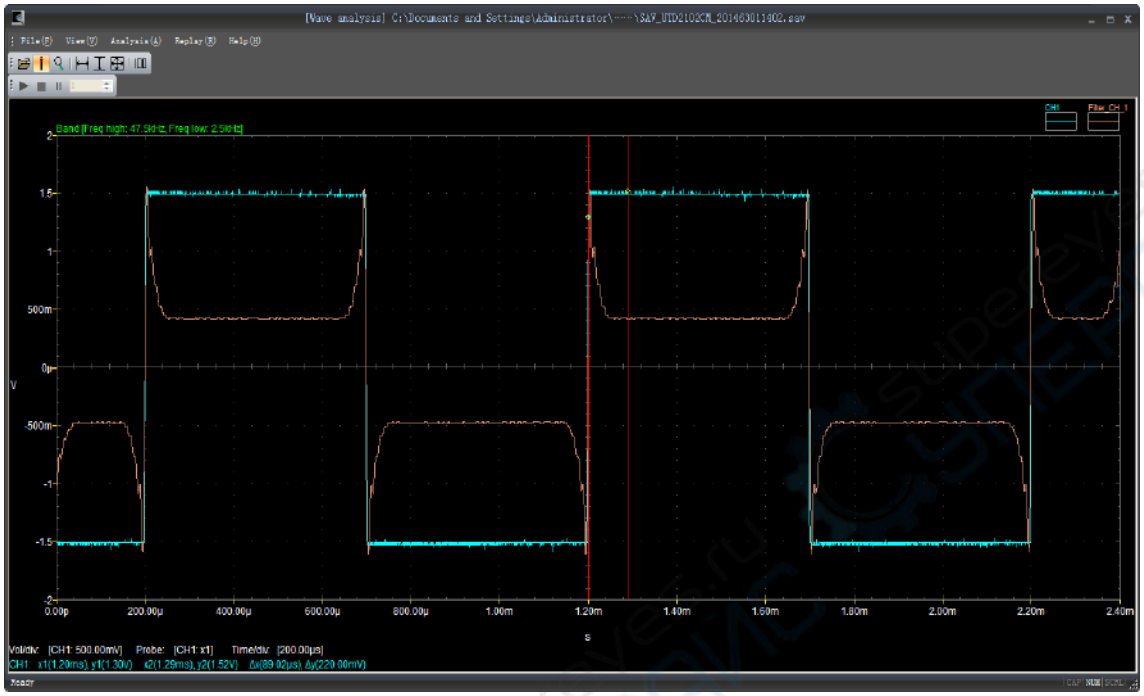

Fig.4-12

4.2.4 Playback (effective for the data of "*.REC" format)

Play/Stop/Pause: It is used for playing, stopping and pausing an imported recorded waveform data (*.REC) file.

Single-frame play: If the "▲" button or "▼" button in the red box in Fig.4-13 is clicked, single-frame play of the waveform data will be realized.

Fig.4-13

4.2.5 Help

About: It is used for displaying relevant version information of the current software.

4.3 View properties of the current frame

4.3.1 Measurement mode

After the SAV waveform data are opened, you may click  in the tool bar and right click the mouse in the waveform display area to enter the measurement mode. See Fig.4-14.

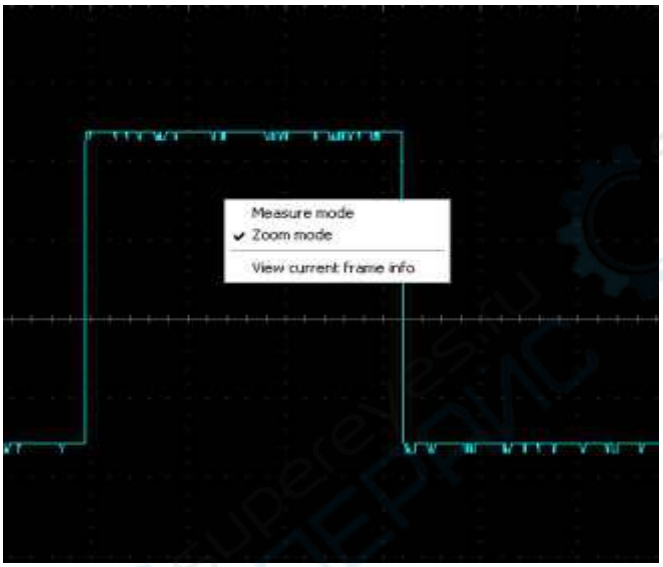

Fig.4-14

In the measurement mode, measurement and analysis of the SAV waveform data can be realized through the cursor lines. See Fig.4-15.

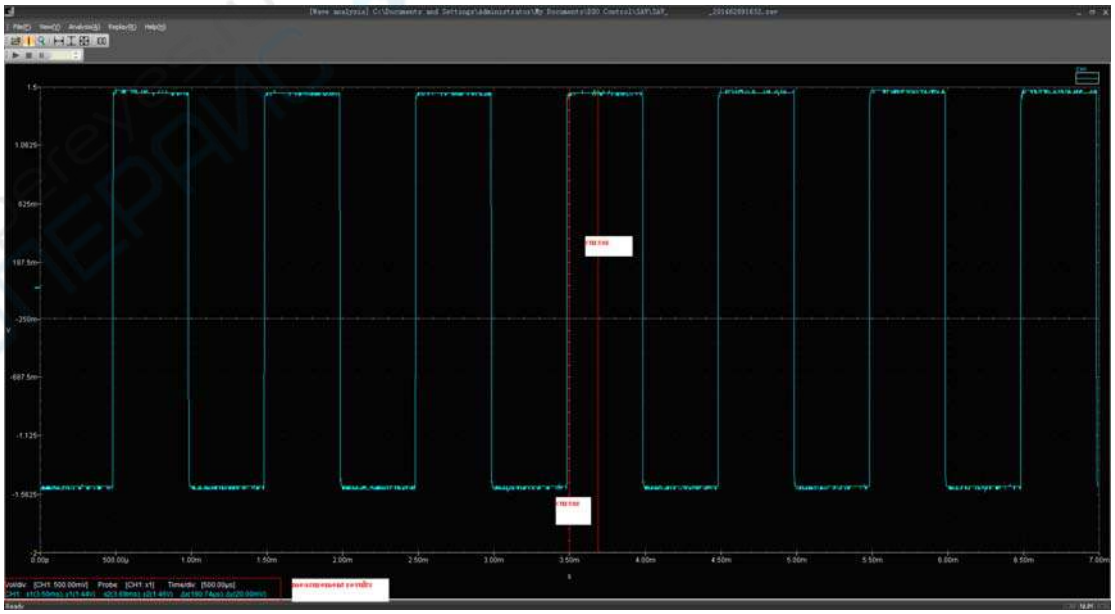

Fig.4-15

The two vertical red cursor lines can be dragged by the mouse. Voltage and time related

parameters will be displayed on the lower left corner in real time in the process.

4.3.2 Zooming mode

There are three zooming modes including zooming in along the X axis, zooming in along the Y axis and zooming in along both the X axis and the Y axis. See the three buttons in the red box in Fig.4-16.

Fig.4-16

After resetting, the 100% view will be restored.

Fig.4-17

4.3.3 View properties of the current frame

After a file of "*.SAV" or "*.REC" format is opened, right click the mouse in the waveform display area. Option "View properties of the current frame" will then pop up. Fig.4-18 shows an example of a file of "*.REC" format.

Fig.4-18

After "View properties of the current frame" is clicked, window showing information of the current frame will pop up to display waveform parameter information of the current frame. See Fig.4-19.

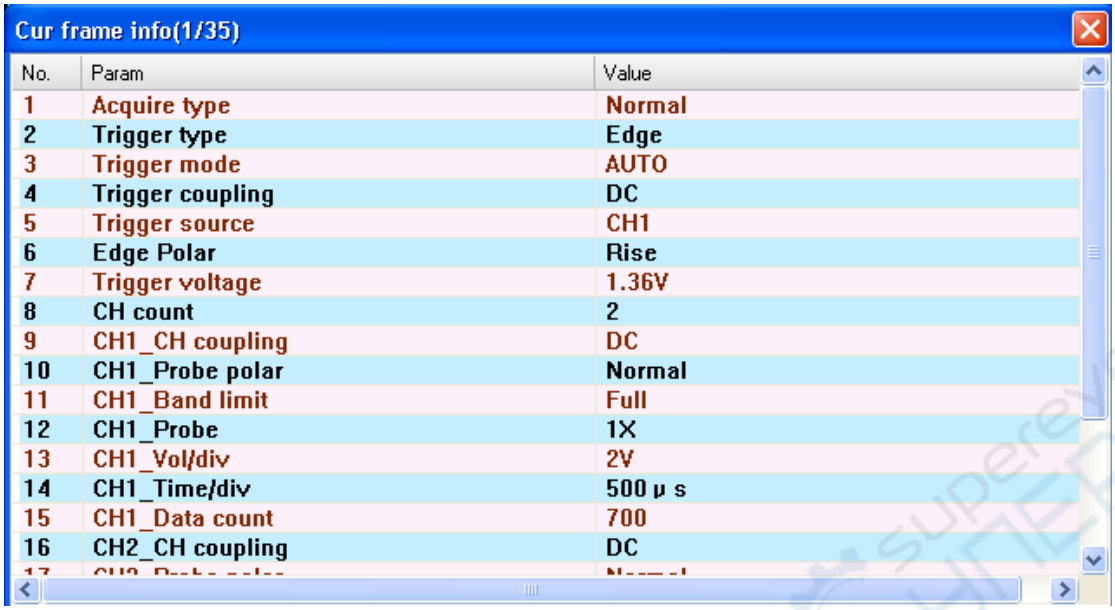

Fig.4-19

4.4 Application example

1KHz/3Vpp square wave signal data (*.SAV) are uploaded to the software and then filtered by a band-pass filter with an upper frequency limit of 10KHz and a lower frequency limit of 100Hz. The virtual display shall display the filtering waveform only.

a. Start the software with the method introduced in section 1.

b. Choose File and Open in order in the menu and choose the waveform file through the correct path. See Fig.4-8.

Fig.4-20 (a)

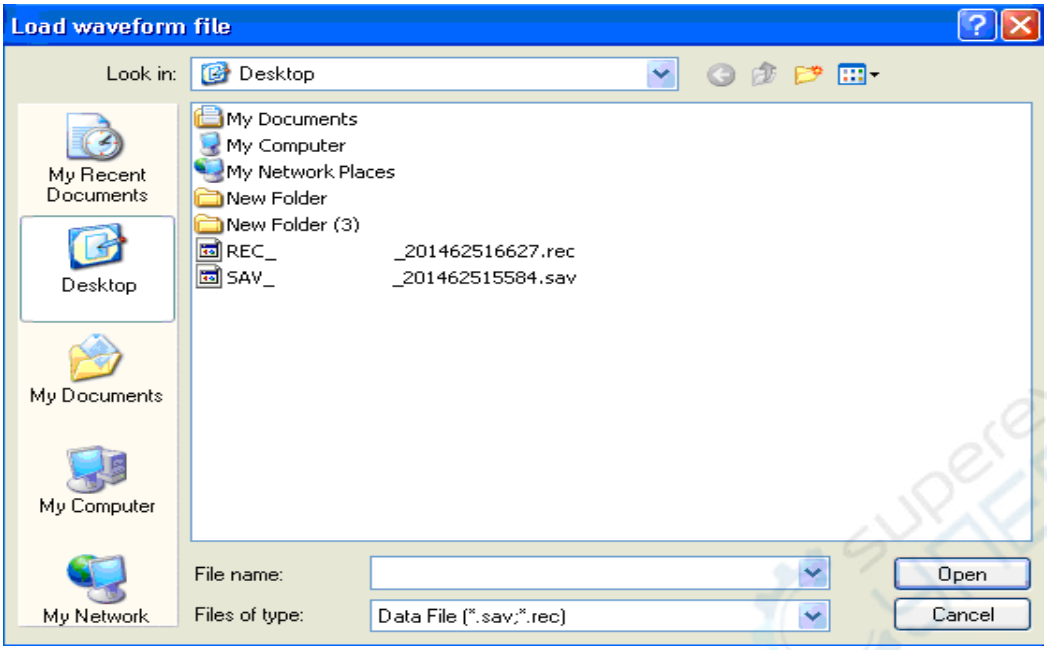

Fig.4-20 (b)

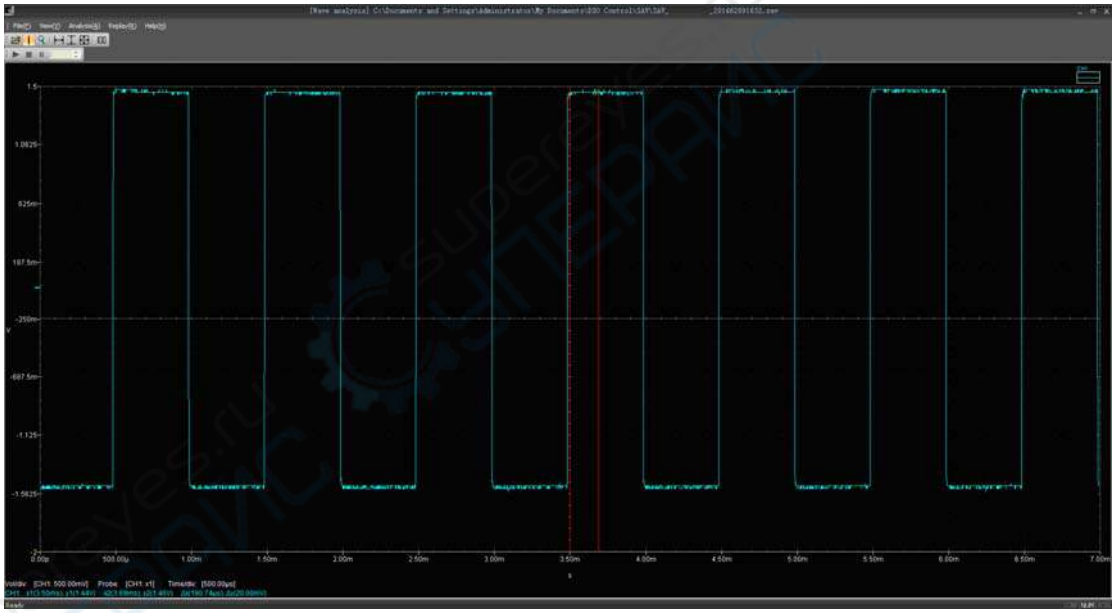

Fig.4-20 (c)

c. Choose Analyze and Filter in order in the menu, choose Band in the filter type column in the filter parameter setup dialog box, set the upper frequency limit and the lower frequency limit to be 10KHz and 100Hz, respectively, and click OK. See Fig.4-9.

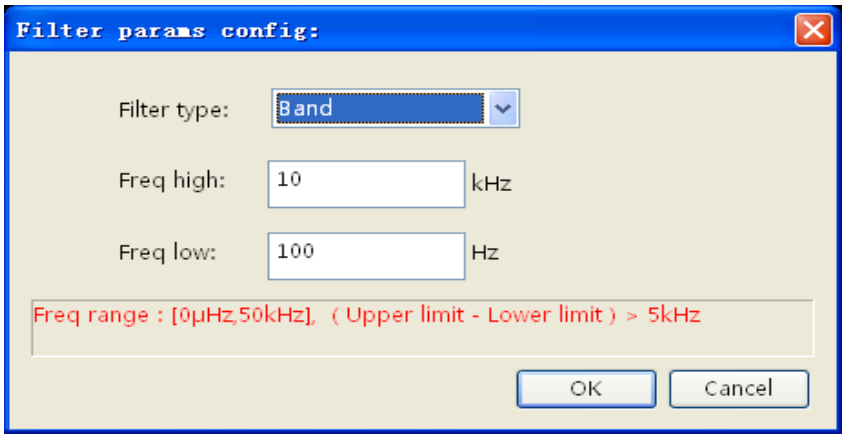

Fig.4-21 (a)

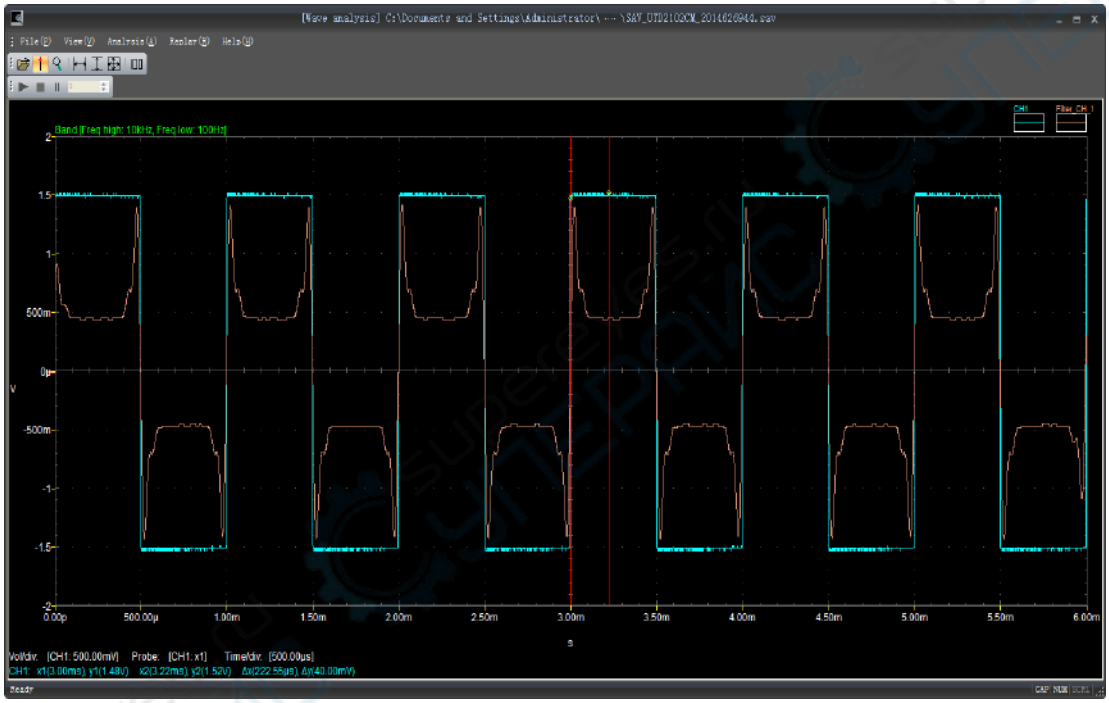

Fig.4-21 (b)

d. Choose View and Filter (separate) in order in the menu to view virtual display of the software. See Fig.4-22.

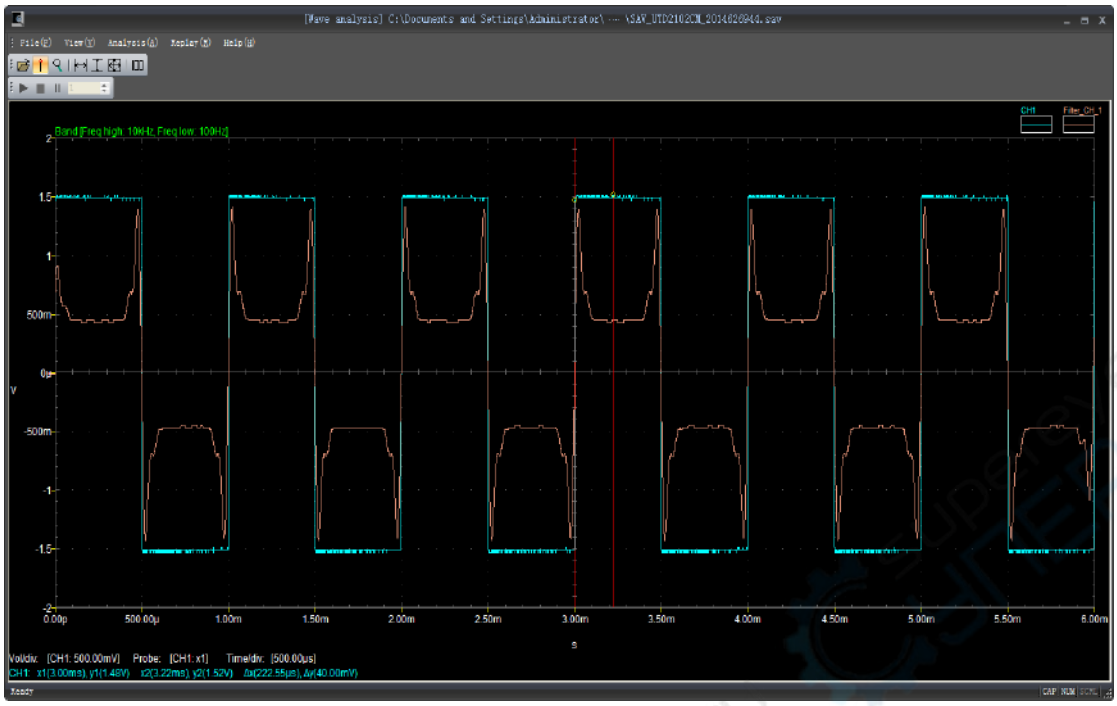
[Wave analysis] C:\Documents and Settings\Administrator\ ··· \SAV_UTD2102CM_20140206044.sav
File(F) View(V) Analysis(A) Xopler(X) Help(H)
CH1
Filter_CH_1
Band[Freq high 10KHz,Freq low 100Hz]
2
1.5
1
500m
0
V
-500m
-1
-1.5
-2
0.00p
500.00µ
1.00m
1.50m
2.00m
2.50m
3.00m
3.50m
4.00m
4.50m
5.00m
5.50m
6.00m
s
Voltdiv: [CH1:500.00mV] Probe: [CH1:x1] Timeldiv: [500.00µs]
CAP NUM SCRL

Fig.4-22

Chapter 5: System prompt and troubleshooting

5.1 System prompt information

Wrong device connection or model: Check whether the oscilloscope model and the communication interface type are correct, whether the device is correctly connected and whether the software driver has been updated.

5.2 Troubleshooting

1. If a device connection failure is prompted after the Connect Device button is clicked, handle it with the steps below.

(1) Check whether power connection of the oscilloscope is correctly connected.

(2) Check whether the oscilloscope and the software are correctly set.

(3) Check whether the cable between the module and the computer is correctly connected.

(4) Check whether the USB driver is correctly installed.

(5) If the result of each check above is right, start and run the software and the oscilloscope again before further operation.

2. If the software driver cannot be updated, operate with the steps below:

(1) On the computer desktop, right click the mouse as shown in Fig.5-1. A right button menu as shown in Fig.5-2 will then pop up.

Fig.5-1

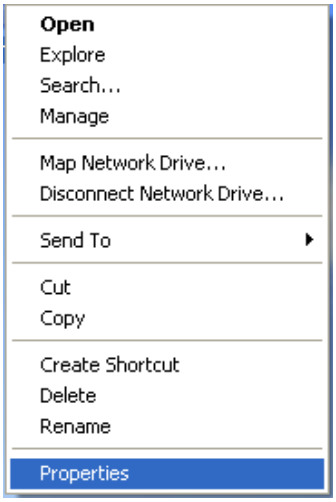

Fig.5-2

(2) In Fig.5-2, choose Properties and right click the mouse. A window as shown in Fig.5-3 will then pop up automatically.

Fig.5-3

(3) In Fig.5-3, choose Hardware. A window as shown in Fig.5-4 will then pop up.

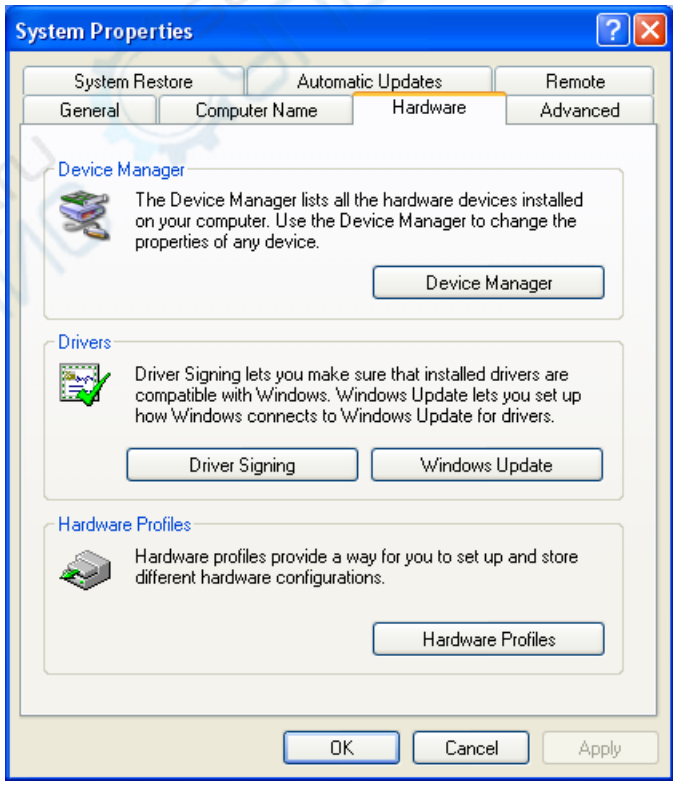

Fig.5-4

(4) In Fig.5-4, choose Device Manager (D). A window as shown in Fig.5-5 will then

pop up automatically.

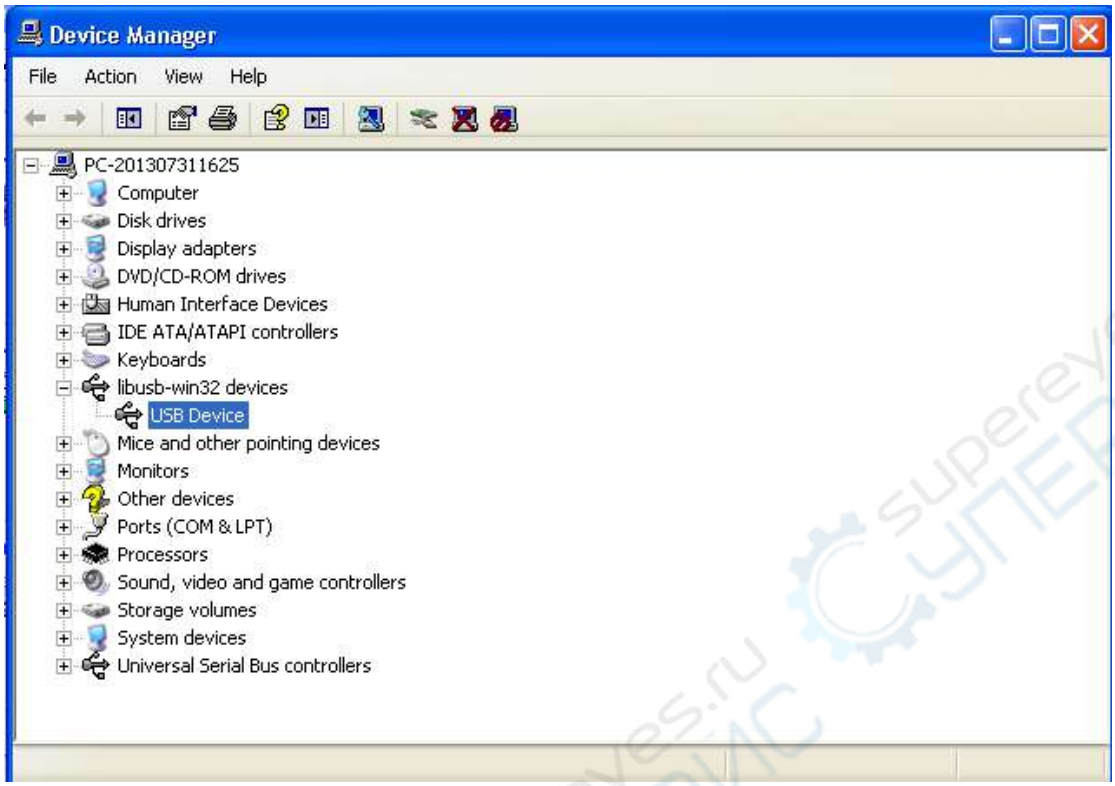

Fig.5-5

(5) After “USB Device” is unloaded from “libusb-win32 devices” in Fig.5-5, Again run the oscilloscope again and choose “Update driver automatically” to finish driver update.

Remarks: Don’t unplug the communication cable directly during communication between the software and the oscilloscope; otherwise an unexpected phenomenon may appear.

Copyright statement

Thank you!