Digital Storage Oscilloscope

Waveform Analysis Software

User Manual and Installation Guide

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Chapter 1 Installing your digital storage oscilloscope waveform analysis software

1.1 Hardware requirements

Equipment requirements	Minimal
Computer	Windows 2000/XP/Vista, 128 MB RAM, 16X CD-ROM or better (Vista users please refer to its individual hardware requirements), VGA display or better.

1.2 Installing the software

Your digital storage oscilloscope comes with a digital storage oscilloscope waveform analysis software (the “waveform analysis software”). Alternatively, you can download the software online :
Company website : http://www.uni-trend.com
File name : Oscilloscope waveform analysis software.

Installation :

Step one : Insert the CD-ROM supplied with your oscilloscope into the CD-ROM drive of the computer. Wait for the system to read and find the waveform analysis software contents (Fig. 1-1).

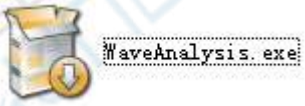

Fig. 1-1

Note 1. The installation pack downloaded online must be unzipped before application.
Note 2. The software supports Windows 2000, Windows XP, Vista and Windows 7 operating systems.

Step two : Double left click the mouse to run the waveform analysis software installation as shown in Fig. 1-1. A screen for language selection will pop up, as shown in Fig. 1-2. Use the pull-down menu to select language.

Fig. 1-2 Language selection

Step two : After setting the language, a welcome screen will appear with the software installation guide, as shown in Fig. 1-3.

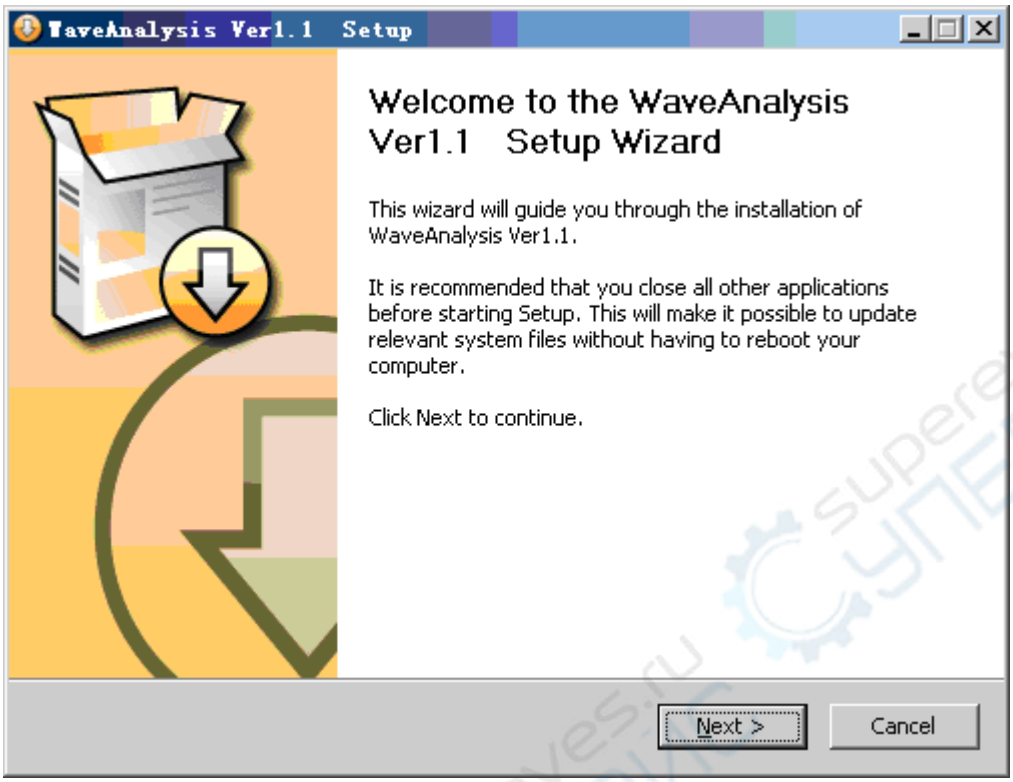

Fig. 1-3

Step three: Read the prompt in Fig. 1-3 then click the NEXT (N) button to enter the next step, as shown in Fig. 1-4.

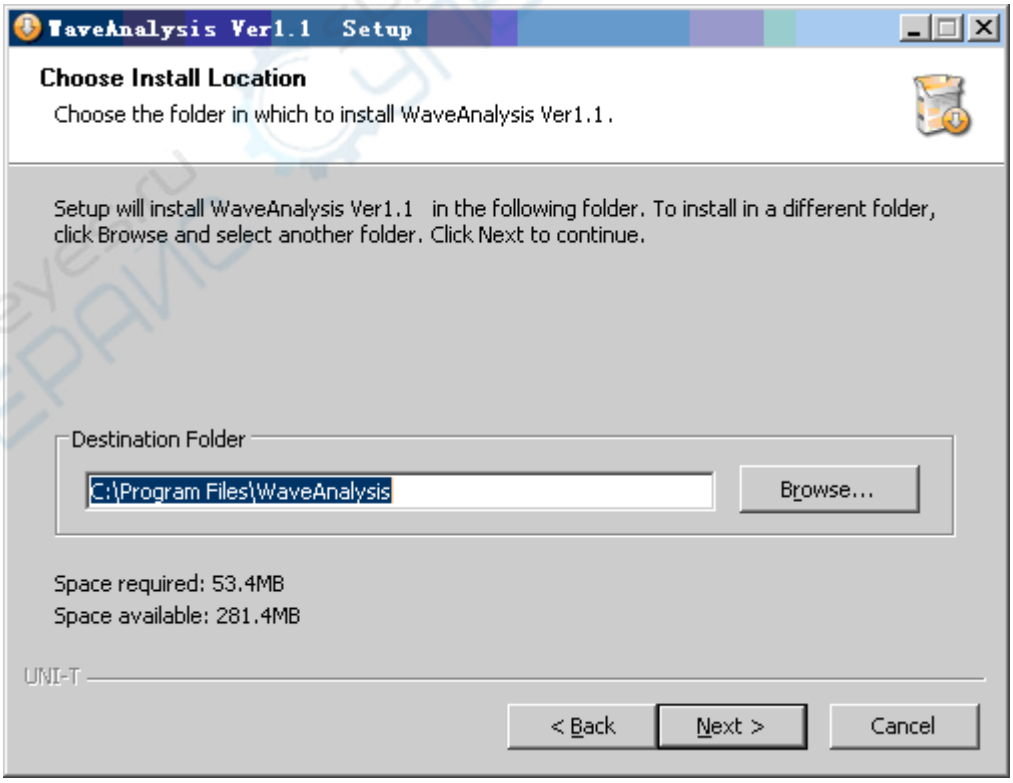

Fig. 1-4

Step four : In Fig. 1-4, click BROWSE (B) to designate the installation path for the waveform

analysis software then click NEXT. Alternatively, simply click NEXT for the default path and enter the screen in Fig. 1-5.

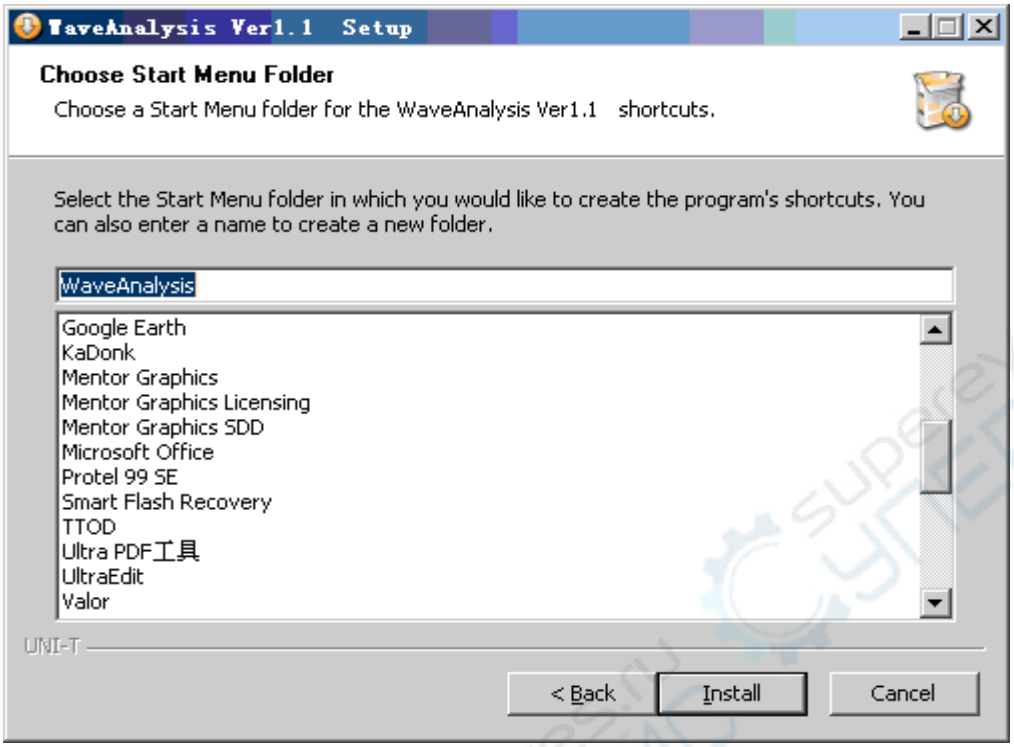

Fig. 1-5

Step five : In Fig. 1-5, designate the path for quick installation of the waveform analysis software, then click NEXT. Alternatively, simply click NEXT for the default path and enter the programmed automatic installation screen shown in Fig. 1-6.

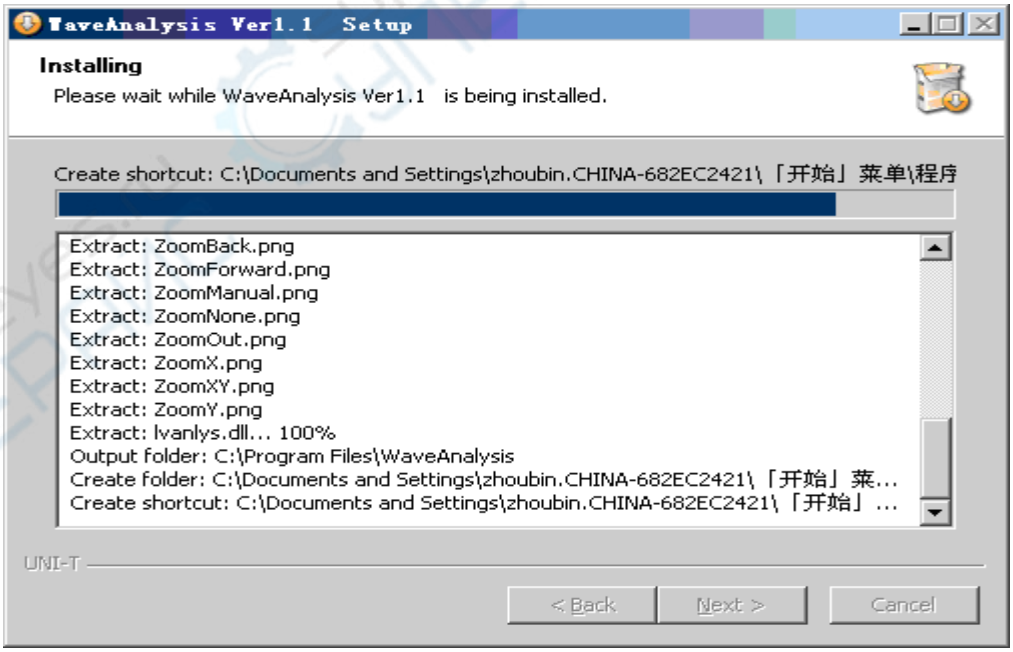

Fig. 1-6

Step six : When automatic installation is complete and the box shown in Fig. 1-8 pops up, click the FINISH (F) button shown in Fig. 1-8. Your waveform analysis software is now successfully installed on your computer and ready for use.

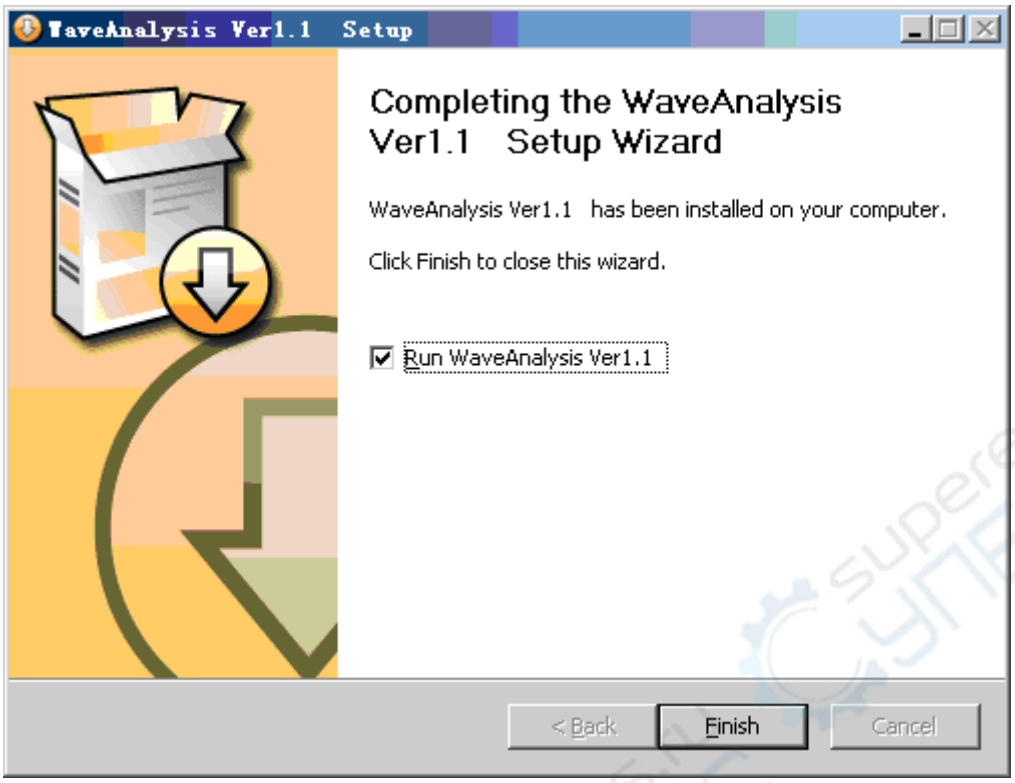

Fig. 1-7

1.3 Running the software

When installation of the waveform analysis software is complete, you can run it on your computer in two ways.

1. When installation of the waveform analysis software is complete, an short-cut icon is automatically created on the computer desktop, as shown in Fig. 1-8. To run the software, simply double left click the icon in Fig. 1-8 with your mouse.

Fig. 1-8

2. You can also run the software by going through START → Programme → WaveAnalysis → WaveAnalysis, as shown in Fig. 1-8.

Fig. 1-9

Chapter 2 Getting to know your digital storage oscilloscope waveform analysis software

2.1 Introduction

The digital storage oscilloscope waveform analysis software is your tool to transfer waveforms acquired by the digital storage oscilloscope to the computer for analysis and processing. With functions like cursor measurement, waveform scaling, data point export, this software makes subsequent waveform processing more convenient.

When the waveform analysis software is run, a display panel pops up — virtual display. After opening a data file, you can observe the waveform saved on the oscilloscope on the virtual display, and the analysis function of this interface allow access to waveform information. Please see below for detailed operation instructions.

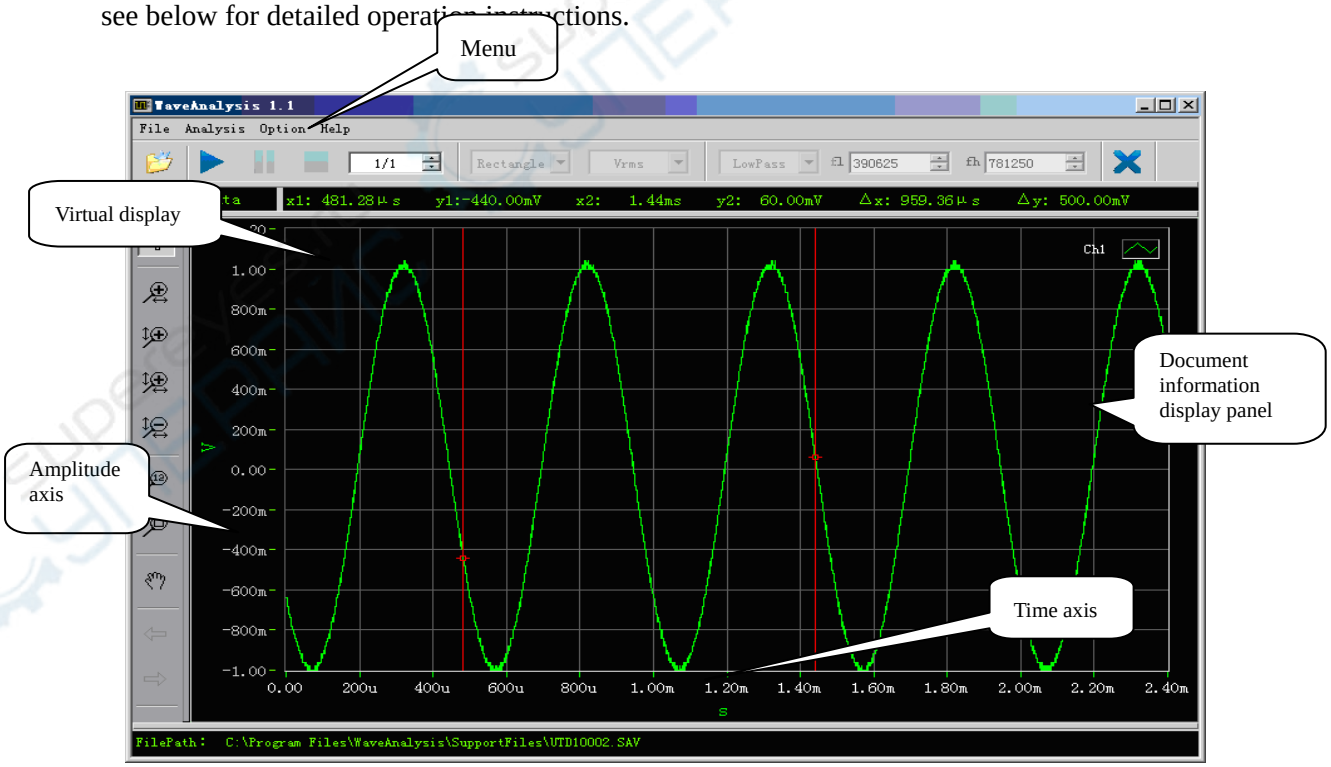

Fig. 2-1

2.2 Main menu

Fig. 2-1 shows three menus under the main menu on the top left corner : document, analysis and help. Their operation instructions are as follows :

1. Document

Opening data : This means reading the waveform document saved on the computer hard disk or other storage media and transferring it to the waveform analysis software.

Select DOCUMENT → OPEN DATA, to load the document in *.sav or *.rec format on the waveform analysis software.

Document information: The document information bar clearly shows the status of waveform at the time of saving. With such information, you can easily restore the original waveform status.

Exit : Exit the waveform analysis software.

2. Analysis

In the analysis menu, you can choose three mathematical functions for processing waveform data : FFT, filter and parameter measurement.

FFT: To perform FFT mathematics on waveform data.

Select the FFT window functions : You can choose from Rectangle, Hanning, Hamming and Blackman.

Vertical range : Choose between Vrms and dBVrms.

To analyse the current data file, select "ANALYSIS" → FFT, then select the window function you required in the pop-up FFT parameters setup box (as shown in Fig. 2-2). Click OK to commence FFT mathematics.

Fig. 2-2

You can also select the vertical unit and window function at the top of the virtual display (as shown in Fig. 2-3).

Fig. 2-3

Filter : To filter waveform data and intercept all signals outside the frequency band.

Four filter types available : You can choose from low-pass, high-pass, band-pass and band-stop.

To filter the current data, select ANALYSE → FILTER, then select the filter type and filter interception frequency in the pop-up filter parameters setup box (as shown in Fig. 2-4). Click OK to filter the current data.

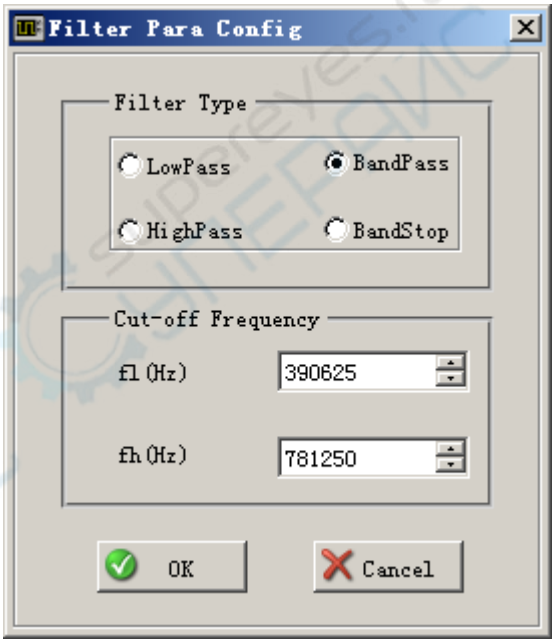

Fig. 2-4

Parameter measurement : To measure waveform data to get the parameter value.

In the menu, select ANALYSE → PARAMETER MEASUREMENT to pop up the parameter table in Fig. 2-2.

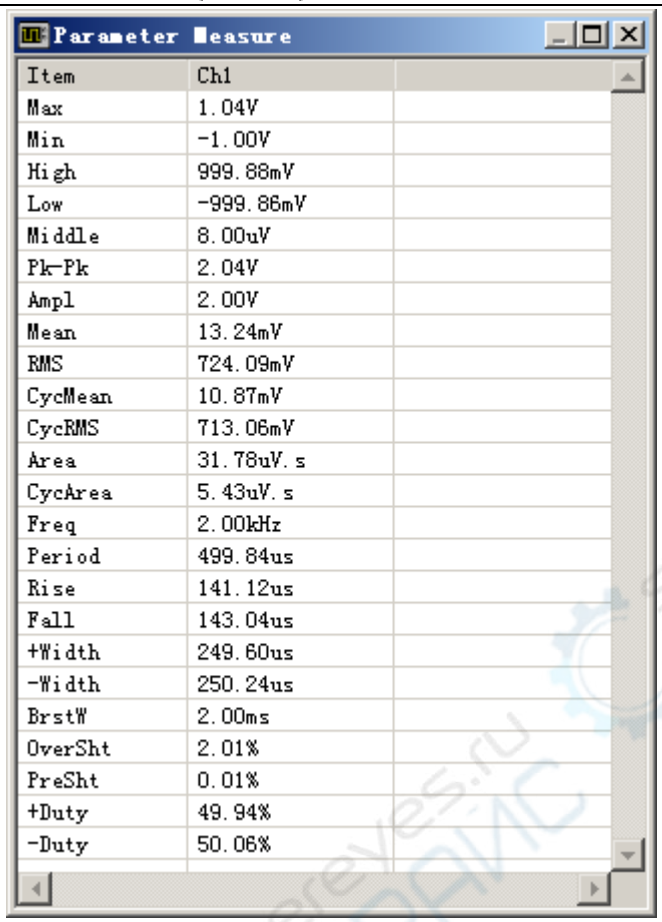

Fig. 2-2

3. Options

Language : Change the display language by selecting the language you desire in the language options menu.

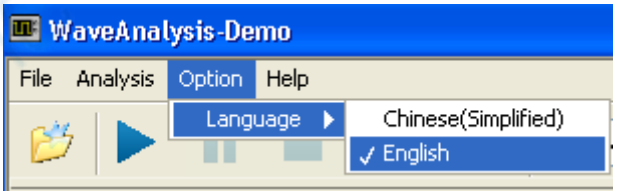

Fig. 2-3

4. Help

ABOUT : This is information on the waveform analysis software version.

Chapter 3 Operation guide for the digital storage oscilloscope waveform

3.1 Loading data

You can load data documents in two different formats — .SAV and .REC — into the waveform analysis software.

Loading .REC documents : As shown in Fig. 3-1, the document being loaded is a recorded waveform file (.REC document). A .REC document is a waveform document recorded by the oscilloscope.

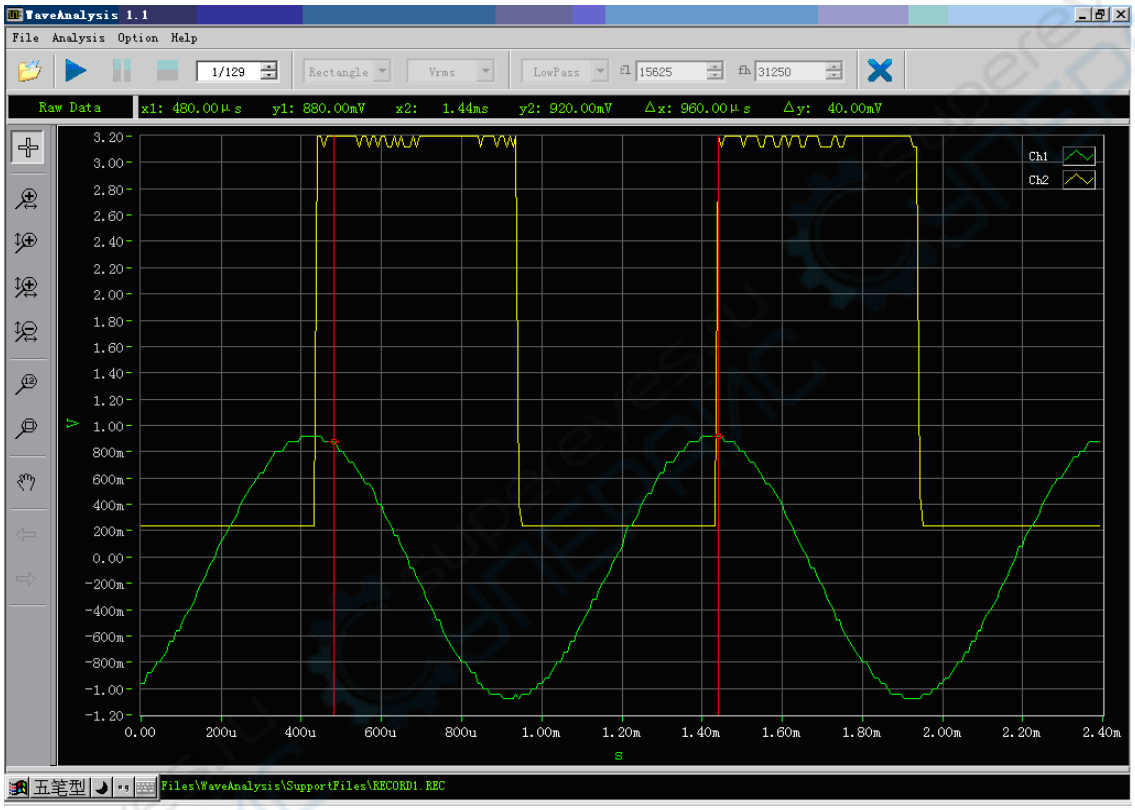

Fig. 3-1 Loading a recorded waveform document

When loading is complete, click the PLAY button to play the waveform. To pause, click the PAUSE button. Using the up and down buttons, you can manually select the required waveform, as shown in Fig. 3-2.

Fig. 3-2 Playback operation box

Loading .SAV documents : As shown in Fig. 3-3, the document being loaded is an original waveform data file (.SAV document). A .SAV document is a waveform document saved by the oscilloscope.

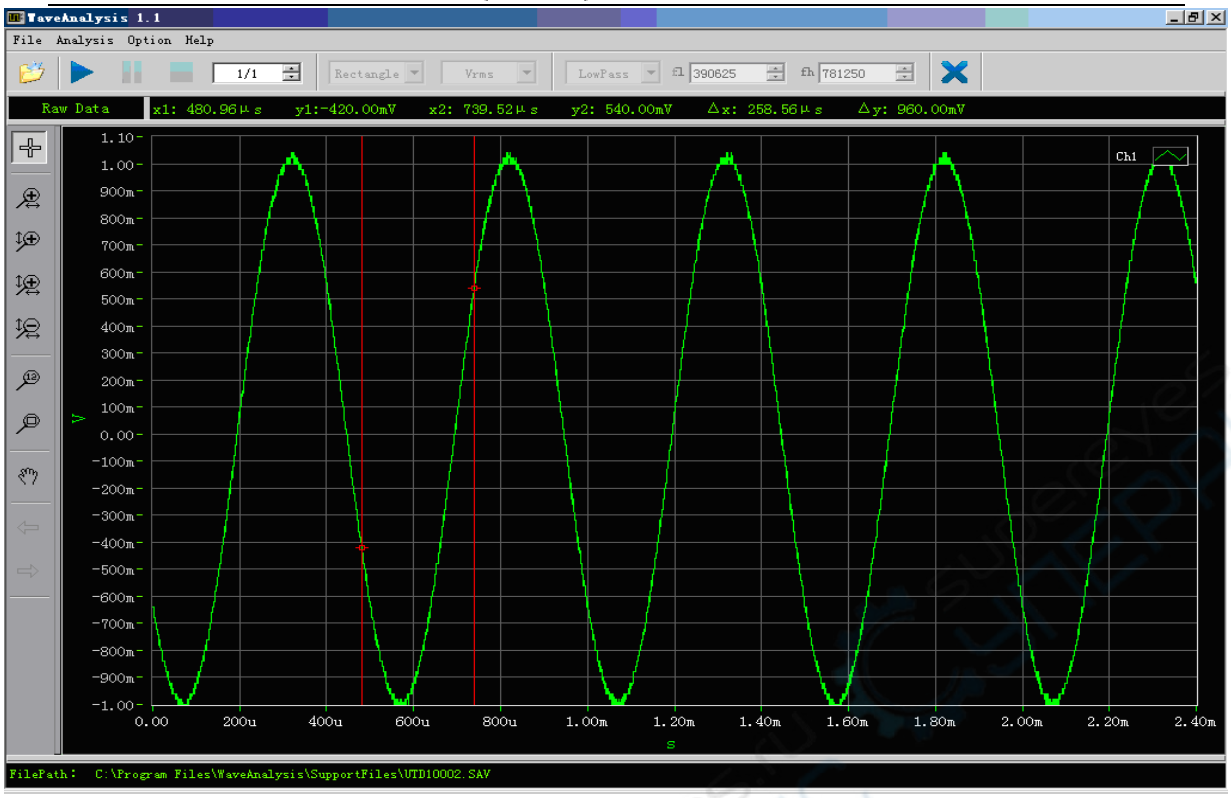

Fig. 3-3 Loading original data

When original data loading is complete, you can perform tasks like scaling and analysis. On the right side of the virtual display, you can also see the oscilloscope's operation status when the waveform was saved, including vertical range, channel coupling, etc.

3.2 Cursor measurement

You can measure time difference (Δt) and amplitude difference (ΔV) between two cursors. Right click the mouse to pop up a dialog box and select CURSOR → DISPLAY. To calculate the time difference ($\Delta t = |x1-x2|$) and amplitude difference ($\Delta V = |y1-y2|$), drag the cursor with the mouse to read the different between the axes as shown in Fig. 3-4.

Note : Place the mouse pointer on the cursor to move it. Right click the mouse to select the cursor menu. In this menu you can select to hide or display the measurement cursor.

Cursor

Cursor coordinate display bar

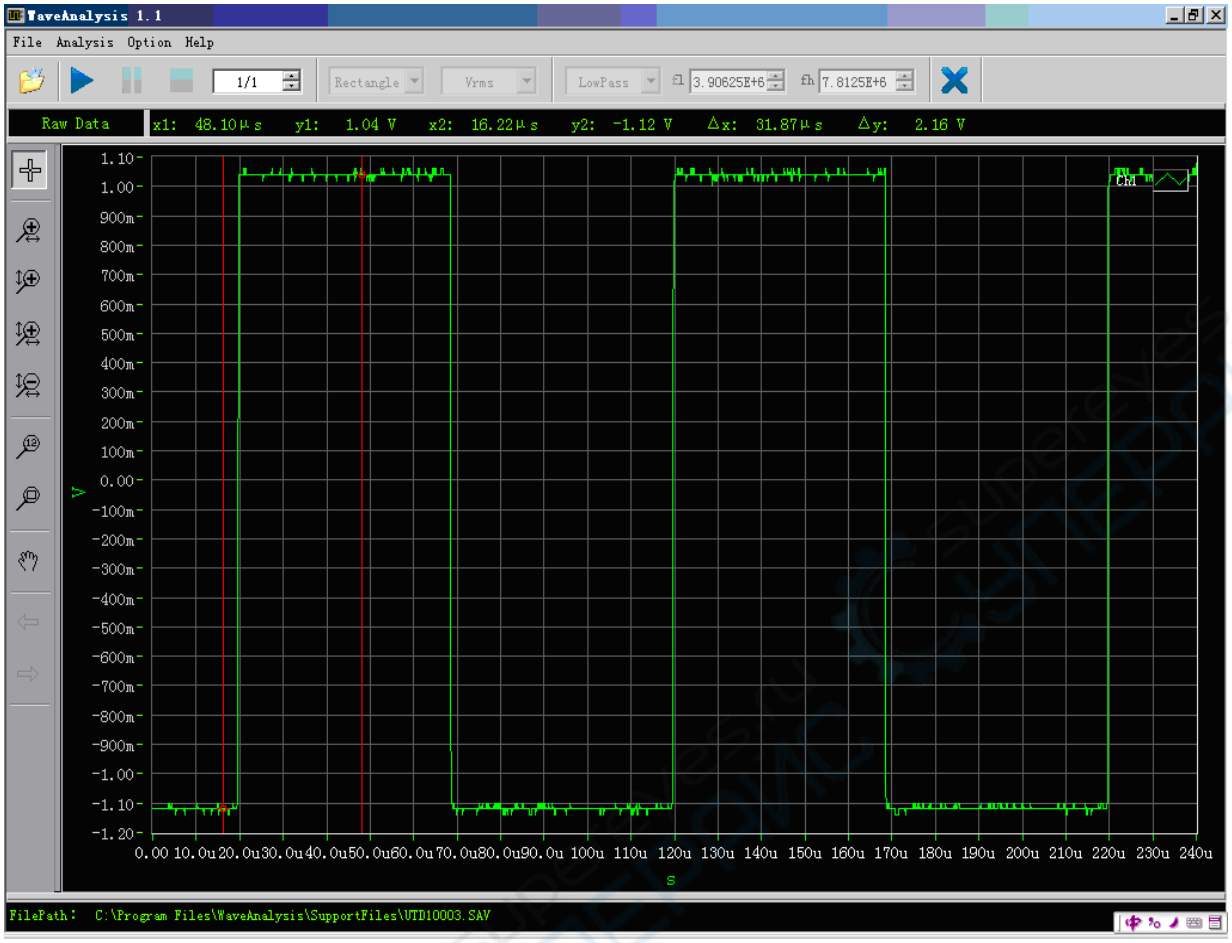

Fig. 3-4 Cursor measurement

3.3 Data analysis function

The waveform analysis software is a powerful data analytical tool. It can carry out original data FFT and digital filter mathematical functions.

FFT mathematics : Click the analysis menu and select FFT to pop up the “FFT parameters setup” dialog box. Select the required window function type then click “OK” to enter the FFT mathematical mode, as shown in the figure below :

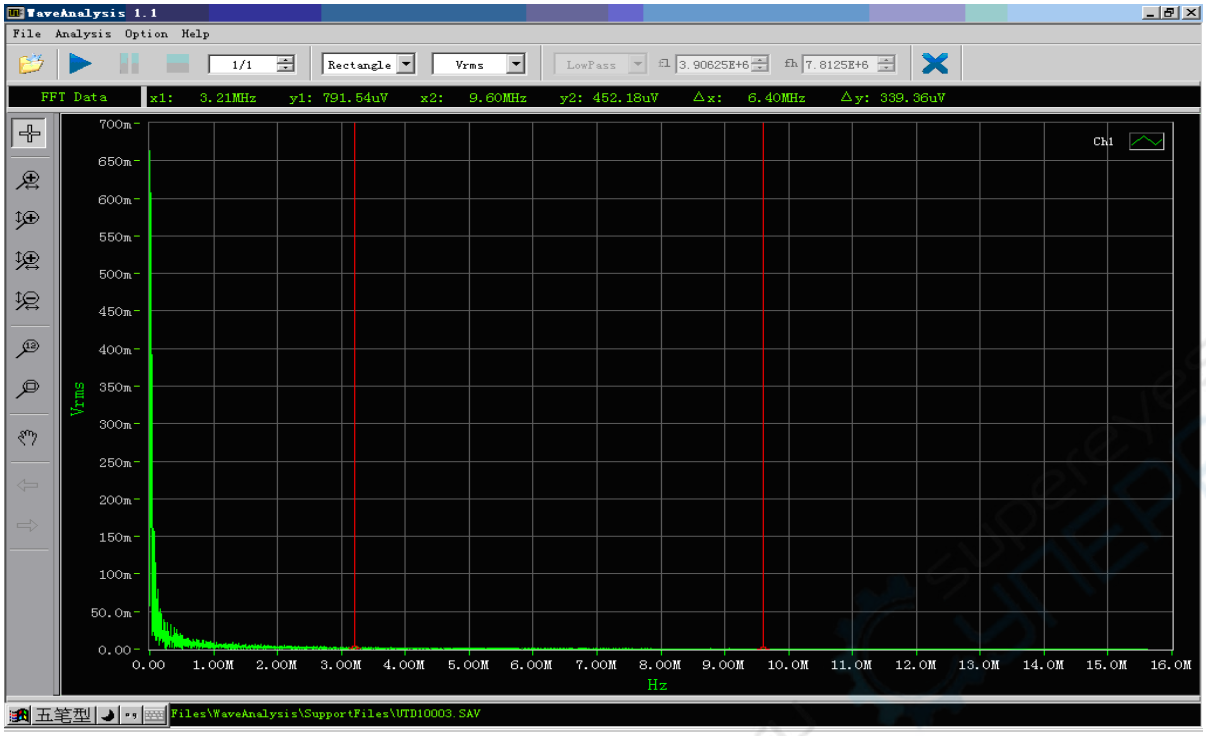

Fig. 3-5 FFT mathematical function

If you wish to change the window function type or vertical unit, proceed as shown in the following figure.

Fig. 3-6 FFT selection menu

Note : To switch the Y axis to Vrms or dBVrms, right click the mouse to select the Y axis menu.

Digital filter : Click the analysis menu and select FILTER to pop up the “Filter parameters setup” dialog box. Select the required filter type and set an appropriate filter interception

frequency, then click “OK” to enter the digital filter mode, as shown in the figure below :

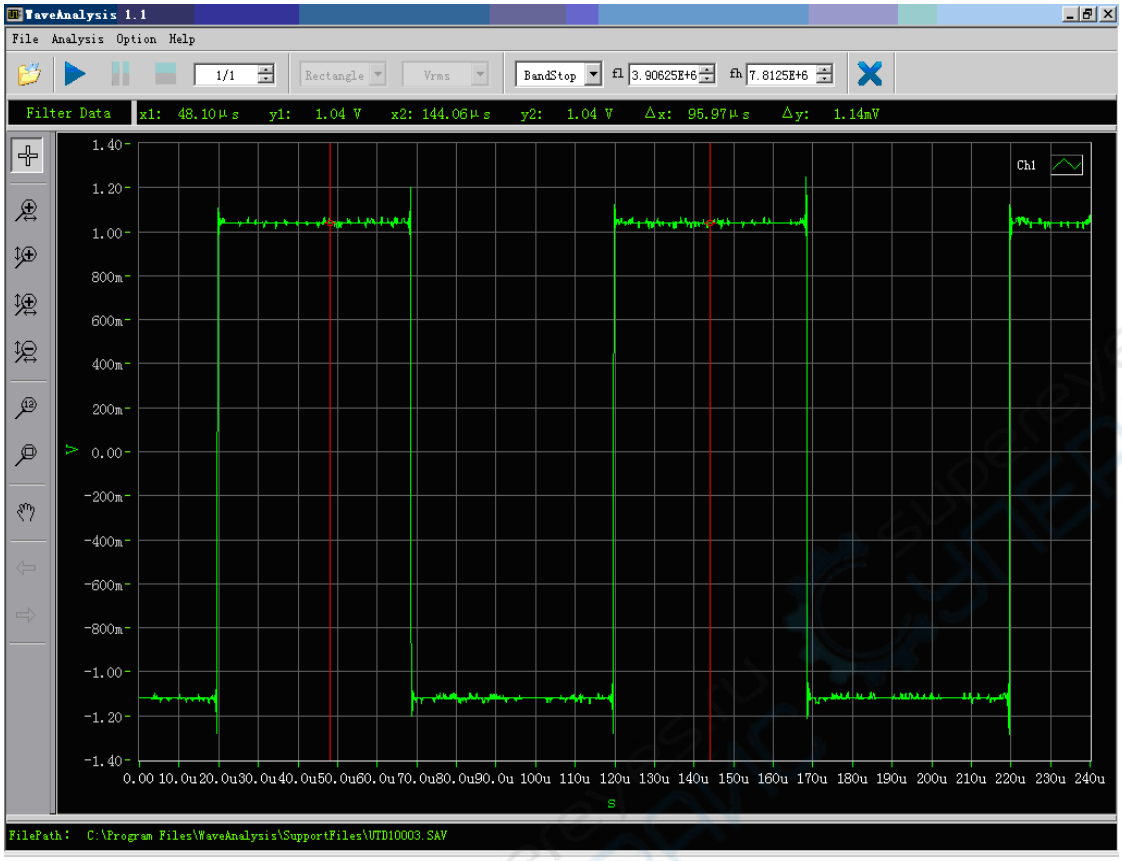

Fig. 3-7 Low-pass filter

If you wish to change the filter type, proceed as shown in the following figure.

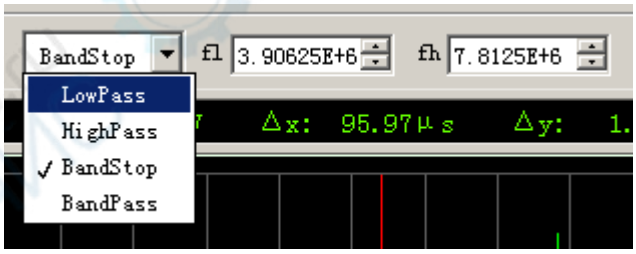

Fig. 3-8 Filter selection menu

When low-pass filter and high-pass filter are selected, set the interception band width by changing the f1 frequency. When band-pass filter and band-stop filter are selected, complete the setup by setting the f1 and f2 rationally to the required frequencies.

Switching data types :

Note : To switch between original data, FFT data and filter data, right click the mouse to select the data type menu as shown in Fig. 3-9.

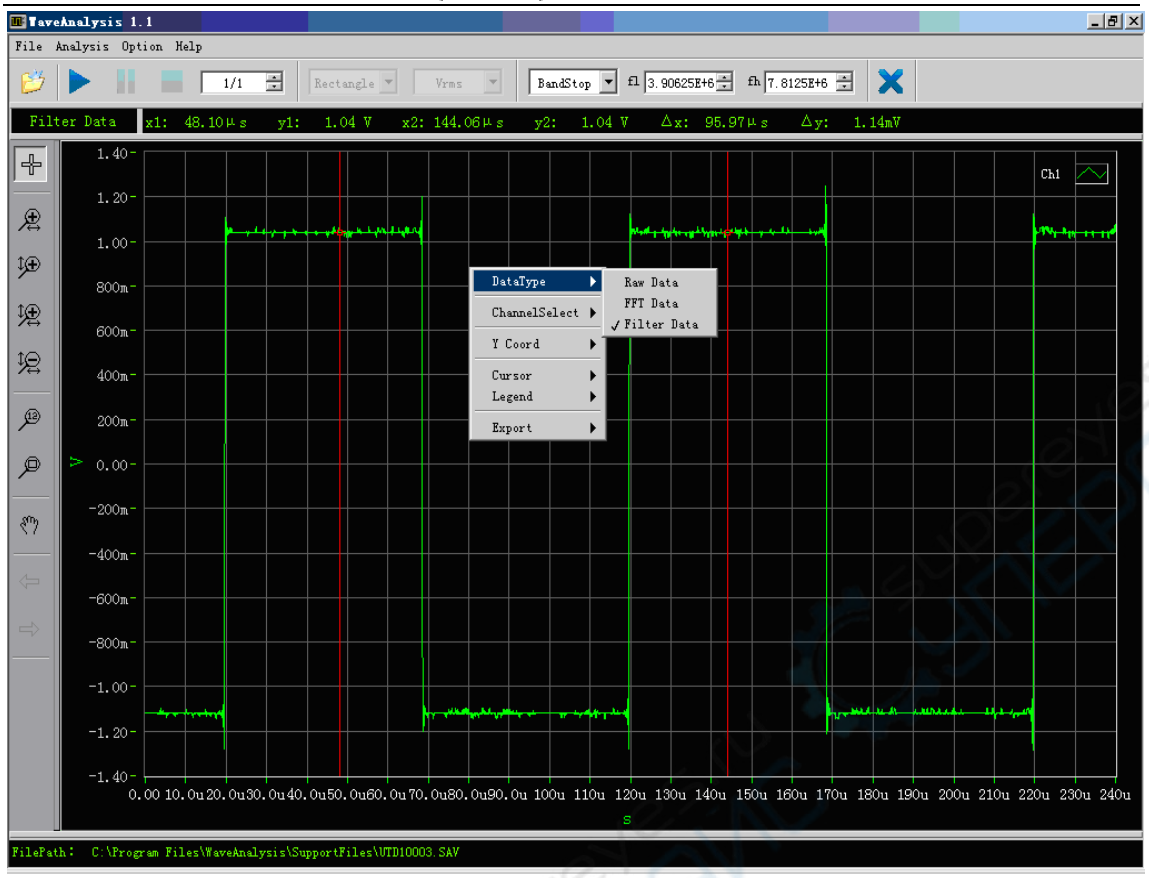

Fig. 3-9 Switching data types

3.4 Scaleable graphics

Right click the mouse to select the graphic scaling menu. Enter the scaling options page to control waveform data in various ways :  (horizontal zoom),  (vertical zoom),  (horizontal and vertical zoom),  (zomm out),  (manual),  (display all),  (pan),  (back),  (Forward).

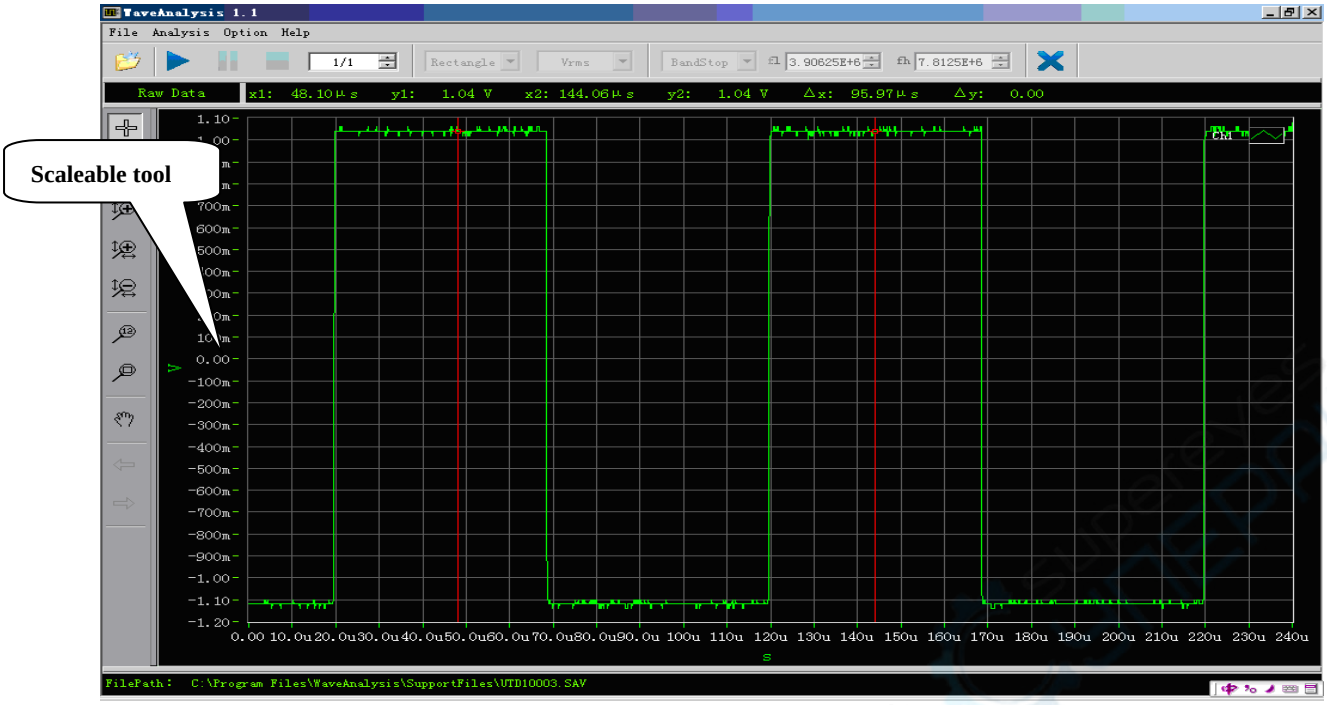

Fig. 3-10 Graphic scaling menu

Amplifying a waveform: For horizontal zoom, click  . A large icon will appear. Left click and drag the mouse several times to display the broken-line box shown in Fig. 3-11. The waveform inside the box is the waveform to be amplified.

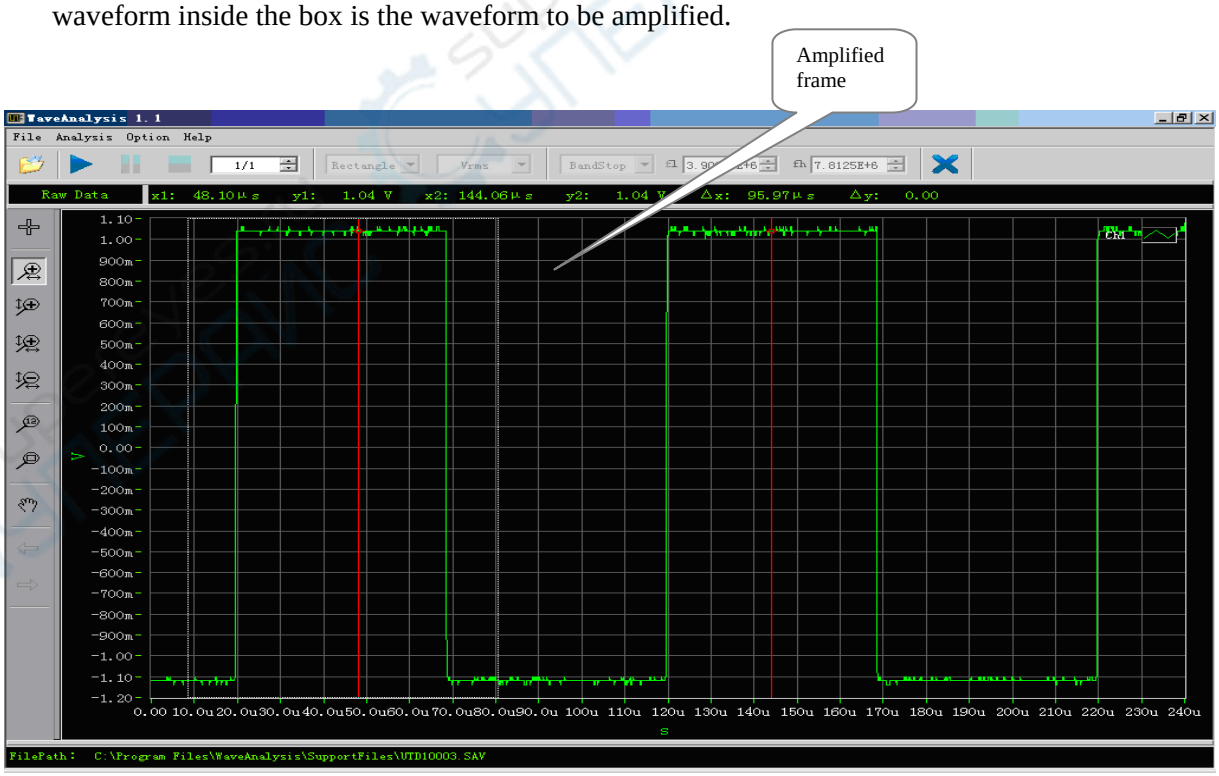

Fig. 3-11 Waveform before amplification

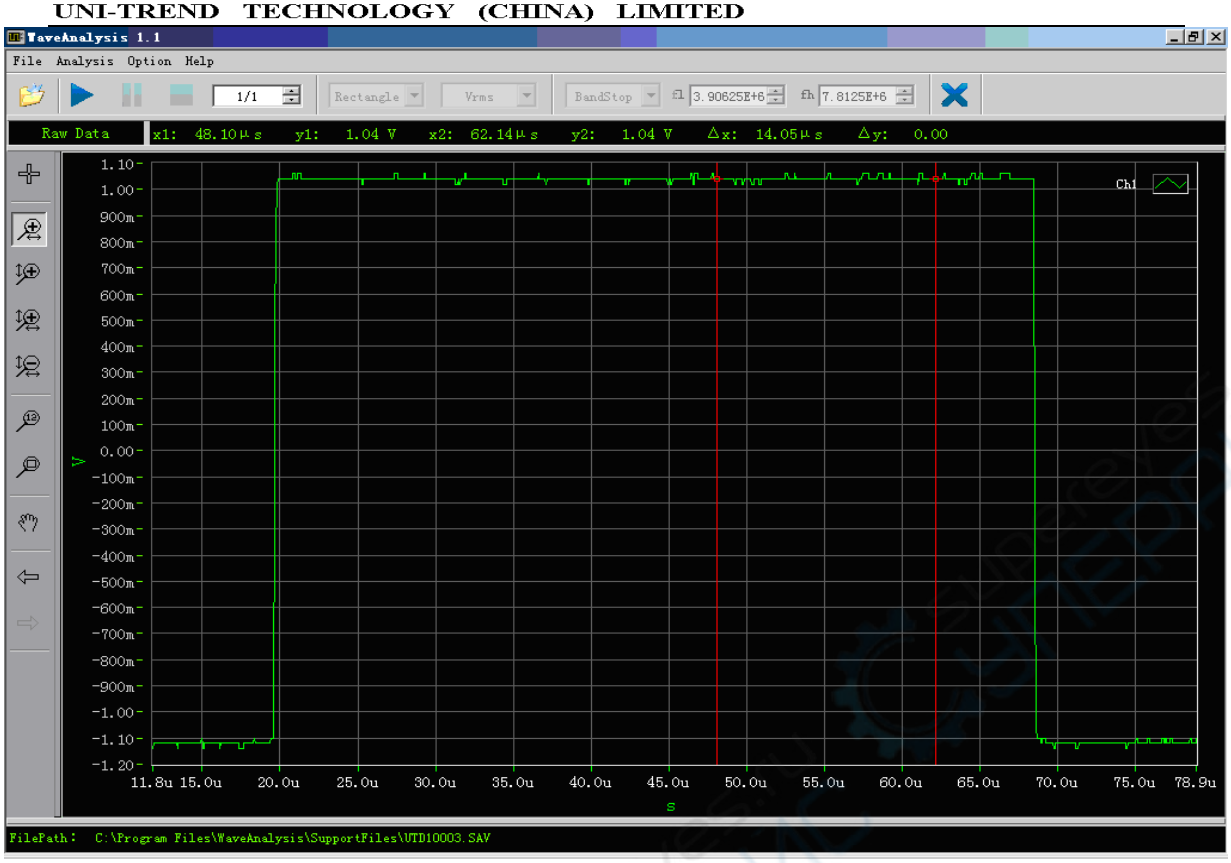

Fig. 3-12 Waveform after amplification

Shifting a waveform : After amplifying the waveform, right click the mouse to select the shift option in the graphic scaling menu. You can now control the waveform's movement.

Restoring a waveform : To restore the original size of an amplified waveform, right click the mouse and select the auto option in the graphic scaling menu to return the waveform to its original size.

3.5 Exporting data and images

Right click the mouse and select the export menu. Enter the export options to select export of the current data or graphic figure, as shown in Fig. 3-13.

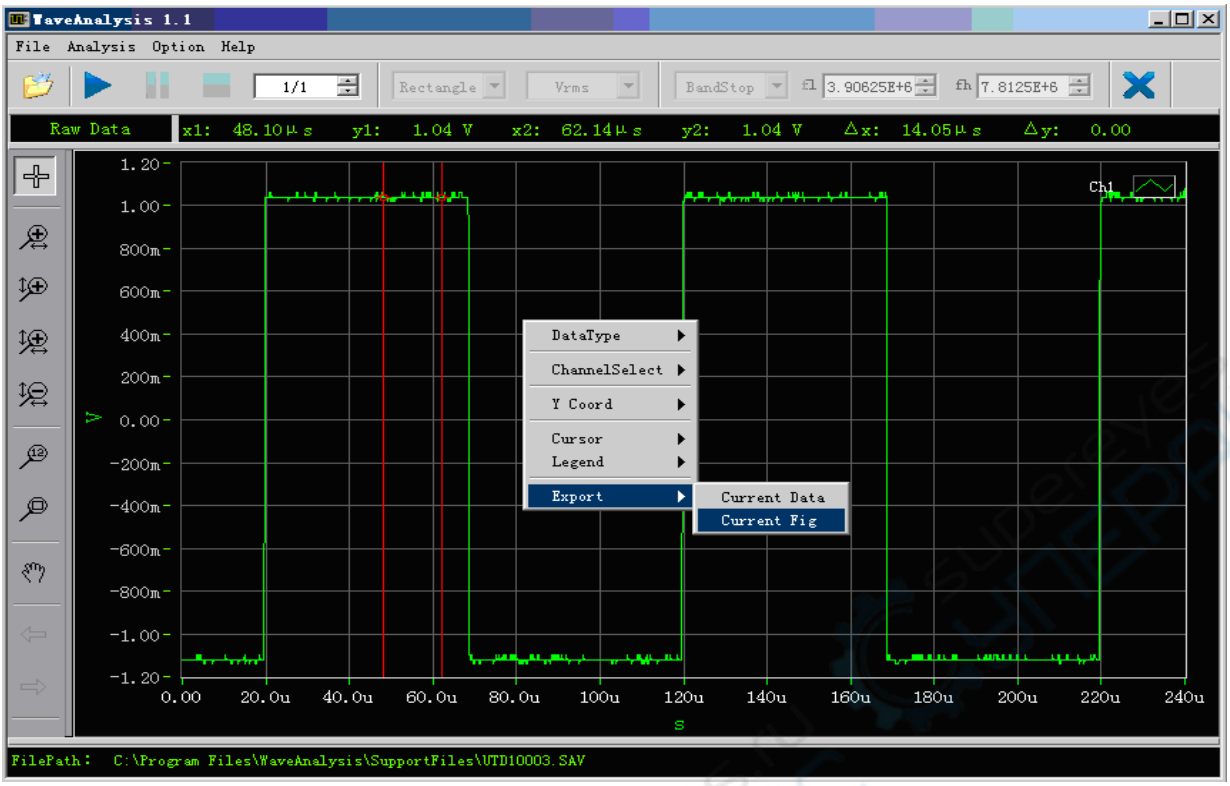

Fig. 3-13 Export options

When you select to export the current data, all data points of the waveform will be exported and saved as a txt file. The data can be analysed with other common software or used for secondary development.

When you select to export the current graphic figure, the dialog box shown in the figure below will appear. You can select BMP, JPEG or PNG.

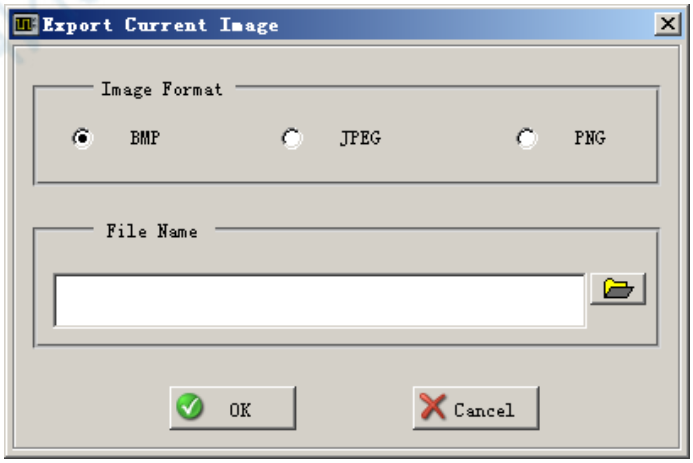

Fig. 3-14 Graphic formats

3.6 Document information

The document information bar clearly shows the status of waveform at the time of saving. With such information, you can easily restore the original waveform status. You can access information like vertical range, channel coupling, bandwidth limit, probe attenuation, channel inversion, acquisition mode, scan time base, trigger mode, trigger type, trigger slew rate, trigger coupling, trigger position, trigger voltage, etc., formed when the oscilloscope saved the waveform, as shown in Fig. 3-15.

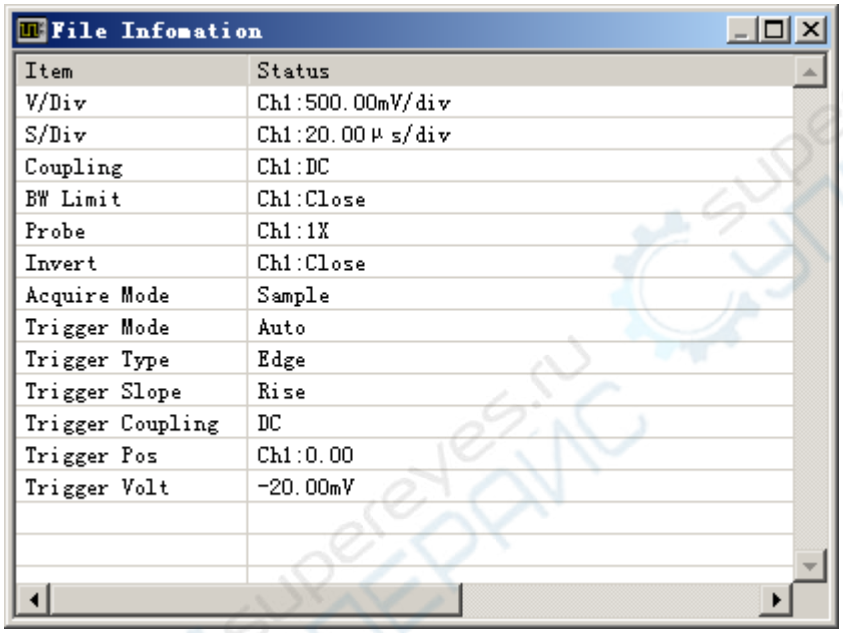

Fig. 3-15 Document information bar

Chapter 4 Practical illustrations

4.1 Waveform analysis

Illustration : Analyse the waveform document with your analysis software

With a UTD1000 Series Oscilloscope, save the channel waveform document on a USB device to analyse it with the software. Follow the operation steps below :

For glitch wave signals input at 100kHz frequency in Channel A, select [SAVE] then press [F1] to enable the save function. In the save mode, press [F1] to select Waveform A for save type, then press [F2] to select USB for medium. Press [F3] to select position 1, press [F4] to save the waveform in Channel A on the USB.

With other oscilloscope series, connect the oscilloscope with the computer via the USB terminal. Open the “Digital Storage Oscilloscope Communication & Control Software” and select the correct model of connection equipment. When connection is done, save the waveform data by selecting the save data options in the [document] menu.

Copy the waveform to your required location, then run the waveform analysis software. Select OPEN DATA in the document menu.

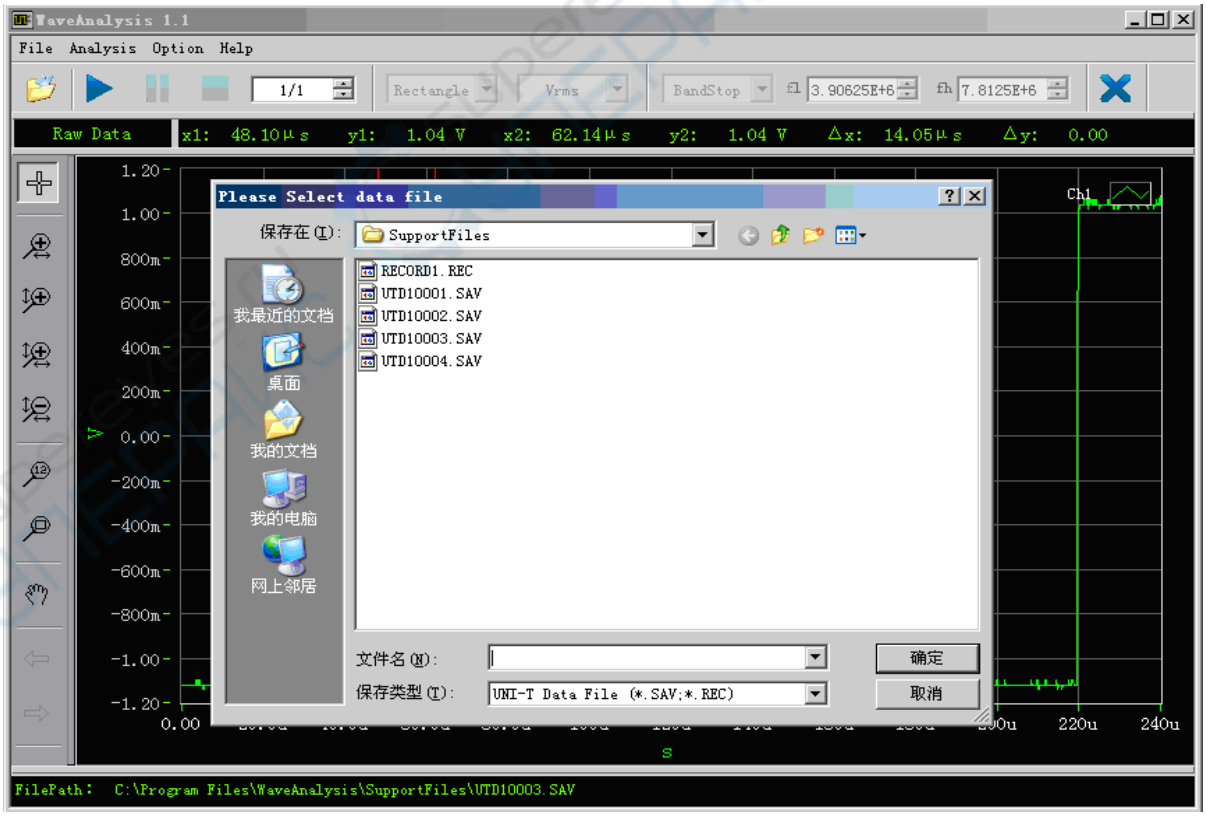

Fig. 4-1 Loading a waveform–1

Select a waveform document named UTD10001.SAV saved on the oscilloscope. After confirming, the waveform document is loaded into the software, as shown in Fig. 4-2.

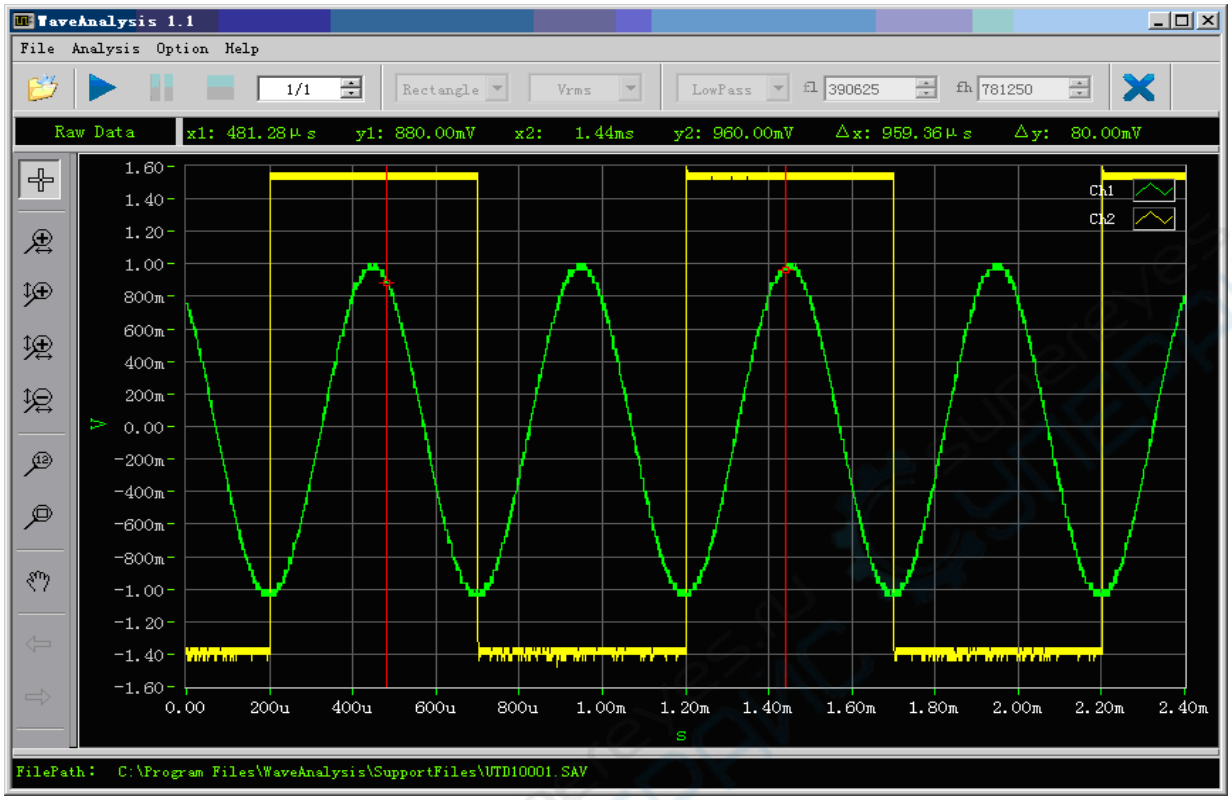

Fig. 4-2 Loading a waveform – 2

You can now analyse the data as explained in Chapter 3.

4.2 Parameter measurement

Illustration : Measure a waveform with the waveform analysis software.

Save the waveform as shown above, then export the waveform document to the waveform analysis software, as shown below :

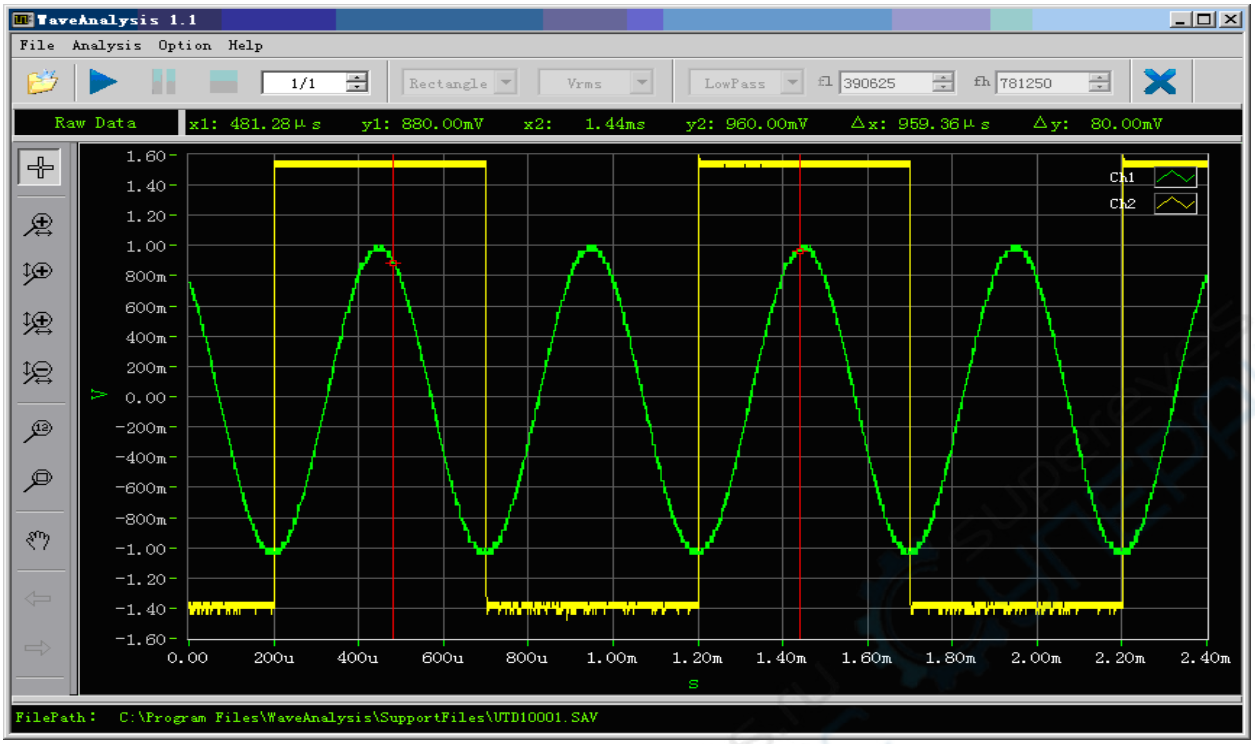

Fig. 4-3 Loading a waveform

To carry out simple parameter measurement of the waveform, select the parameter measurement function in the analysis menu, as shown in Fig. 4-4.

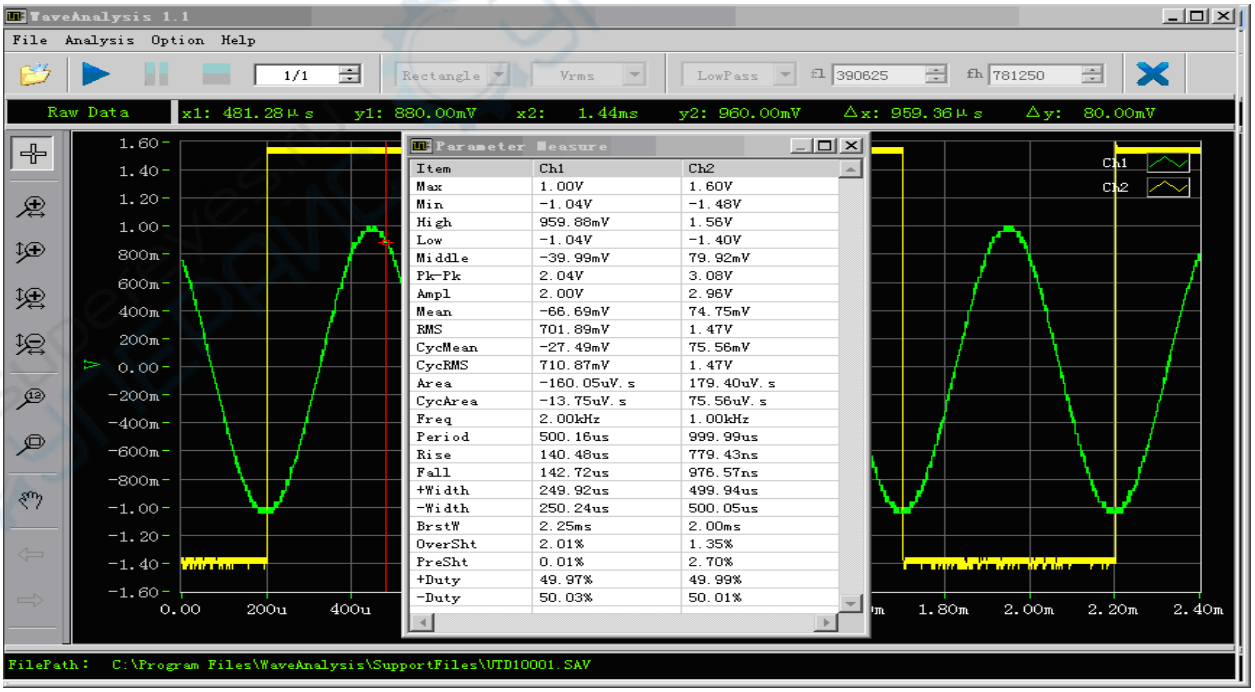

Fig. 4-4 Parameter measurement

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