DSView

User Guide

v0.99

Revision History

The following table shows the revision history for this document.

Date(DD/MM/YY)	Version	Revision
30/05/18	V0.99	release for DSView v0.99
19/07/17	v0.98	release for DSView v0.98
08/09/16	v0.96	Initial release for DSView v0.96

Contents

1 Overview 4
1.1 Introduction 4
1.2 Download 4
1.3 Installing DSView 4
1.3.1 Operating System 4
1.3.2 Recommended Minimum Hardware 4
1.3.3 How to Install 5
1.4 User Interface 8
2 Logic Analyzer 9
2.1 Hardware Connection 9
2.2 Hardware Options 11
2.2.1 Mode 11
2.2.2 Channel 12
2.3 Sample Duration/Rate 13
2.3.1 Sample Duration 13
2.3.2 Sample Rate 13
2.4 Trigger 14
2.4.1 Simple Trigger 14
2.4.2 Advanced Trigger 15
2.5 Capture 18
2.5.1 Normal Capture 18
2.5.2 Instant Capture 19
2.5.3 Capture Mode 19
2.6 Navigating 20
2.6.1 Panning Left/Right 20
2.6.2 Zooming in and Out 21
2.6.3 Pattern Search 21
2.6.4 Channel Customization 22
2.7 Measurement 22
2.7.1 Width/Period/Frequency/Duty Cycle 23
2.7.2 Pulse Counter 23
2.7.3 Edge distance 24
2.7.4 Cursor Insert 24
2.7.5 Cursor Move 24
2.7.6 Cursor Jump 25
2.7.7 Cursor Measure 26
2.7.8 Delete Cursor 27
2.8 Protocol Decoder 27
2.8.1 Add Decoder 28

2.8.2 Stack Decoder 29
2.8.3 List Viewer 30
2.8.4 Search Results 31
2.8.5 Export Results 32
2.8.6 Delete Decoder 32
2.9 File Operation 33
2.9.1 Setting Store/Load 33
2.9.2 Save 33
2.9.3 Open 33
2.9.4 Export 34
2.9.5 Screen Shot 34
3 Oscilloscope 35
3.1 Hardware Connection 35
3.2 Hardware Options 36
3.2.1 Operation Mode 37
3.2.2 Auto Calibration 37
3.2.3 Manual Calibration 38
3.3 Capture 38
3.3.1 Channel Customization 38
3.3.2 Horizontal Resolution 39
3.3.3 Run/Stop 39
3.3.4 Single Capture 39
3.3.5 Trigger 40
3.4 Measurements 41
3.4.1 Auto Measurements 41
3.4.2 Mouse Measurements 41
3.4.3 Cursor Measurements 43
3.5 Spectrum Analysis 45
3.5.1 FFT Options 45
3.5.2 Navigating Spectrum 46
3.6 File Operations 47
3.6.1 Setting Store/Load 48
3.6.2 Save 48
3.6.3 Open 48
3.6.4 Export 48
3.6.5 Screen Shot 49

1 Overview

1.1 Introduction

DSView is a multi-function signal capture and analysis software. Its main function include logic signal capture and measure, digital protocol analysis and debug, analog signal real-time capture and measure, spectrum analysis, etc.
DSView is also an open source software based on sigrok project (www.sigrok.org), developed and maintained by DreamSourceLab (www.dreamsourcelab.com). Current version (v0.99) support three operation modes: Logic Analyzer, Oscilloscope and Data Acquisition.
Until now, DSView support following hardware:

- DSLogic series logic analyzer
  - DSLogic: 400Mx4/ 200Mx8/ 100Mx16 channels logic analyzer
- DSCope series oscilloscope
  - DSCope: 200MS/s / 8bit / Dual Channels oscilloscope

1.2 Download

Installer: http://www.dreamsourcelab.com/download.html
Source code: http://www.github.com/DreamSourceLab/DSView

1.3 Installing DSView

1.3.1 Operating System

Windows： XP / Vista / Win7 / Win8 / Win10
Linux： Debian / Ubuntu, Fedora, OpenSUSE, etc.
Apple： OS X 10.8 and above

1.3.2 Recommended Minimum Hardware

CPU: P4 1.5G and above
Memory: 2G and above
HDD: 20G and above
USB： USB2.0 and above

1.3.3 How to Install

1.3.3.1 Windows

CAUTION

a) *If an older DSView software have been installed, please uninstall it totally（including drivers）*

b) *If you have the old hardware, which have the following device name(DSLogic/DSLogic Pro/DSCope/DSCope20), and want to use DSView on WIN8 or above, please disable the driver signature enforcement before installing the software：*

win8:

https://learn.sparkfun.com/tutorials/disabling-driver-signature-on-windows-8/disabling-signed-driver-enforcement-on-windows-8

win10:

https://answers.microsoft.com/en-us/insider/forum/insider_wintp-insider_devices/how-do-i-disable-driver-signature-enforcement-win/a53ec7ca-bdd3-4f39-a3af-3bd92336d248?auth=1

Install Steps:

1、 Double click the **Executable** setup file.

2、 Click **Next** on welcome page.

3、 Click **I Agree** on license agreement page, if you accept the terms of the agreements; otherwise, click **Cancel** to stop installing.

4、 Choose install location, and click **Install.**

5、 Waiting done. If following page appear (Figure 1-1), for the old hardware, which have the following device name(DSLogic/DSLogic Pro/DSCope/DSCope20), please select **Install this driver software anyway**

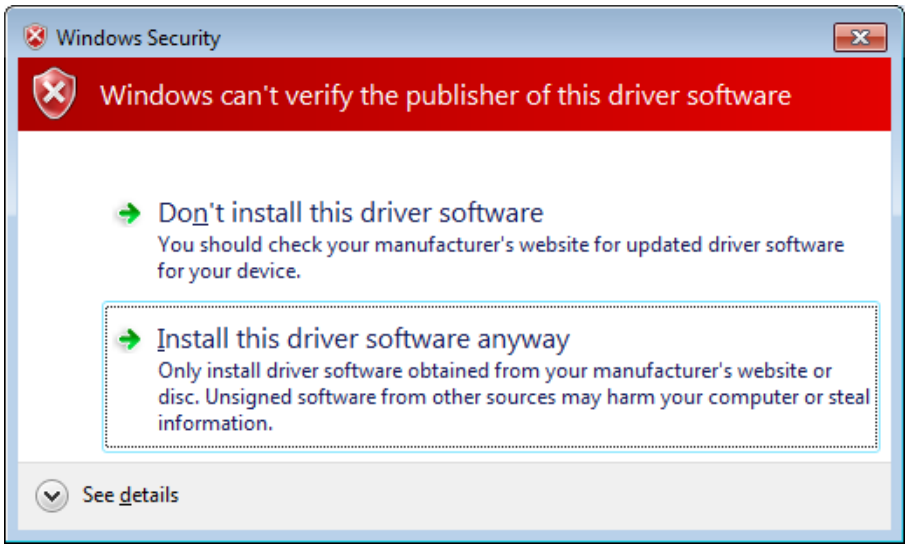


Figure 1-1

Windows XP

Please install the hardware driver manually on windows xp operation system according to the steps of Figure 1-2. This instruction will be popped up when running the installer on xp system.

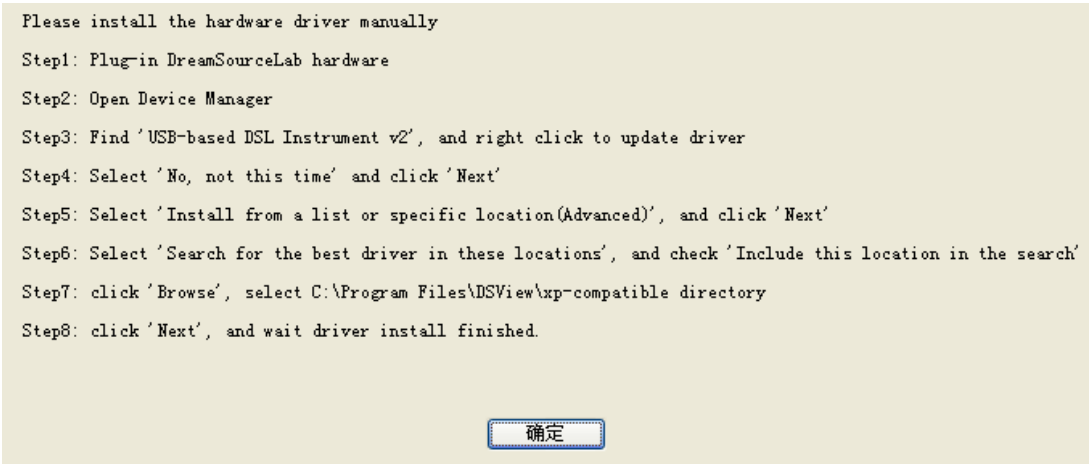


Figure 1-2

1.3.3.2 Linux

Step1: Get the DSView source code

$ git clone git://github.com/DreamSourceLab/DSView

Step2: Installing the requirements:

please check your respective distro's package manager tool if you use other distros

Debian/Ubuntu:

$ sudo apt-get install git-core build-essential cmake autoconf automake libtool pkg-config libglib2.0-dev libzip-dev libudev-dev libusb-1.0-0-dev python3-dev qt5-default libboost-dev libboost-test-dev libboost-thread-dev libboost-system-dev libboost-filesystem-dev check libfftw3-dev

Fedora (18, 19):

$ sudo yum install git gcc g++ make cmake autoconf automake libtool pkgconfig glib2-devel libzip-devel libudev-devel libusb1-devel python3-devel qt-devel boost-devel check libfftw3-devel

Arch:

$ pacman -S base-devel git cmake glib2 libzip libusb check python boost qt5 fftw

Step3: Building

$ cd libsigrok4DSL

$ ./autogen.sh

```
$ ./configure
$ make
$ sudo make install
$ cd ..

$ cd libsigrokdecode4DSL
$ ./autogen.sh
$ ./configure
$ make
$ sudo make install
$ cd ..

$ cd DSView
$ cmake .

/*
 * If this step fails,
 * make sure that your pkg-config is properly configured
 * to find the libsigrok and libsigrokdecode libraries
 * (It's not by default in Fedora 23).
 * To do this add "export PKG_CONFIG_PATH="/usr/local/lib/pkgconfig"
 * to your ~/.bashrc and reload it `. ~/.bashrc`.
 */

$ make
$ sudo make install
```

1.3.3.3 Mac OS X

1、 download the dmg file
2、 open the dmg, and drag DSView to Application directory.

1.4 User Interface

Figure 1-3 shows the user interface of DSView under logic analyzer mode.

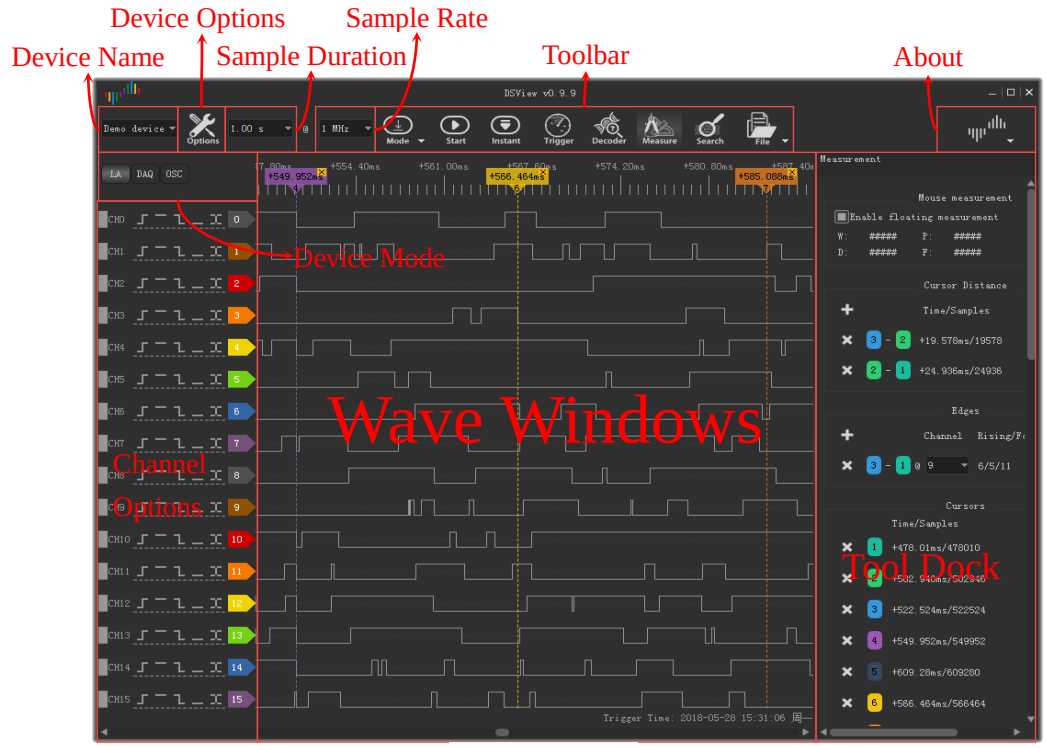


Figure 1-3

Figure 1-4 shows the user interface of DSView under oscilloscope mode.

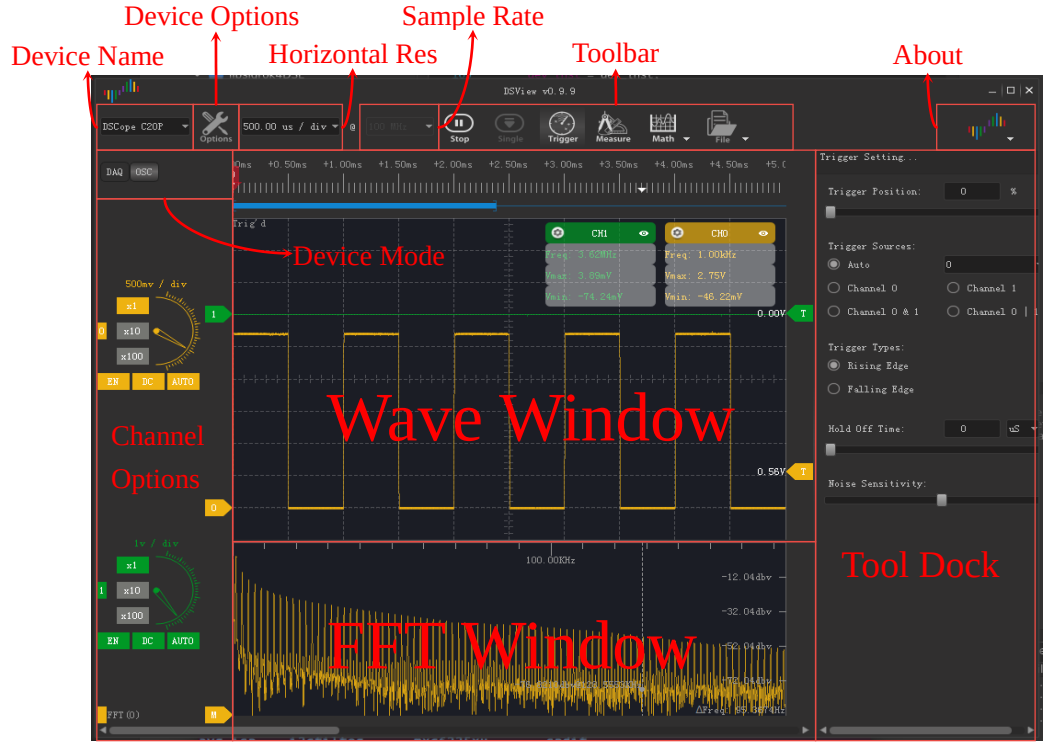


Figure 1-4

2 Logic Analyzer

2.1 Hardware Connection

1) Connect DSLogic to PC's USB port, and check the LED indicator has been lit up.

CAUTION

In order to achieve the best data transfer performance, please use the original or short and good quality USB cable, connect to the native port of the motherboard, and try to avoid using ports of extended hub.

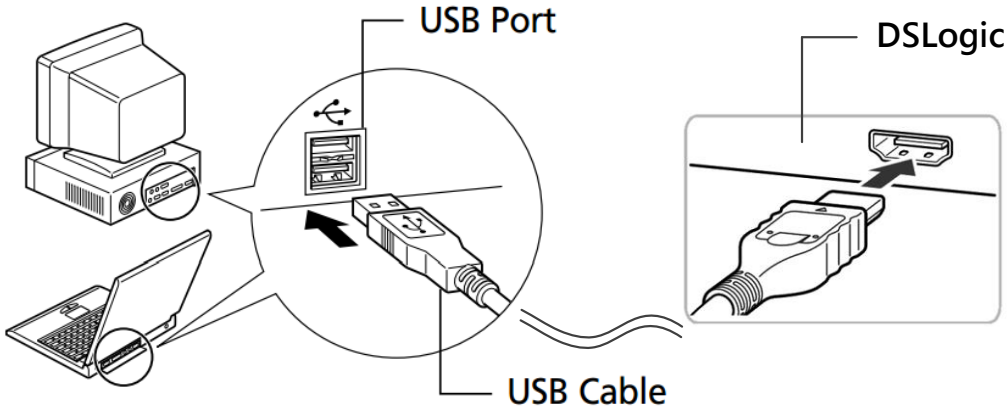


Figure 2-1

2) Open DSView software, check the LED indicator become green, and DSView show the correct device name.

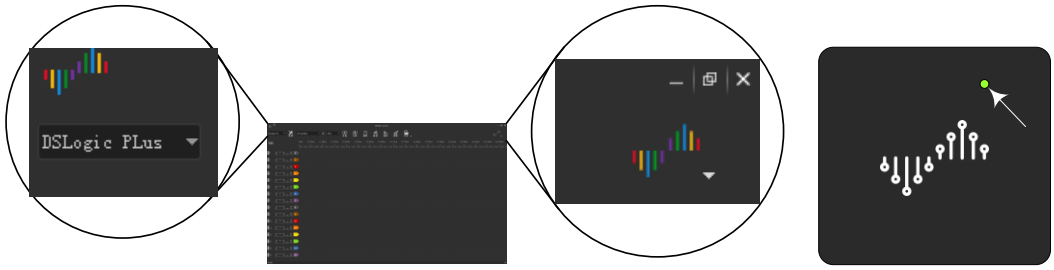


Figure 2-2

3) Connect the shielded fly wires to the external port of logic analyzer. Figure 2-3 shows the wire mapping of DSLogic Plus kit. Except for 16 signal channels, the 'CK' channel is the clock input for state capture, 'TI' channel is the external trigger input ,'TO' channel is the external trigger output.

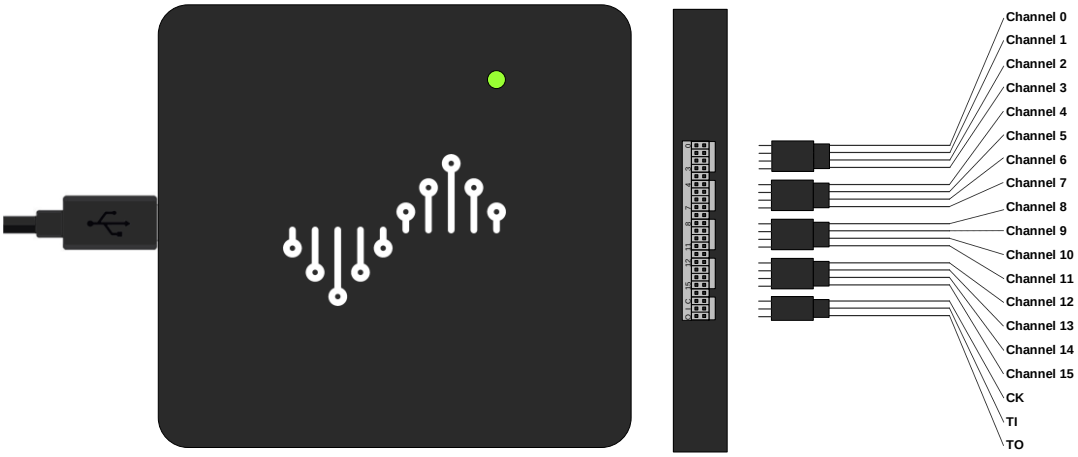


Figure 2-3

4) Connect probe clips to the signals being measured. For low frequency signal (<5MHz), a common ground is enough (Figure 2-4 left). For high frequency signal, an independent ground connection for each channel is recommended (Figure 2-4 right).

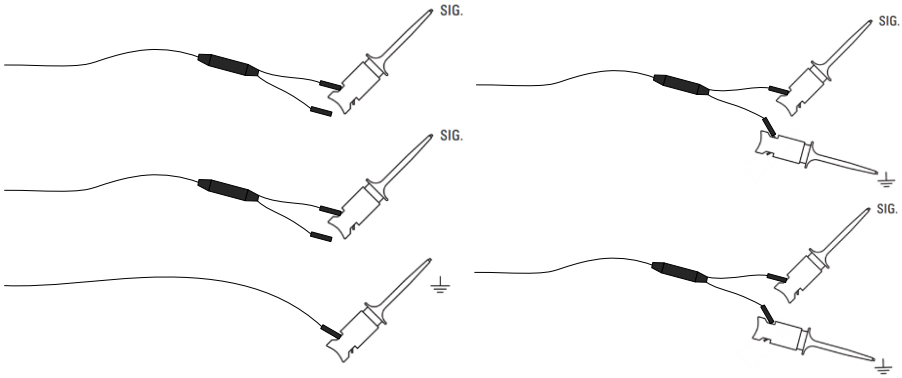


Figure 2-4

2.2 Hardware Options

Click **Options** button (Figure 2-5).

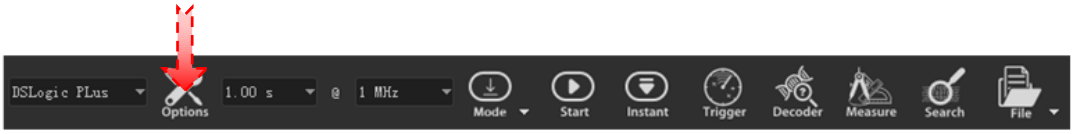


Figure 2-5

Device Options window will be opened (Figure 2-6).

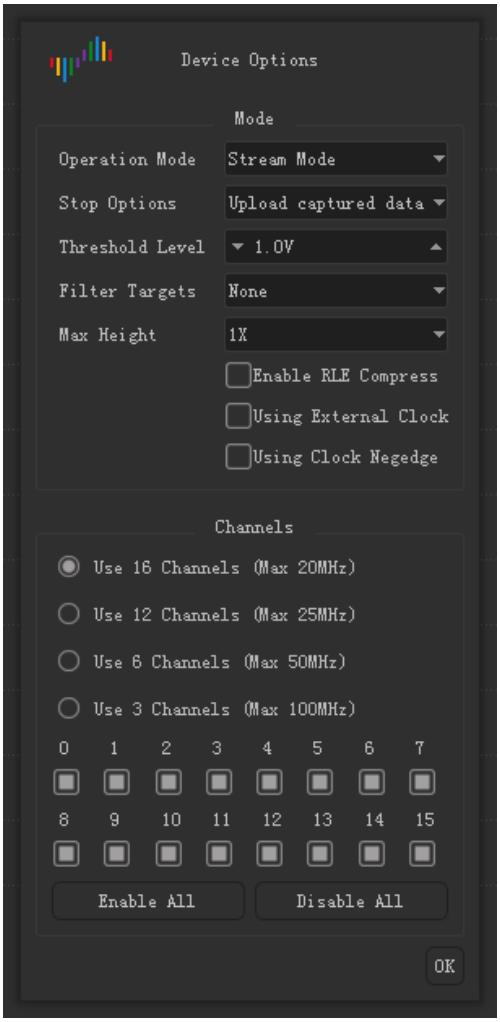


Figure 2-6

2.2.1 Mode

- **Operation Mode:**
  - **Buffer Mode:** data are stored in the on-board memory, and transferred to PC when capture finished. This mode support high sample rate (up to 400MHz) and

limited sample depth. RLE compression is supported in this mode to extend sample depth.

- **Stream Mode:** data will be transferred to PC during the capture duration. This mode has limited sample rate and well sample depth.
- **Internal Test:** test only.

- **Stop Options:**
  - **Stop immediately:** Under buffer mode, when stop during capturing, no data will be uploaded, current capture will be stopped immediately
  - **Upload captured data:** Under buffer mode, when stop during capturing, data already captured in hardware buffer will be uploaded, and show on wave window.
- **Threshold Voltage:** 0-5v range and 0.1v step. This feature will make the logic analyzer compatible to most of voltage standard. (old DSLogic hardware don't support this feature)
- **Filter Targets:**
  - None: original capture result
  - 1 Sample Clock: filter all pulse less than 1 sample clock time.
- **Max Height:** max display height of each channel.
- **Using External Clock:** use external clock as the sample clock for state capture.
- **Using Clock Negedge:** use the falling edge of sample clock as the sample edge.

2.2.2 Channel

- **Channel Mode:**
  - **In Buffer Mode**

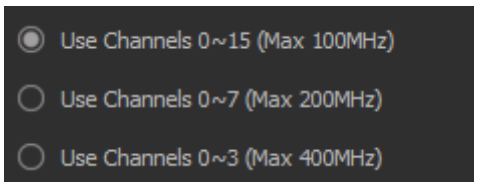


Figure 2-7

For 100MHz and below sample rate, all of 16 channels are available, for 200MHz sample rate, only 0-7 channels are available, for 400MHz sample rate, only 0-3 channels are available.

- **In Stream Mode**

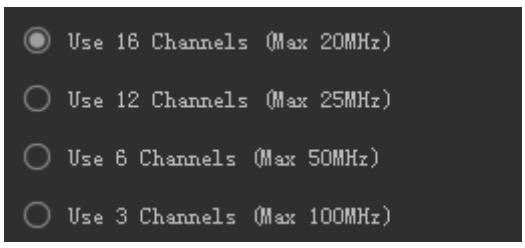


Figure 2-8

If only 3 channels be used, the max sample rate is 100MHz. If only 6 channels be used, the max sample rate is 50MHz. If only 12 channels be used, the max sample rate is 25MHz. If all 16 channels be used, the max sample rate is 20MHz.

- **Channel Enable:**

After channel mode set, each available channel can be enabled or disabled. **Enable All** will enable all available channels; otherwise, **Disable All** will disable all available channels.

2.3 Sample Duration/Rate

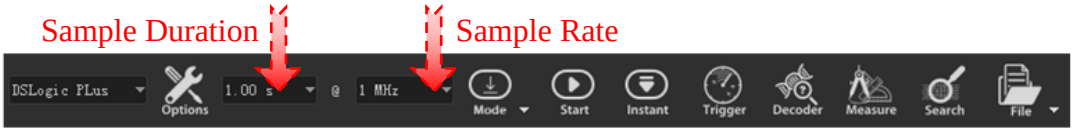


Figure 2-9

2.3.1 Sample Duration

As Figure 2-9 shows, the left box indicate sample duration. There are different ranges under different mode, sample rate and channel number.

- **Buffer Mode:** max duration = hardware depth / sample rate / channel number. For example, DSLogic Plus device has 256Mbits hardware memory, so @100M 16channles, the max sample duration will be about 167.77ms; @400M 1channel, the sample duration will be about 671.09ms. If RLE compress is enabled, larger sample duration will be reached, which depends on total signal changes.
- **Stream Mode:** max duration(64bit software) = 16G / sample rate. For example, @1MHz sample rate, the max sample duration will be about 4.77 hours; @100MHz sample rate, the max sample duration will be about 2.86 minutes.

2.3.2 Sample Rate

As Figure 2-9 shows, the right box indicate sample rate for each channel. There are different ranges under different mode.

- **Buffer Mode:**
  - 100M@16 channels：10KHz~100MHz
  - 200M@8 channels：10KHz~200MHz
  - 400M@4 channels：10KHz~400MHz
- **Stream Mode:**
  - 20M@16 channels：10KHz~20MHz
  - 25M@12 channels：10KHz~25MHz

- 50M@6 channels：10KHz~50MHz
- 100M@3 channels：10KHz~100MHz

In common case, sample rate should be 4x-10x times than the highest frequency of signal be measured. For example, for a serial signal with 115200 baud rate, 1MHz sample rate is reasonable, for SPI signals with 50MHz clock, 400MHz sample rate is reasonable.

2.4 Trigger

As Figure 2-10 shows, DSView support two trigger modes: simple trigger and advanced trigger.

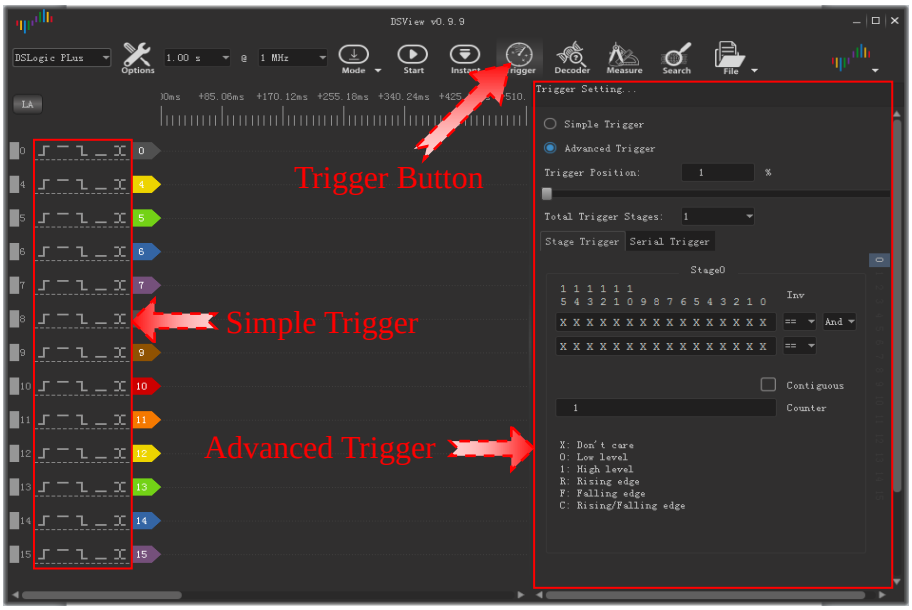


Figure 2-10

2.4.1 Simple Trigger

Simple trigger support edge or level trigger of single or multiple channels, and also support trigger position setting. As Figure 2-10 shows, check Simple Trigger radio button will select simple trigger as the final settings. Figure 2-11 shows the simple trigger setting for each channel.

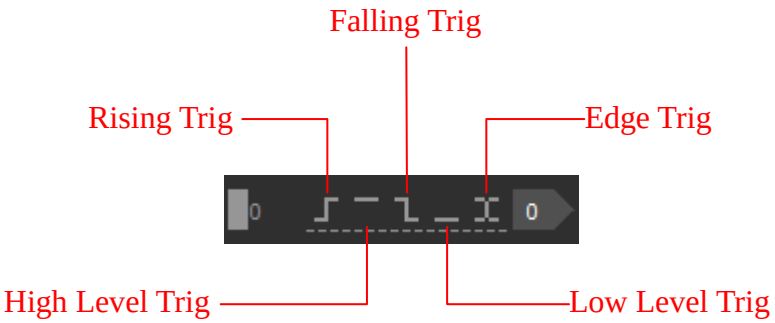


Figure 2-11

If more than one channel have been set, it will be **AND** relationship between channels.

Trigger position can be used to set the position percent of the trigger point in the whole capture depth. As Figure 2-12 shows, left is 10% trigger position, right is 90% trigger position.

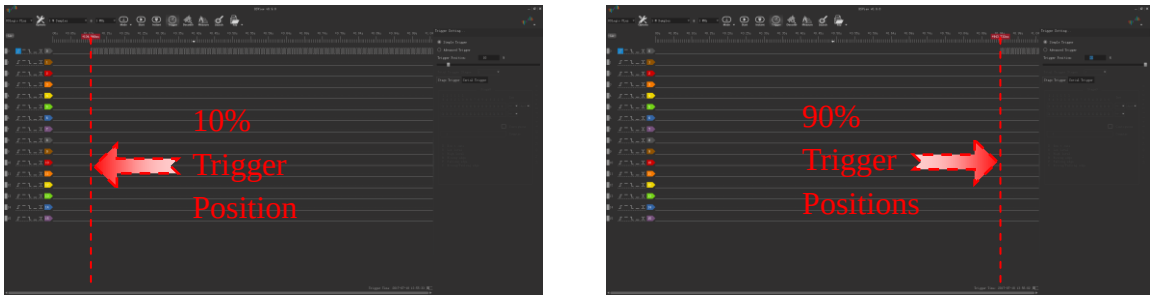


Figure 2-12

2.4.2 Advanced Trigger

Advanced trigger can be used to setup complex trigger flag, such as, multi-events trigger, protocol trigger, etc. DSView support two advanced trigger modes: stage trigger and serial trigger.

Stage trigger support 16 stages of trigger flag. Each stage support logic operation (and/or) of 2 sets of trigger. Each set support edge/level trigger of all channels, invert and counter.

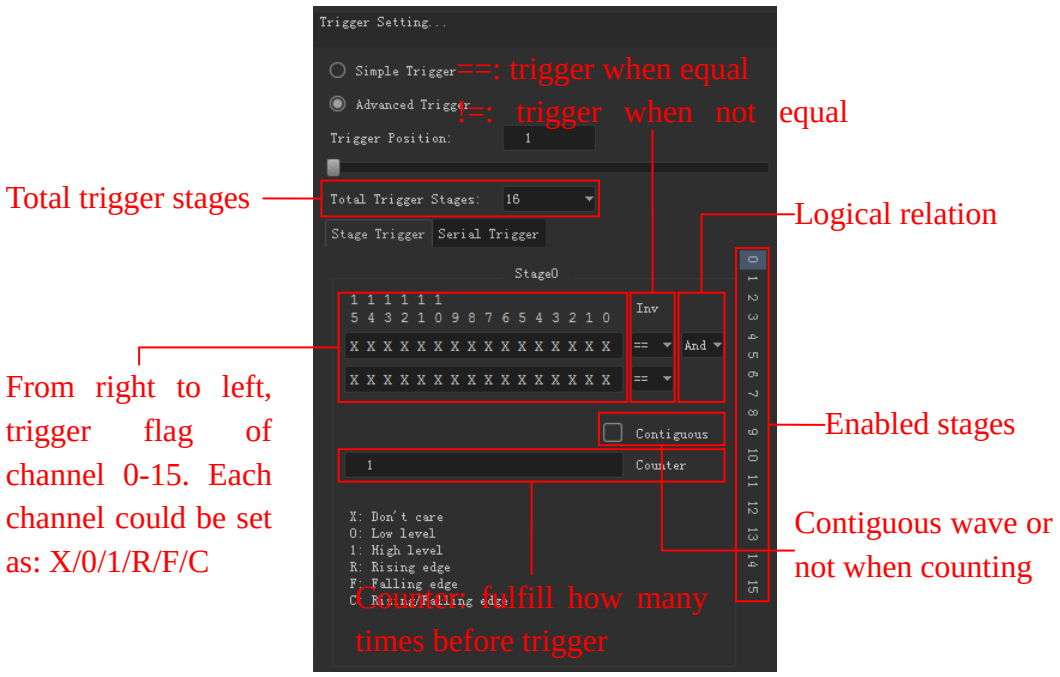
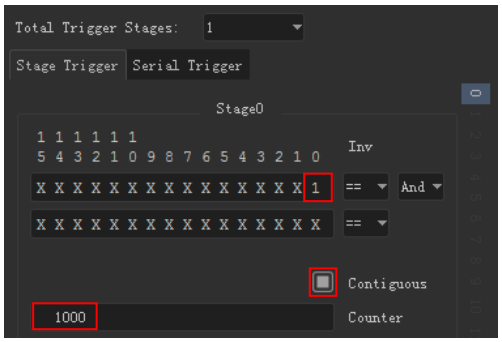


Figure 2-13

Followings are some example of advanced trigger

- High level of channel 0 keep longer than 1000 sample intervals



- Rising edge of channel 0 or falling edge of channel 1

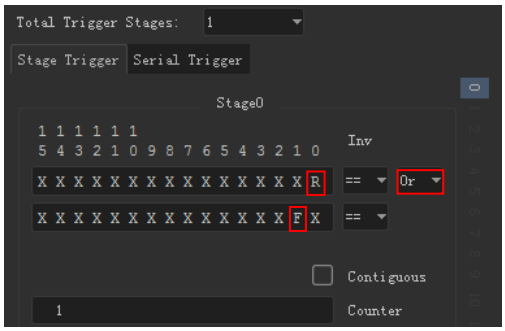


Figure 2-14

- Rising edge of channel 0, then 100 count of falling edge of channel 1, then high level of channel 2

Figure 2-15

As Figure 2-16 shows, Serial trigger designed a generic trigger template for most of serial bus, which can be used to setup complex protocol trigger. For example, trigger when there is 0x50 byte in the i2c data stream.

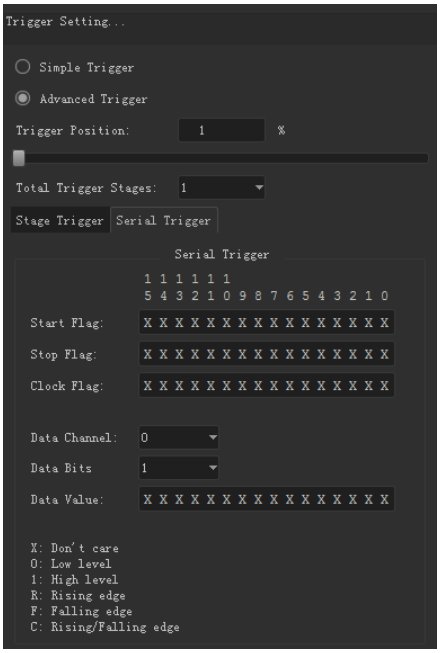


Figure 2-16

Behaviors of serial trigger: After ***Start Flag*** matched, value of ***Data Channel*** on each ***Clock Flag*** will be sampled and moved into a shift registers with bits of ***Data Bits***. If the value of shift register is equal to the ***Data Value*** of most right ***Data Bits***, trigger fired. Additionally, If ***Stop Flag*** matched, the shift register will be cleared.

Followings are some examples of serial trigger.

- Trigger when 0b01000010 appeared in I2C bus (channel 0: scl，channel 1: sda)

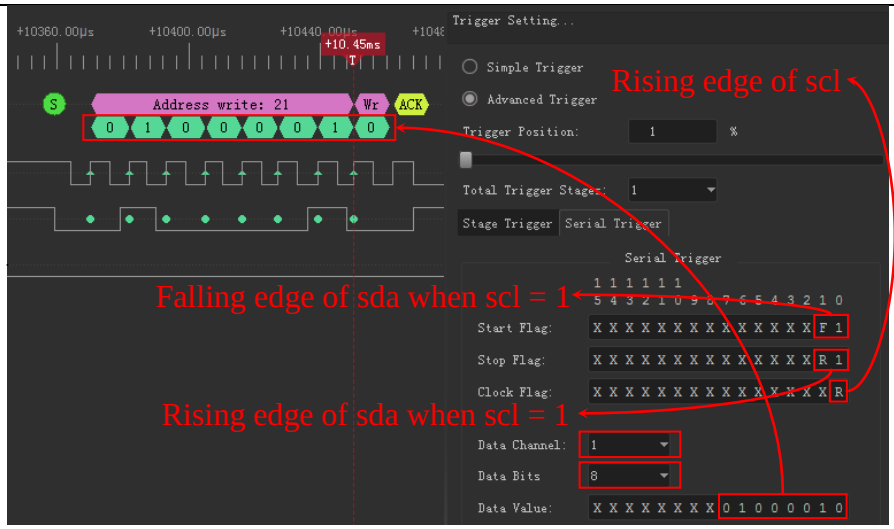


Figure 2-17

- Trigger when 0x1234 appeared in SPI bus (channel0: cs#, channl1: clk, channel2: miso, channel3: mosi)

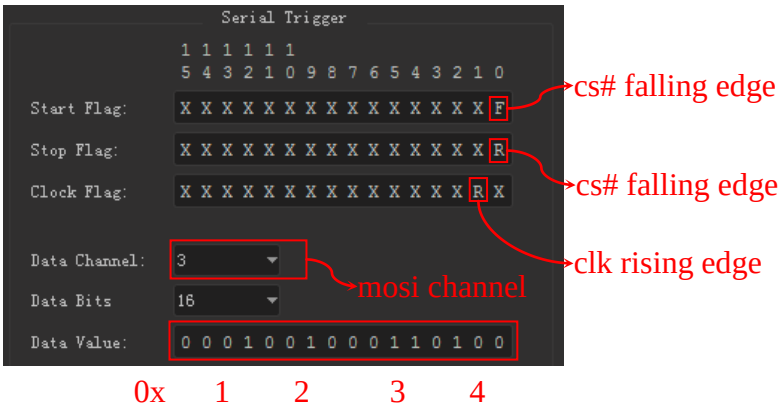


Figure 2-18

2.5 Capture

As Figure 2-19 shows, DSView support two capture operations: normal capture and instant capture.

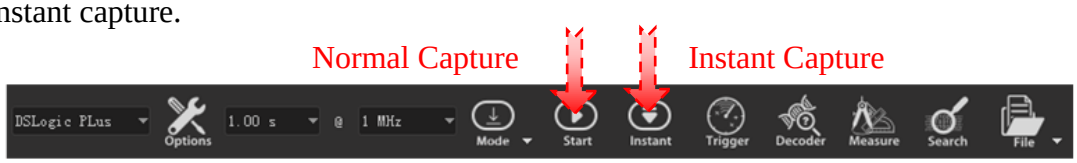


Figure 2-19

2.5.1 Normal Capture

There are little differences of capture procedure in buffer and stream mode:
Capture of buffer mode:

1. Click **Start** button

2. Transfer capture parameters to hardware
3. Issue start command, wait data feedback
4. If no trigger set, hardware start capture immediately
5. If trigger set, hardware start capture, and wait trigger pattern
6. **If capture depth reached, or on-board memory full, hardware finish capture and send data back**
7. DSView receive and process data
8. After transfer finished, DSView stop and show data on the wave window.

Capture of stream mode:

1. Click **Start** button
2. Transfer capture parameters to hardware
3. Issue start command, wait data feedback
4. If no trigger set, hardware start capture immediately
5. If trigger set, hardware start capture, and wait trigger pattern
6. **Hardware send data back during capture, until reach the capture depth.**
7. DSView receive and process data
8. After transfer finished, DSView stop and show data on the wave window

2.5.2 Instant Capture

The only difference between normal and instant capture is that instant capture will ignore any trigger settings, and force logic analyzer start a capture. This feature will help us to check hardware state immediately.

2.5.3 Capture Mode

As Figure 2-20 shows, DSView support two capture modes: single capture and repetitive capture.

Single Capture: under this mode, capture operation will be resumed just one time. When sample duration reached, capture will stop automatically.

Repetitive Capture: under this mode, capture operation will be resumed repeatedly, until stop button be pressed. Combine with trigger settings, this mode can help you observe the wave of specific event automatically without extra operations. Additionally, you can define the repetitive interval between 1 second and 10 seconds.

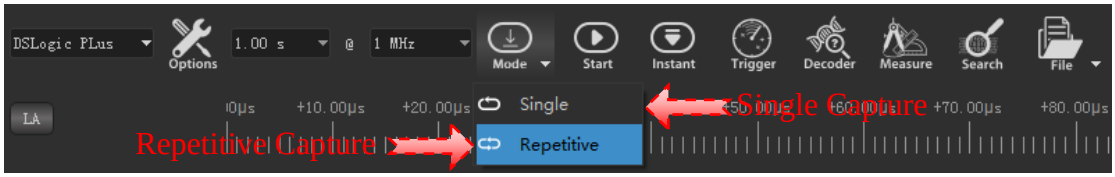


Figure 2-20

2.6 Navigating

As Figure 2-21 shows, captured data will be rendered on wave window. DSView provide rich methods to help users to navigate the data, include panning, zooming, search and mark.

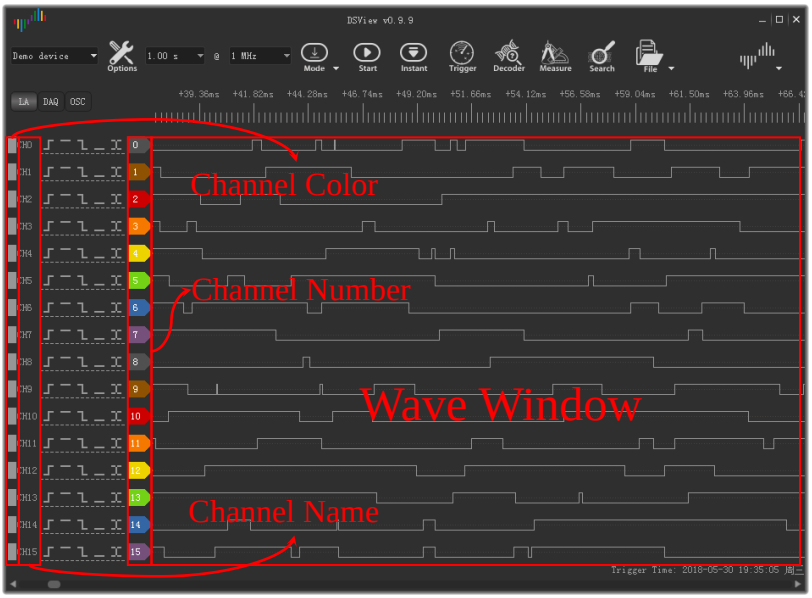


Figure 2-21

2.6.1 Panning Left/Right

Small range drag: in the wave window, press the left button of mouse, move left/right will drag the wave window to left/right.

Figure 2-22

Dynamic roll: in the wave window, press the left button of mouse, move left/right quickly and release the left button. This operation will start dynamic roll, which will stop in a certain time decided by the move speed and distance of the mouse.

Figure 2-23

Large range drag: drag the scroll bar in the bottom of the wave window will quickly jump to a certain position.

2.6.2 Zooming in and Out

Wheel zoom: as Figure 2-24 shows, in the wave window, scroll the wheel of mouse will zoom the wave in/out.

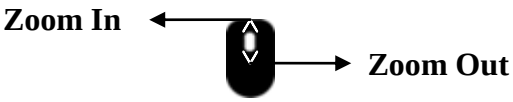


Figure 2-24

Window zoom: in the wave window, press the right button of mouse, move mouse to draw a rectangle window, selected area will be zoom to full window when release the right button.

Figure 2-25

Zoom toggle: in the wave window, if it's not the max zoom out state, double click the right button of mouse will reach the max zoom out state, double click again will return back to the previous zoom set.

2.6.3 Pattern Search

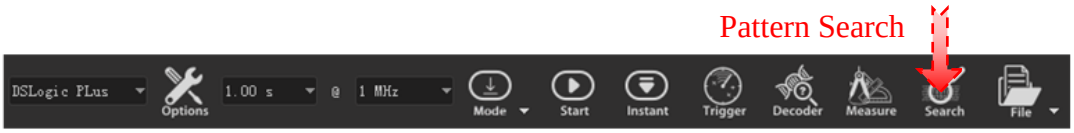


Figure 2-26

As Figure 2-26 shows, click **Search** button, the search toolbar will be open at the bottom of the window, as Figure 2-27 shows.

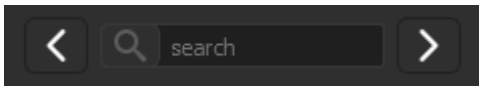


Figure 2-27

Click the search text editor, a setting window will pop up. For example, as Figure 2-28 shows, this pattern indicate to search rising/falling edge of channel 0. Click **OK** to set the search pattern. Then click pre/next button will jump to the pre/next edge of channel 0.

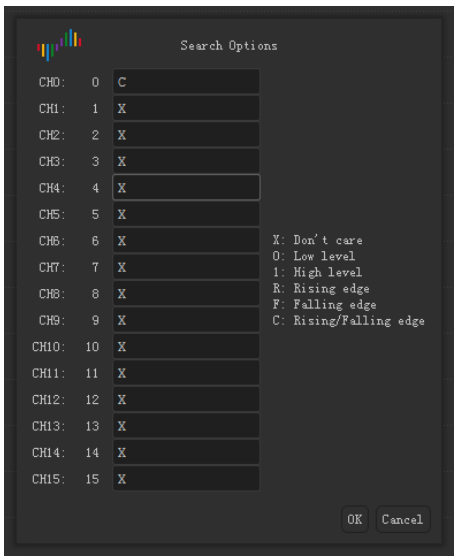


Figure 2-28

2.6.4 Channel Customization

- **Channel color/name:**

As Figure 2-29 shows, click color/name area to modify the color/name of specific channel.

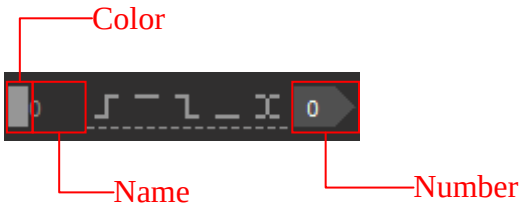


Figure 2-29

- **Channel move:**

As Figure 2-30 shows, move mouse above the **Number** label, there will be an arrow label show on it. Two methods can be used to move the channel:

Method 1: press and hold left button of mouse, move mouse to move channel, and then release the button to finish the move.

Method 2: click left button of mouse to grab channel, then channel will be moved with mouse, click again to release channel.

Figure 2-30

2.7 Measurement

DSView provide rich methods of measurement, and simple mouse operations can

complete most of the measurements, such as width, frequency, period, duty cycle and pulse count. Additionally, DSView support limitless cursors, which can be used to measure, mark and jump among data.

2.7.1 Width/Period/Frequency/Duty Cycle

As Figure 2-31 shows, when put mouse on any pulse in wave window, there will be a measurement window which shows width, period, frequency and duty cycle of current pulse.

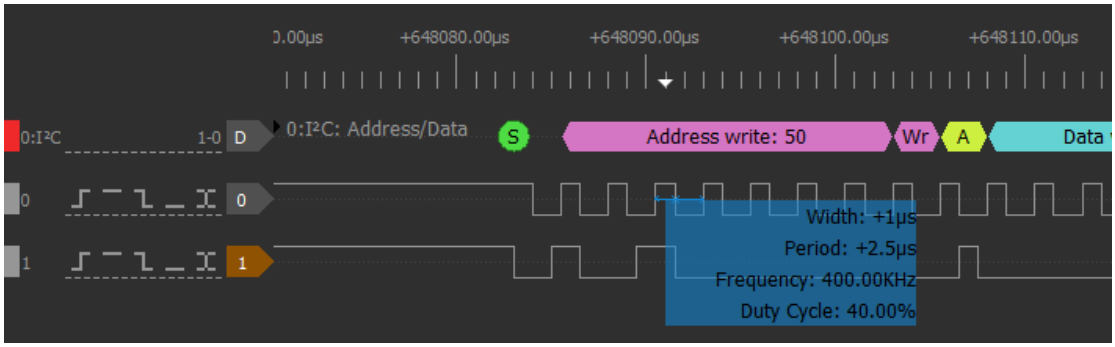


Figure 2-31

2.7.2 Pulse Counter

As Figure 2-32 shows, mouse operations can be used to count rising/falling/edges of any channel between any time intervals.

1. Move mouse to the measured channel (between high and low level) in wave window.
2. Move to the start point, click the left button of mouse
3. Move to the end point, there will be a measure window which shows count of rising/falling/edges.
4. Click the left button of mouse again to finish the measurement.

Figure 2-32

2.7.3 Edge distance

As Figure 2-33 shows, mouse operations can be used to measure distance between two edges.

1. Move mouse to the start edge, and click the left button of mouse
2. Move to the end edge, there will be a measure value which shows distance (time/samples).
3. Click the left button of mouse again to finish the measurement.

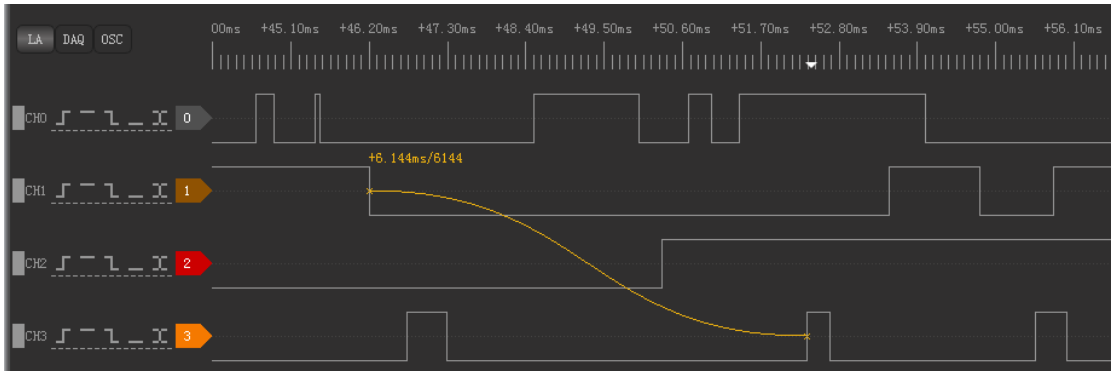


Figure 2-33

2.7.4 Cursor Insert

Method 1: in wave window, move mouse to target position, double click the left button of mouse. A new cursor will be inserted at the target position.

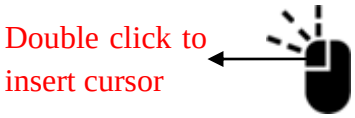


Figure 2-34

Method 2: in time ruler area, move mouse to target position, click the left button of mouse, there will be a down arrow, click the left button of mouse within the arrow area. A new cursor will be inserted at the target position.

Figure 2-35

2.7.5 Cursor Move

Method 1: move mouse to the target cursor, click the left button of mouse to select the cursor, then the cursor will follow the mouse movement, click the left button again to put the cursor at the target position. If want to put the cursor on edge of any signal,

just move mouse near to the edge, the cursor will be snapped to the edge automatically.

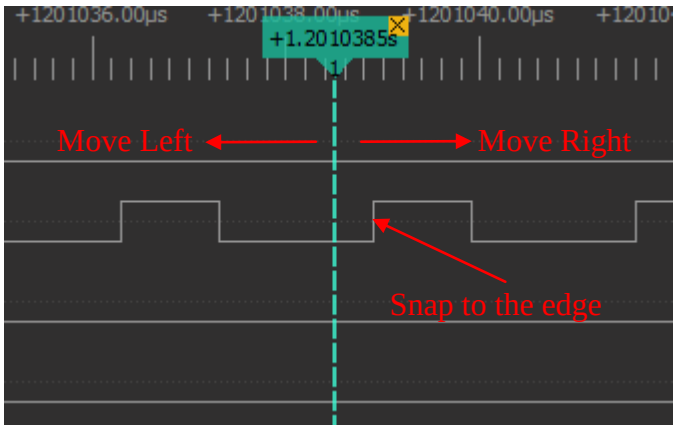


Figure 2-36

Method 2: in time ruler area, move mouse to the target position, click the left button of mouse, all existing cursors will be listed, click the number of the target cursor will put it at the target position.

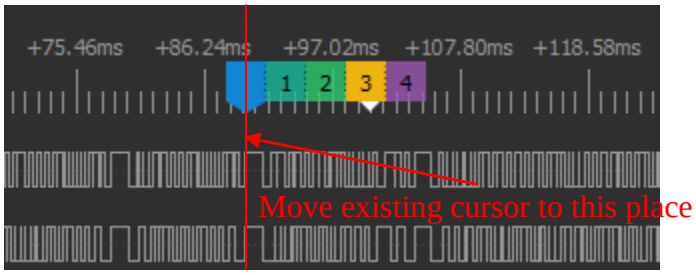


Figure 2-37

2.7.6 Cursor Jump

Cursor can be used to mark important position. DSView provide a simple method to jump among any existing cursors. Click the right button of mouse in any time ruler area, all existing cursors will be listed, click number of the target cursor will jump to this cursor's position.

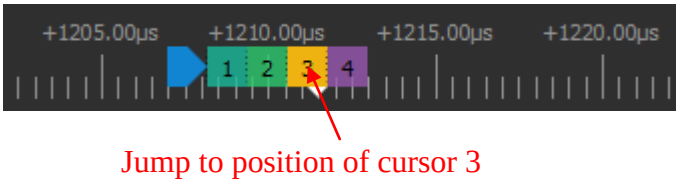


Figure 2-38

2.7.7 Cursor Measure

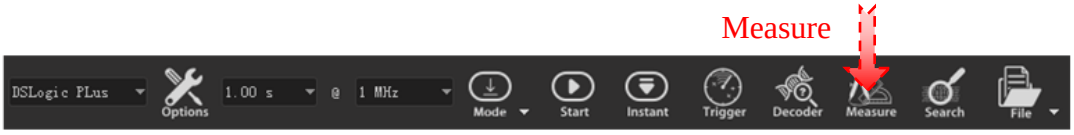


Figure 2-39

As Figure 2-40 shows, Click **Measure** button, measure dock will be opened. There are two measure groups: distance measure and edges counter.

Distance measure: this can be used to measure the time or sample count between two cursors. Click + button to add a new set of distance measurement, and then click the start/end area to select the start/end cursor individually.

Edges counter: this can be used to count edges between tow cursors on specific channel. Click + button to add a new set of edges counter, and then select start/end cursor and channel number to be measured.

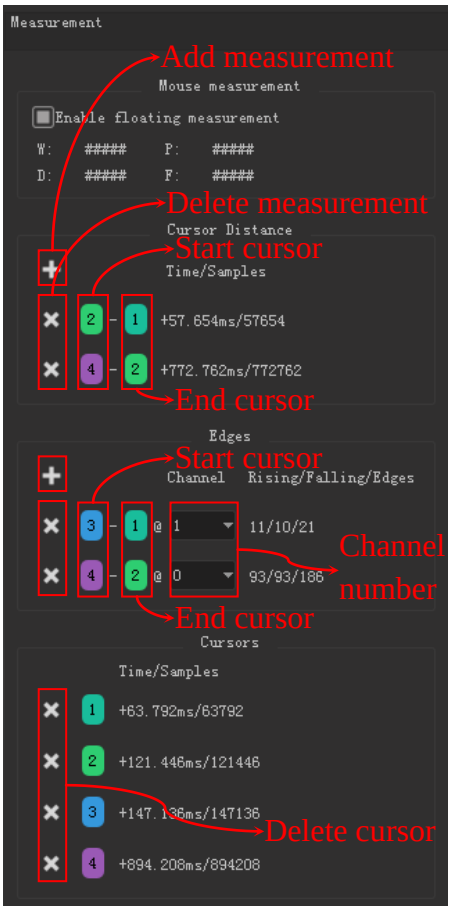


Figure 2-40

2.7.8 Delete Cursor

As Figure 2-41 shows, click the '×' area of any cursor will delete the cursor, and remain cursors will be renumbered.

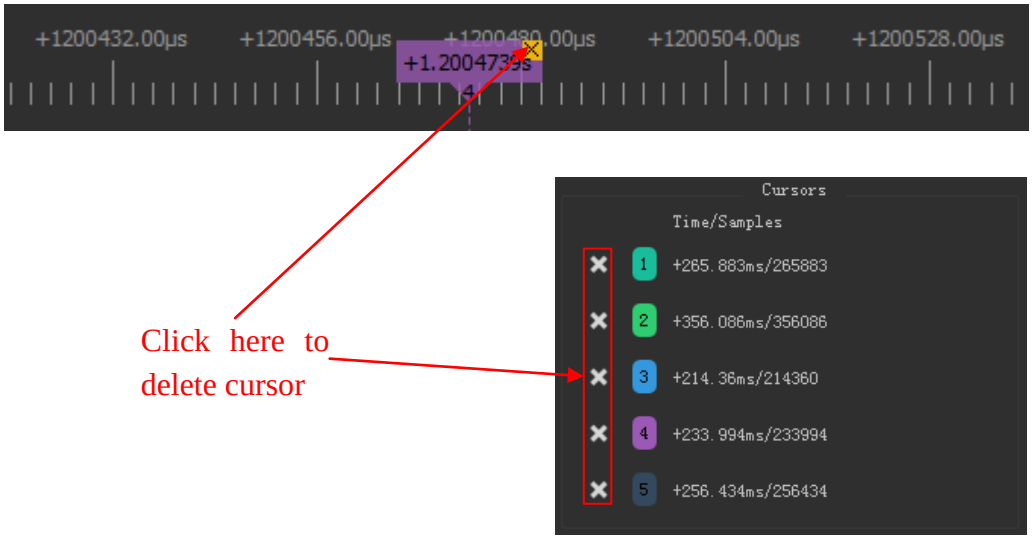


Figure 2-41

2.8 Protocol Decoder

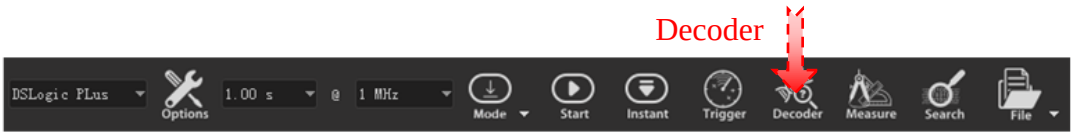


Figure 2-42

Click **Decoder** button, decoder dock will be opened. As Figure 2-43 shows, decoder dock consists of two parts: decoder select, and protocol list viewer.

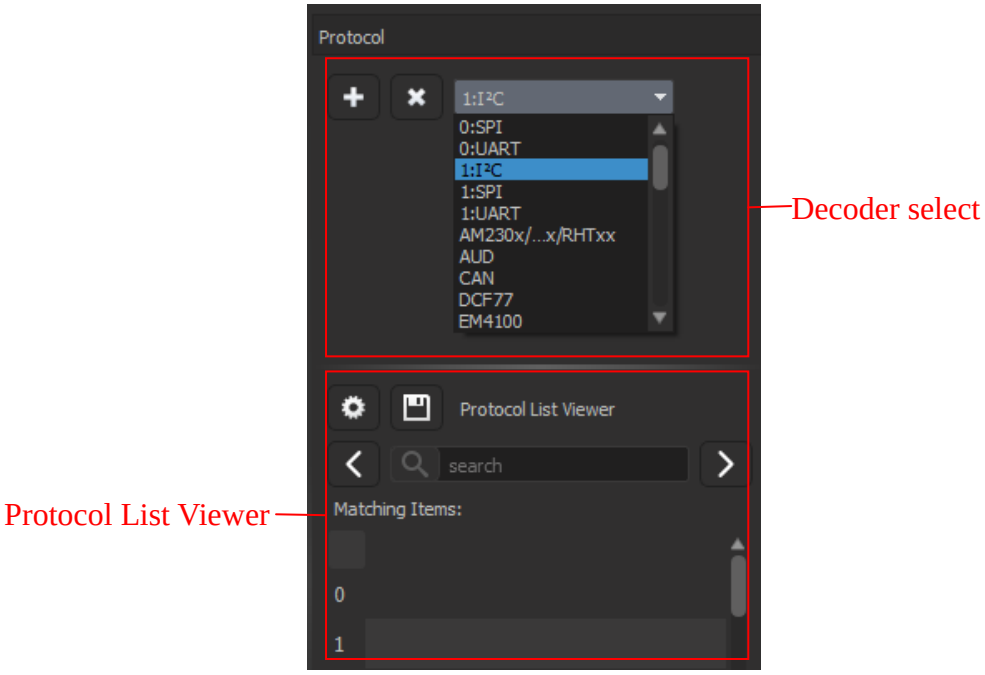


Figure 2-43

2.8.1 Add Decoder

Select the target decoder in the combobox, click the '+' button, the setting window of this decoder will be opened. For example, Figure 2-44 shows the setting window of I2C decoder. After completion these settings, click **OK** to add this decoder. If data is ready, DSView will start to run the decoder and show the decoder results in wave window. More decoders can be added using the same operations.

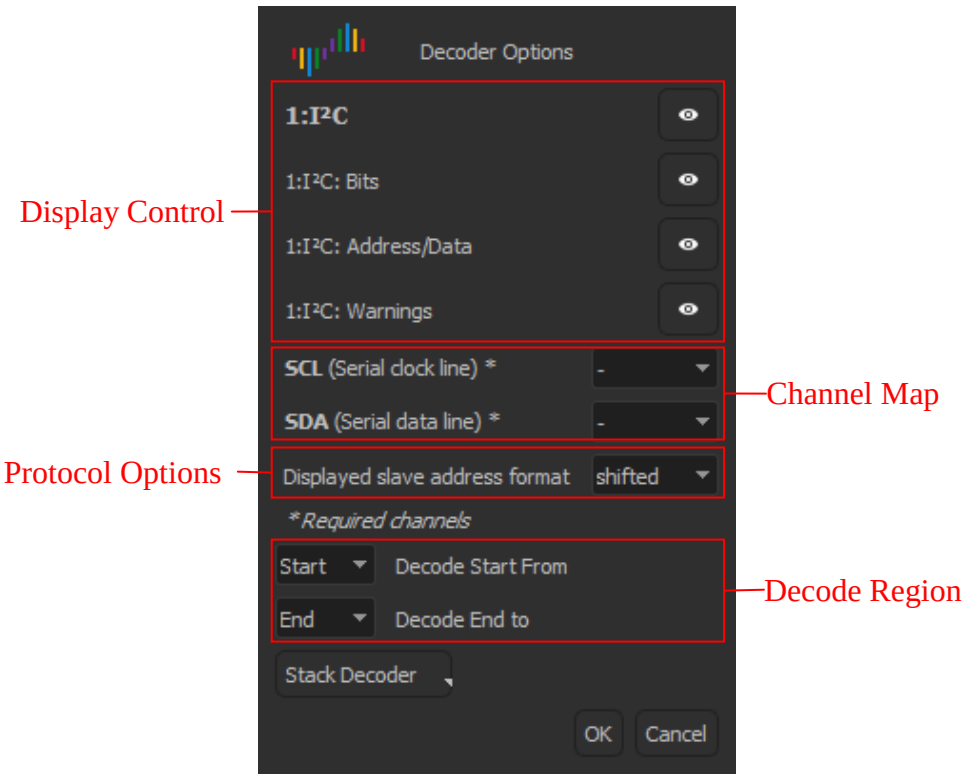


Figure 2-44

By default, decoder will be executed from start to end for current capture. If want to decode part of the data, any cursor can be set to the start or end point. As Figure 2-45 shows, cursor 2 is set to be the end point, so data after cursor 2 will not be decoded.

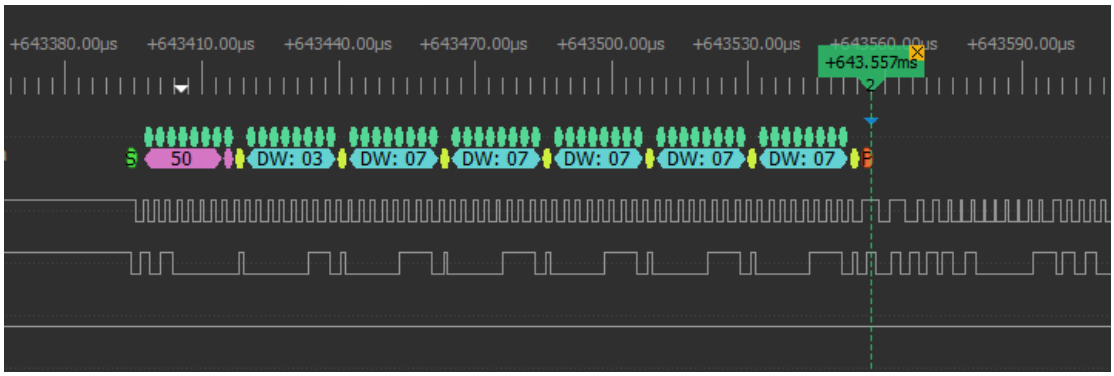


Figure 2-45

2.8.2 Stack Decoder

Stack decoder can be used to decode complex protocol. Click **Stack Decoder** in Figure 2-44 can select the top decoder based on current base decoder.

CAUTION

Decoders with prefix '0:' are optimized for speed-prefer, and don't support stack decoder. Additionally, there is a consistent match between top decoder and base decoder. Please refer to this url (http://www.sigrok.org/wiki/Protocol_decoders) for details. Wrong match will lead to an unexpected result.

For example, as Figure 2-46 shows, I2C decoder is the base decoder, 24xx EEPROM decoder is the top decoder. This can help us focus on high-level transitions not the low-level details.

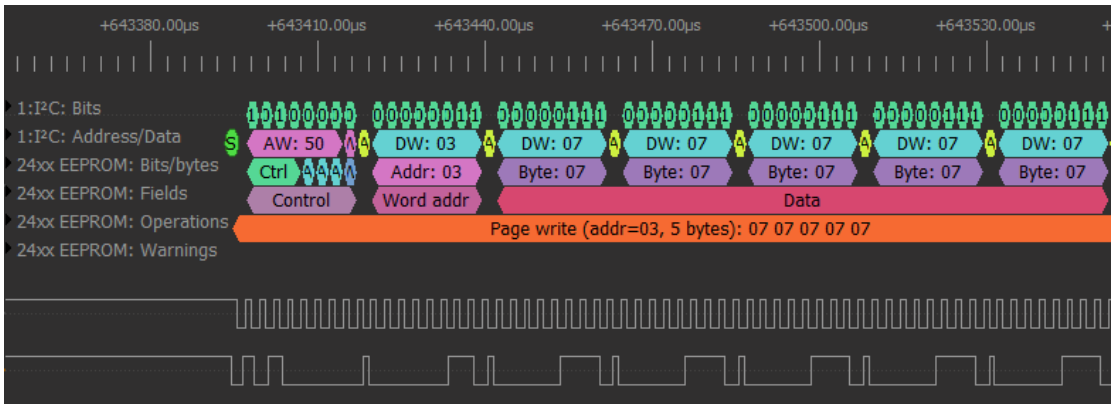


Figure 2-46

2.8.3 List Viewer

List viewer is a necessary complement of graphic display of decoder results. List viewer support rapid location and contents search to better navigate the decoder results.

As Figure 2-47 shows, click on any row of the list viewer can map to the same location in the wave window. Meanwhile, click button, can highlight certain row in list viewer, which mapping current location of wave window.

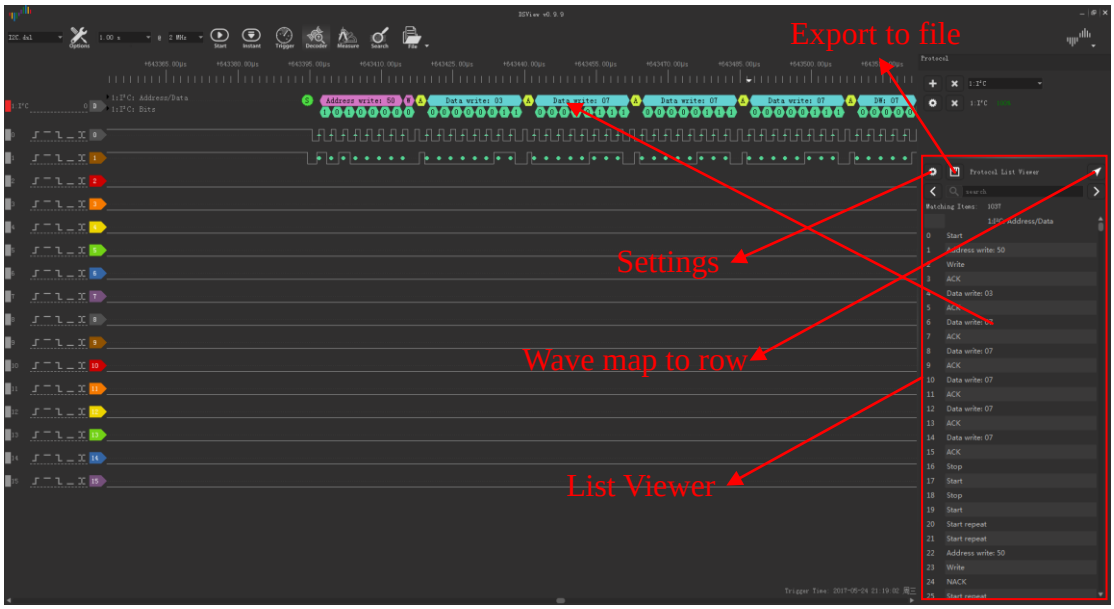


Figure 2-47

2.8.4 Search Results

As Figure 2-48 shows, input the keyword in the search text editor, and click pre/next button will find the previous and next row including the keyword, and also move the wave to corresponding location.

If one row has been selected, pre/next button will search the keyword base on this location.

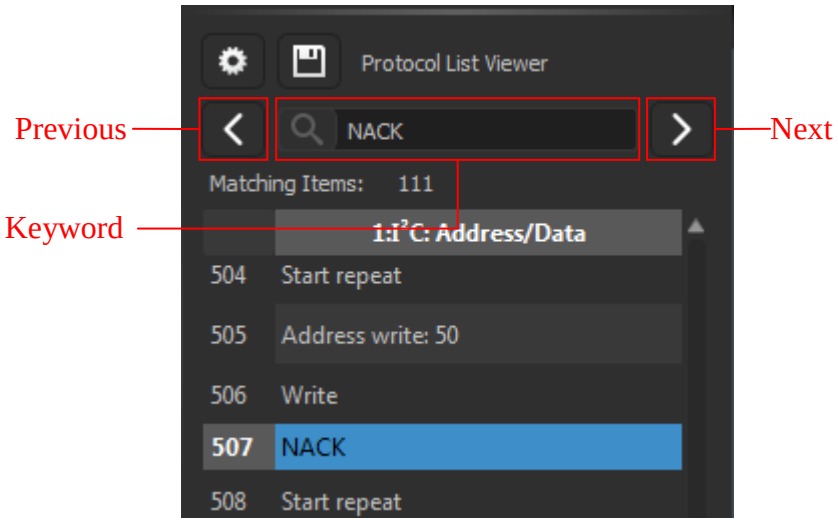


Figure 2-48

If want to search multi-bytes data in the decoder results. Symbol "-" should be used. For example, "70-70-70" indicates three consecutive data. As Figure 2-49 shows, click pre/next button will find out all "70-70-70" operations.

CAUTION *Currently, DSView only support multi-bytes data search for UART/I2C/SPI decoders.*

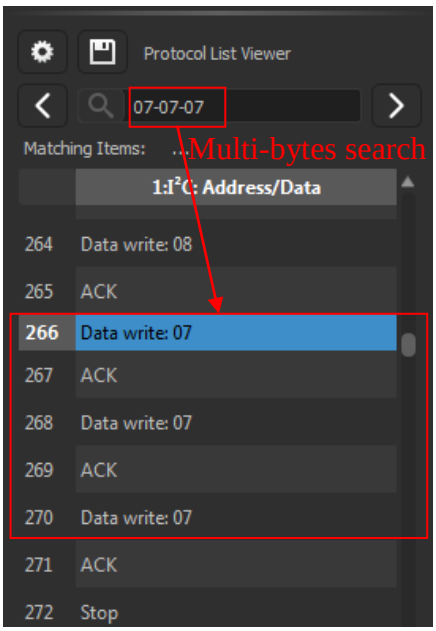


Figure 2-49

2.8.5 Export Results

DSView support export decoding results to a file. As Figure 2-50 shows, click the save button, select file format and target column to export. Currently, support csv and txt file format.

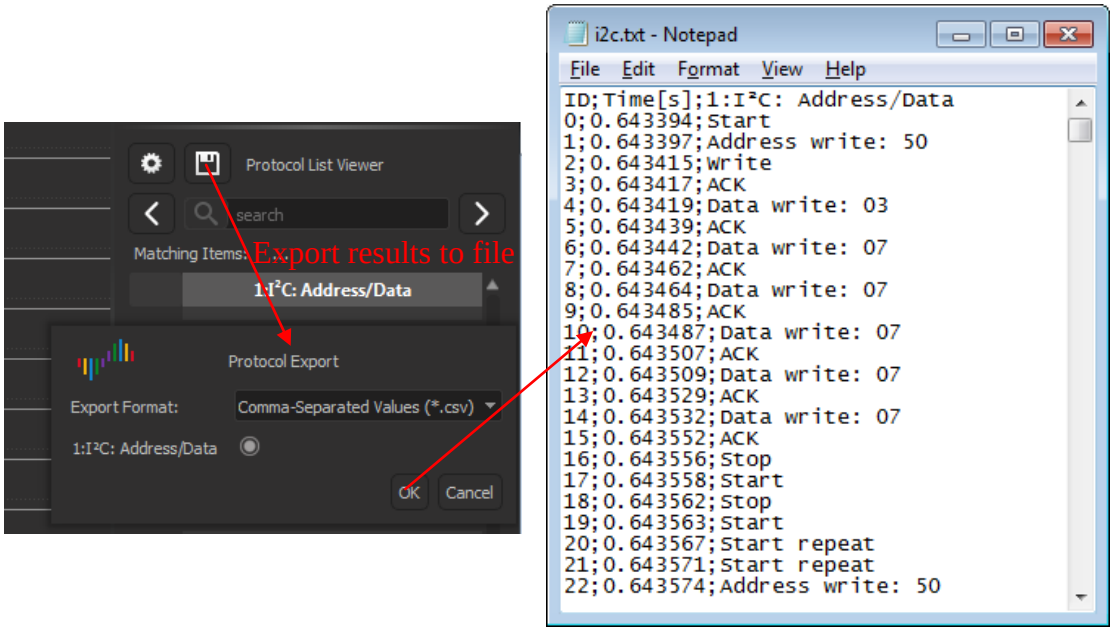


Figure 2-50

2.8.6 Delete Decoder

To delete specific decoder, click the "×" button near the decoder. If want to delete all of existing decoders, click the "×" button near the decoders select combobox.

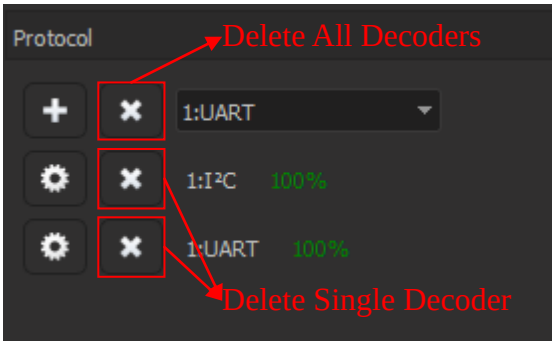


Figure 2-51

2.9 File Operation

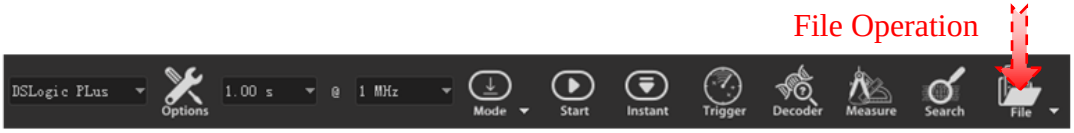


Figure 2-52

Click **File** button, file related operations will be popped up, as Figure 2-53 shows. DSView support settings store/load, data save/open, data export, screen shot operations.

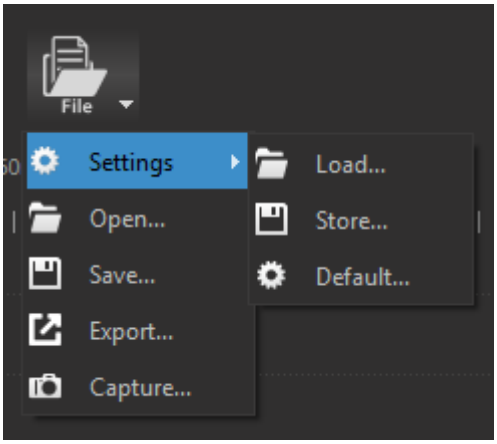


Figure 2-53

2.9.1 Setting Store/Load

Settings are current configurations, include device options, enable, color and name of channels, and trigger settings. Click **Settings** > **Store** will save current settings to file. When click **Settings** > **Load**, select corresponding settings file, saved settings will be loaded in current session.

Settings > **Default** will load default configurations, used to recovery to factory default condition. Meanwhile, DSView support auto save of settings. When open software, last settings before previous close will be loaded automatically.

2.9.2 Save

File > **Save** will save current data to be a resolvable file format. So DSView can open it later.

2.9.3 Open

DSView only support open file with dsl suffixes, which generated by DSView itself. Just click **File** > **Open**, select *.dsl file, data will be reload, and rendered in the wave

window.

2.9.4 Export

DSView also support export current data to be a common file format. So captured data can be loaded into other software. In LA mode, formats of csv, vcd and gnuplot, etc. are supported when using **File** > **Export**.

2.9.5 Screen Shot

If want to save current window to be a picture, click **File** > **Capture**. This will generate a PNG file.

3 Oscilloscope

3.1 Hardware Connection

1) Connect DSCope to PC's USB port, and check the LED indicator has been lit up.

CAUTION *In order to achieve the best data transfer performance, please use the original or short and good quality USB cable, connect to the native port of the motherboard, and try to avoid using ports of extended hub.*

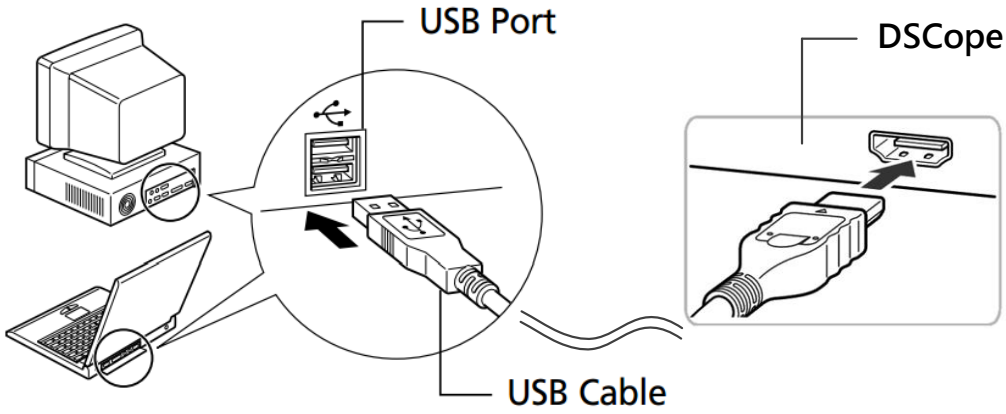


Figure 3-1

2) Open DSView software (please wait for driver search of windows system on first use), check the LED indicator become green, and DSView show the correct device name.

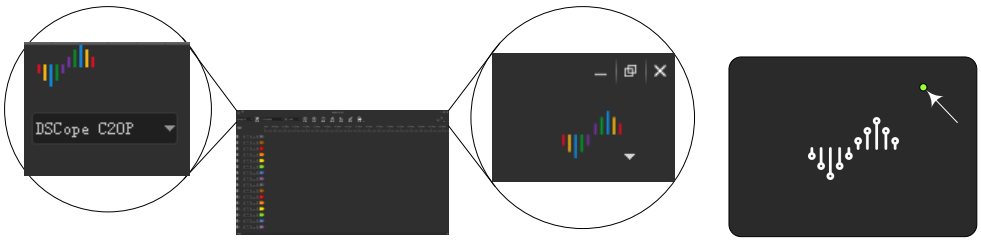


Figure 3-2

3) Connect probes to the MCX port of oscilloscope. DSCope has two standard MCX connectors.

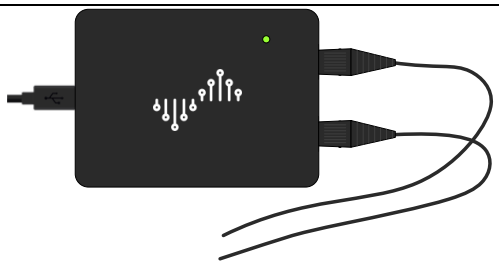


Figure 3-3

4) According to the requirement of measurement, connect ground terminal of probe to ground panel of target system. Be careful of the attenuation rate of the probe.

CAUTION

Ground of probe, oscilloscope and PC are connected together. In order to avoid any damage, please make sure that the ground of target system has the same electric potential with the ground of probe.

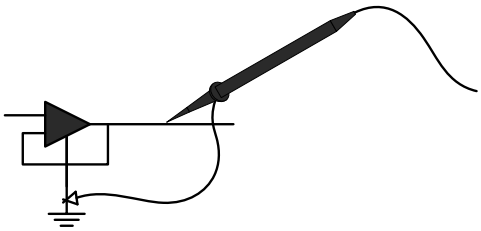


Figure 3-4

3.2 Hardware Options

Click **Options** button (Figure 3-5).

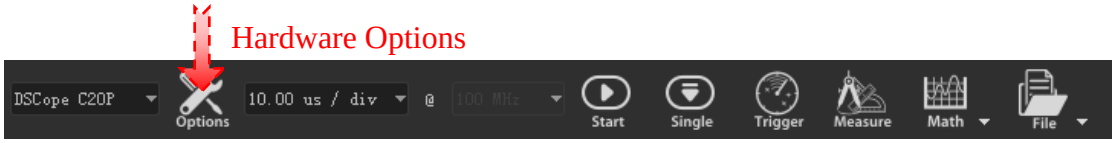


Figure 3-5

Device options window will be opened (Figure 3-6).

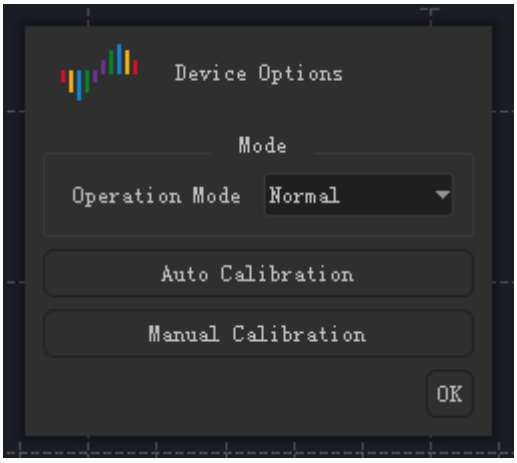


Figure 3-6

3.2.1 Operation Mode

As Figure 3-6 shows, please check that the operation mode have been set to be “Normal”. “Internal Test” mode is only allowed in test.

3.2.2 Auto Calibration

In order to maintain a high precision in different environment with various temperature and humidity, oscilloscopes need calibration of parameters. DSView support two calibration methods: auto and manual.
Click **Auto Calibration** button in Figure 3-6, a message window (Figure 3-7) will be shown.

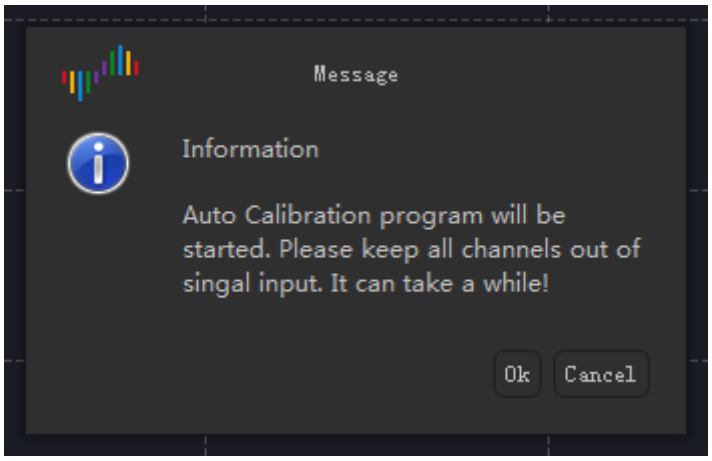


Figure 3-7

Please make sure that there are no connections on BNC connectors of DSCope. Click **OK** button will start the auto calibration process. This will take few minutes. When finished, as Figure 3-8 shows, a **Save** button will appear on the window. Click **Save** button will save this calibration results permanently. Click **Abort** button during auto calibration, will abort the process, and last saved results will be loaded automatically.

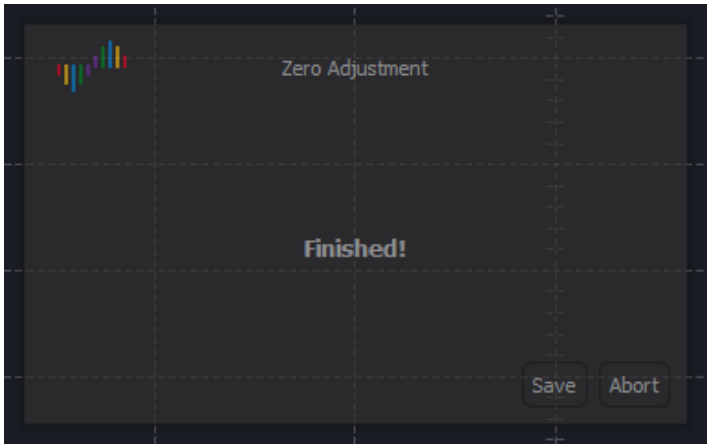


Figure 3-8

3.2.3 Manual Calibration

DSView also support manual calibration. Click **Manual Calibration** button, a setting window, as Figure 3-9 shows, will appear on top of the main window. There are two parameters (voltage gain and offset) for each channel, which can be adjusted.

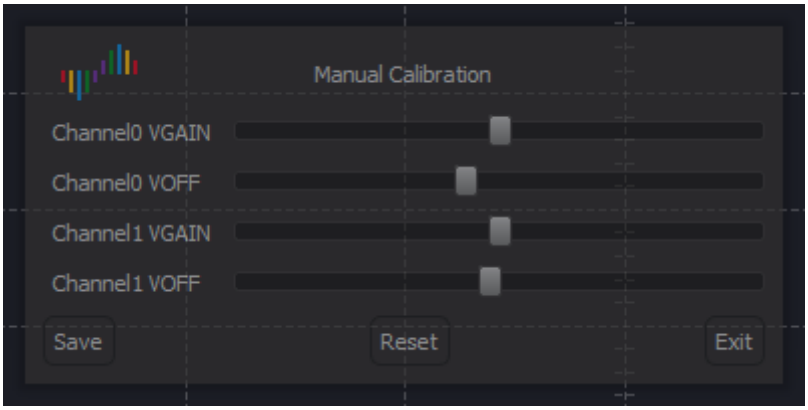


Figure 3-9

Manual calibration need to be processed at each vertical scale individually. In order to observe the real-time adjusted results, DSView should be in running status.
Followings are the detail steps.

1. Click **Manual Calibration** button to show the setting window.
2. Click **Start** button to show current waveform. For offset adjustment, connect input to ground; for gain adjustment, connect input to a calibrated signal.
3. Adjust vertical scale to the target position.
4. Tuning corresponding slider until the waveforms reach the final requirements.
5. If there is other vertical scale needs to be adjusted, return to step 3.
6. When finished, click **Save** button, calibration results will be saved permanently; click **Reset** button, calibration results will be abandoned, and previous settings will be loaded; click **Exit** button, calibration results will be valid temporally until hardware be plugged out, previous settings will be loaded in the next plug in.

3.3 Capture

3.3.1 Channel Customization

As Figure 3-10 shows, color, enable, coupling, attenuation compensation and vertical scale can be set for each channel.
There are two methods to turn the dial.
Method 1: put mouse in the dial area, and roll the wheel
Method 2: put mouse on the top/bottom area of the dial, click the left button of the mouse, dial will be turned up/down.

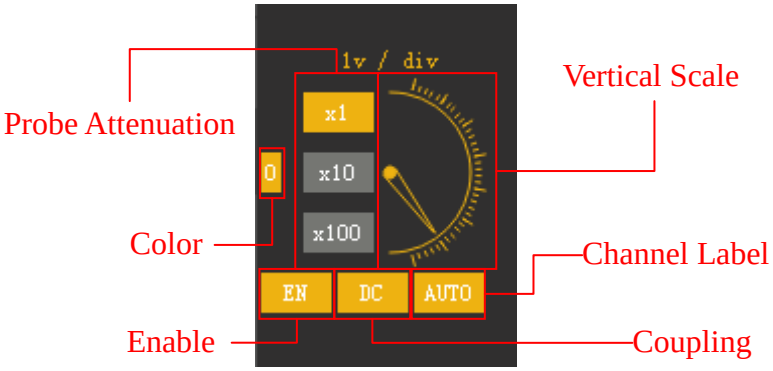


Figure 3-10

Move mouse above the channel label, press the left button of mouse, the vertical offset of the channel will be changed along with the mouse move.
To autoset the waveform of certain channel, click the **AUTO** button.

3.3.2 Horizontal Resolution

As Figure 3-11 shows, this combobox can be used to set horizontal resolution. Additionally, roll the wheel of mouse in wave windows will also change horizontal resolution.

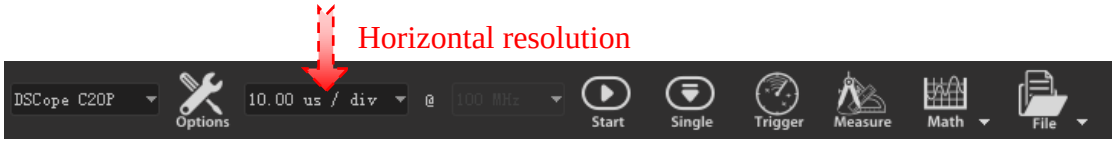


Figure 3-11

3.3.3 Run/Stop

As Figure 3-12 shows, click **Start** button, oscilloscope will start to capture data and show waveform in real-time, and this button will become **Stop**, click it again will stop running and show the last waveform.

Figure 3-12

3.3.4 Single Capture

As Figure 3-13 shows, click **Single** button, oscilloscope will capture data once, show

the waveform, and stop automatically.

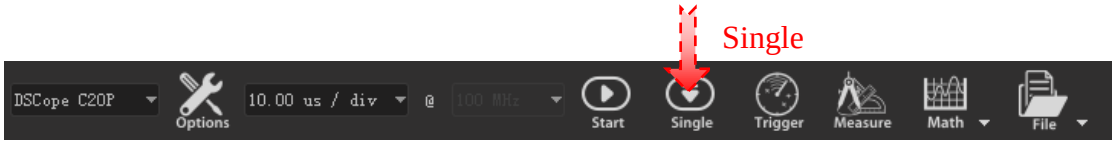


Figure 3-13

3.3.5 Trigger

As Figure 3-14 shows, DSView support simple edge trigger mode, and also support setting of trigger level, trigger position, hold off time and noise sensitivity.

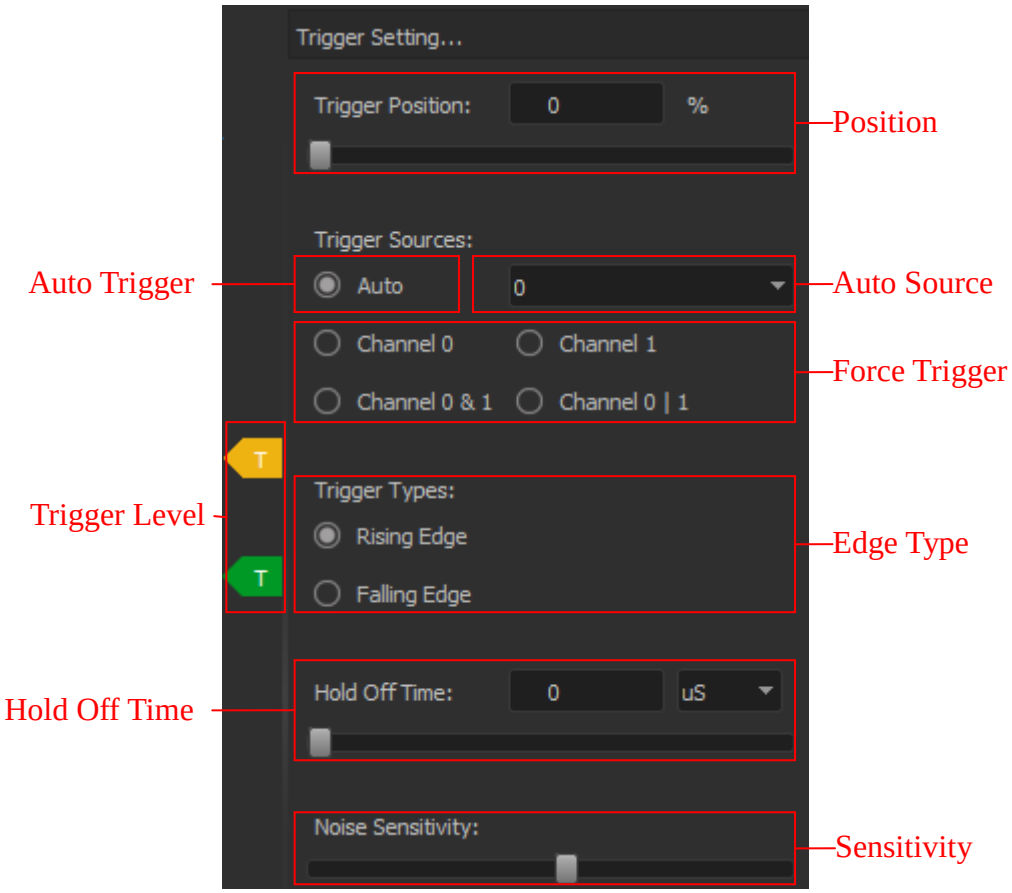


Figure 3-14

Trigger level: trigger level decides the trigger voltage. Each channel has its own trigger level. Click the trigger level label to select it, move mouse to change the trigger level, and click again to finish setting.

Trigger Position: trigger position decide the position percentage in the whole sample duration. For example, 50% indicate trigger point in the middle of the wave.

Auto Trigger: auto trigger will set or cancel trigger setting according to current waveform and trigger level setting. Auto source will decide the channel of auto trigger.

Hold Off Time: Trigger hold off specifies the length of time after a trigger before the

next trigger can occur. It can be of great assistance in observing and analyzing modern signals that are often packetized, or bursty in nature.

Noise Sensitivity: slider in the most left indicate highest sensitive. Any transition through the trigger level will kick off the trigger. Slider in the most right indicate lowest sensitive, only wide range of transition through the trigger level will kick off the trigger, so noise transitions can be filtered out.

3.4 Measurements

3.4.1 Auto Measurements

As Figure 3-15 shows, DSView support auto measurement of frequency, period, maximum voltage, minimum voltage, RMS of voltage and peak to peak voltage. Click the **Eye** button, measure window can be shown or hidden. Click the **Gear** button, each measure item can be opened or closed.

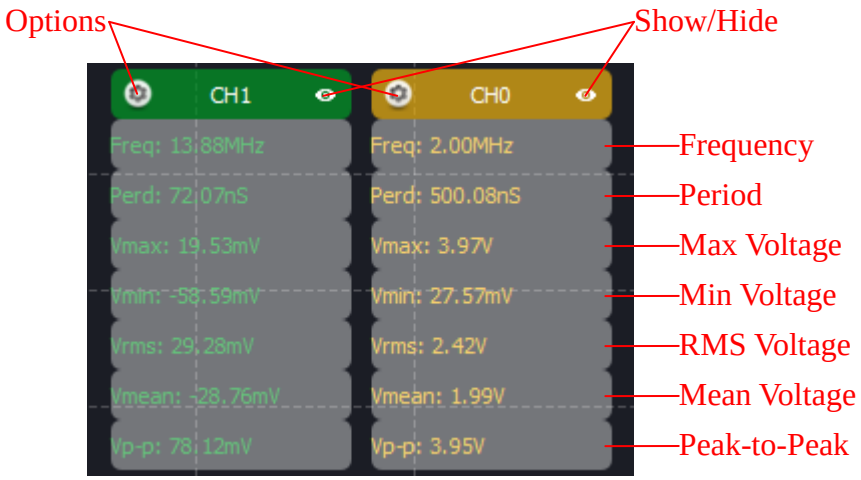


Figure 3-15

3.4.2 Mouse Measurements

DSView also support manual measurement by mouse operations.

Voltage Measurement: As Figure 3-16 shows, in the wave window, move mouse to the target point of the waveform, the voltage of this point will show on the screen.

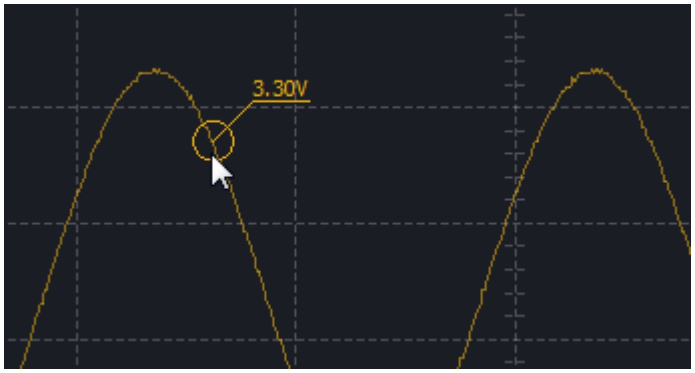


Figure 3-16

Horizontal Measure Ruler: in blank area of the wave window, move mouse to the start point, double click the left button of mouse, move mouse to the next point, double click again, and then move mouse to the end point, double click and finish setup the horizontal measure ruler. As Figure 3-17 shows, horizontal measure ruler can be used to measure width, frequency and duty cycle. This ruler can be cleared by double click in the wave window.

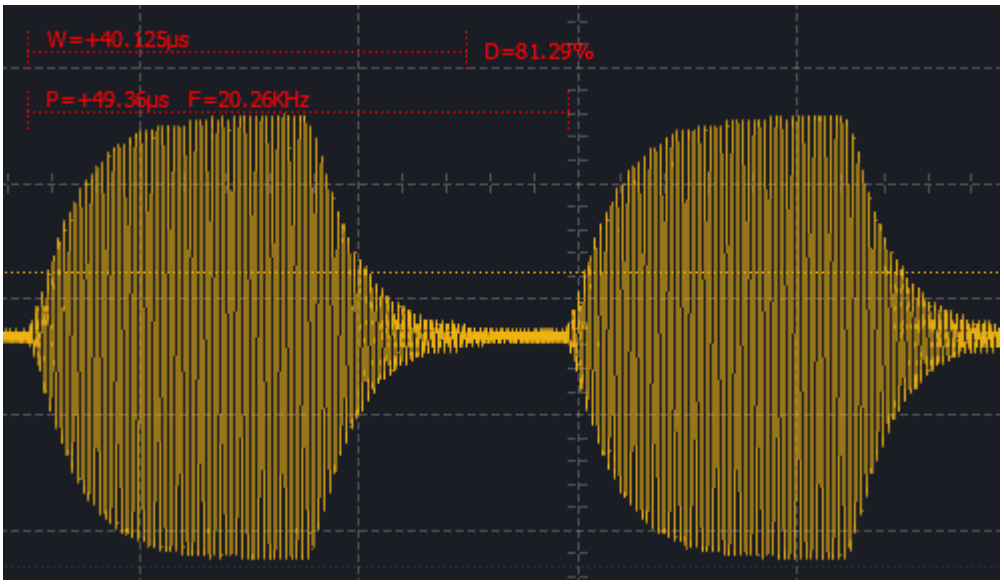


Figure 3-17

Vertical Measure Ruler: like voltage measurement, move mouse to the start point of the waveform, click the left button of mouse in the circle appeared, and then move mouse to the end point, click the left button of mouse again to finish setup the vertical measure ruler. During setup, clock the right button of mouse will cancel the setup.

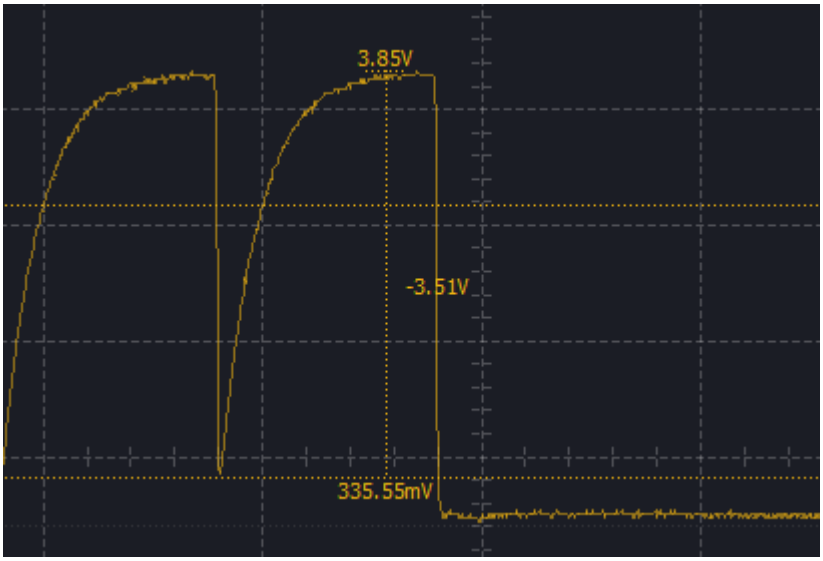


Figure 3-18

3.4.3 Cursor Measurements

Cursor Insert: in time ruler area, move mouse to target position, click the left button of mouse, there will be a down arrow, click the left button of mouse within the arrow area again. A new cursor will be inserted at the target position.

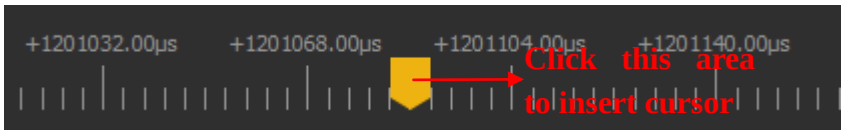


Figure 3-19

Cursor Move:

Method 1: move mouse to target cursor, click the left button of mouse to select the cursor, then the cursor will follow the mouse movement, click the left button again to put the cursor at the target position.

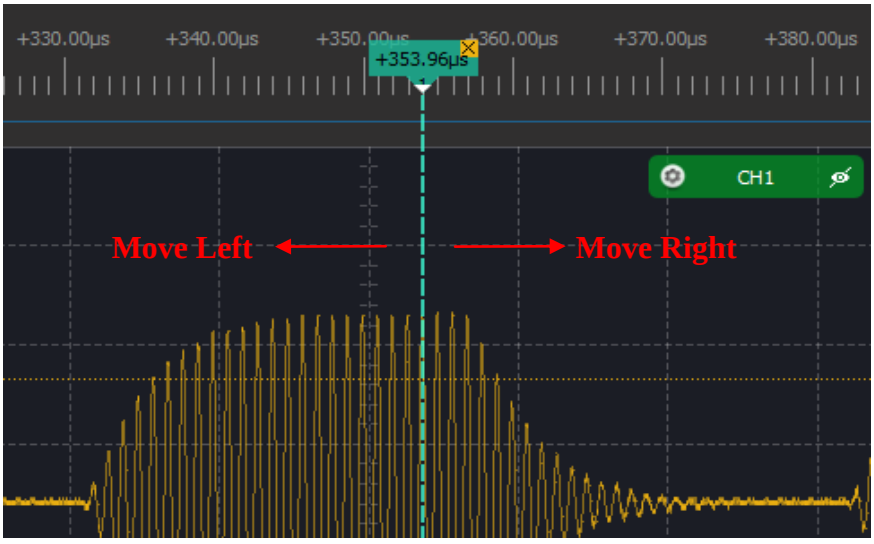


Figure 3-20

Method 2: in time ruler area, move mouse to the target position, click the left button of mouse, all existing cursors will be listed, click the number of the target cursor will put it at the target position.

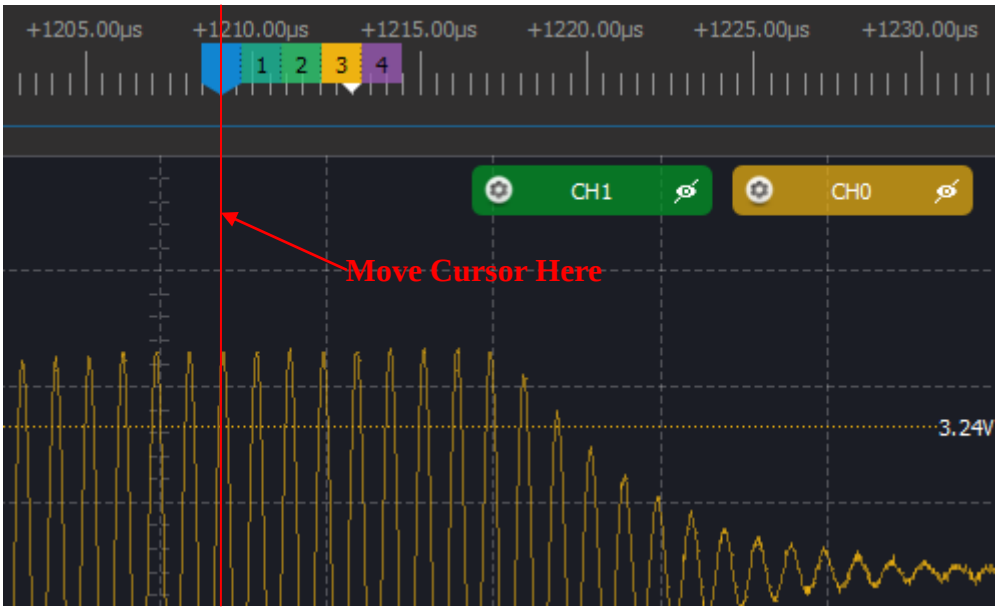


Figure 3-21

Cursor Jump: Cursor can be used to mark important position. DSView provide a simple method to jump among any existing cursors. Click the right button of mouse in time ruler area, all existing cursors will be listed, click number of the target cursor will jump to this cursor's position.

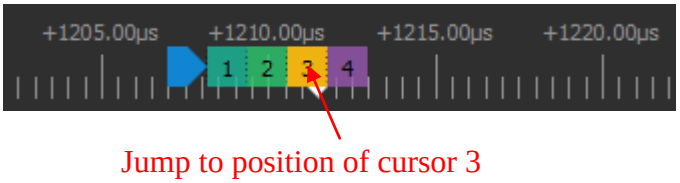


Figure 3-22

Cursor Measurement:

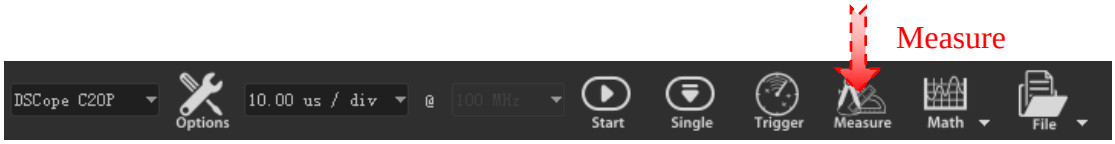


Figure 3-23

As Figure 3-23 shows, Click Measure button, measure dock will be opened. Only the distance measure is valid in OSC mode.

Distance measure: this can be used to measure the time or sample count between two cursors. Click button to add a new set of distance measurement, and then click the start/end area to select the start/end cursor individually.

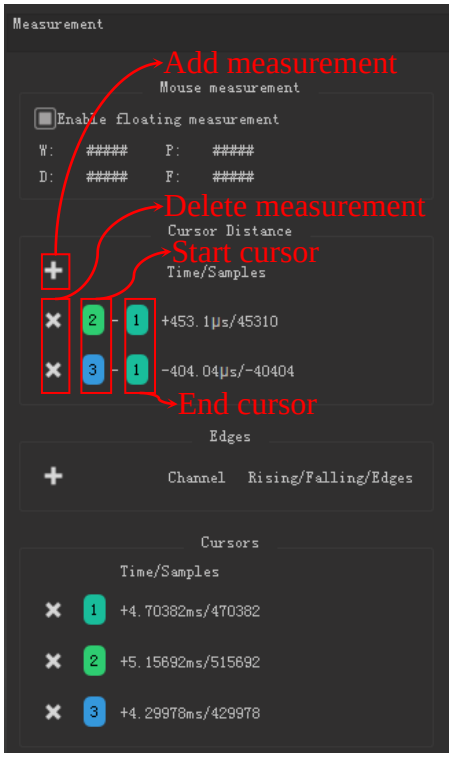


Figure 3-24

Cursor Delete: As Figure 3-25 shows, click the '×' area of any cursor will delete the cursor, and remain cursors will be renumbered.

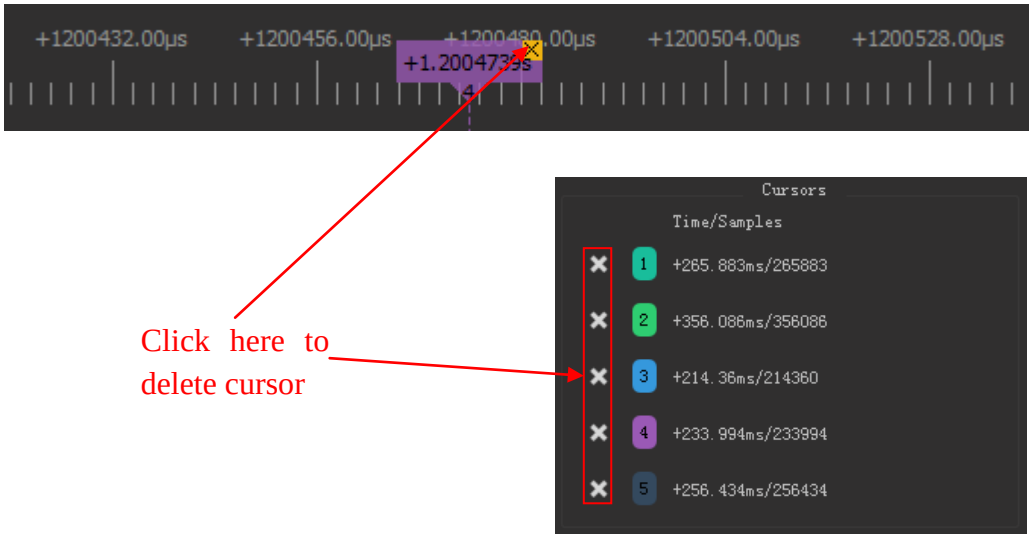


Figure 3-25

3.5 Spectrum Analysis

3.5.1 FFT Options

As Figure 3-26 shows, click **FFT** item under **Math** menu, **FFT Options** window will

be opened. Followings are the detail introductions of these options.

FFT Enable: enable the spectrum analysis window or not.

FFT Length: the length of FFT. Calculate from zero sample time.

Sample Interval: set the interval between each data point used for FFT. This can be used to reduce the spectrum range, and increase the spectrum resolution.

FFT Source: channel source for FFT.

FFT Window: set the window function when calculate the FFT result. Support rectangle, Hann, Hamming, Blackman and Flat-top window.

DC Ignored: ignore DC component.

Y-axis Mode: display mode for Y-axis. Support DBV or linear mode.

DBV Range: set the display range of DBV mode.

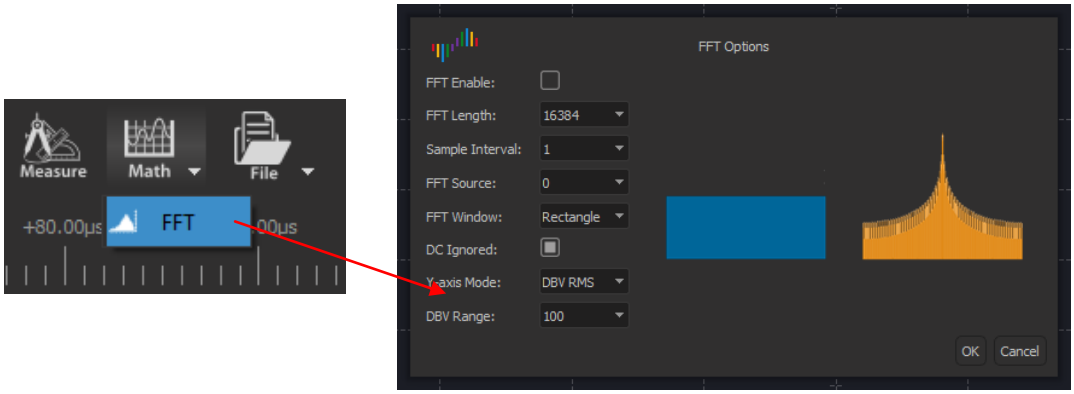


Figure 3-26

3.5.2 Navigating Spectrum

As Figure 3-27 shows, spectrum window display below the wave window.

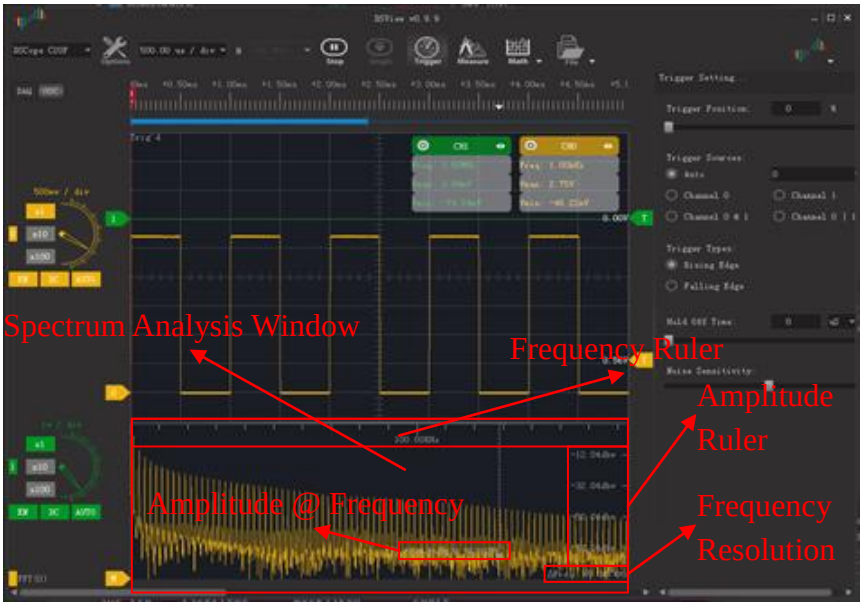


Figure 3-27

Spectrum window support following operations:

Height Adjustment: move mouse to the middle of wave window and spectrum

window, when mouse change to the shape showed in Figure 3-28, press the left button of mouse, and move mouse will change the height of spectrum window.

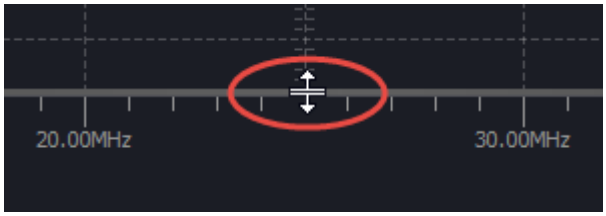


Figure 3-28

Spectrum Zoom: in spectrum window, scroll the wheel of mouse, spectrum ruler will be zooming in/out. It's easy to observe the specific frequency component.

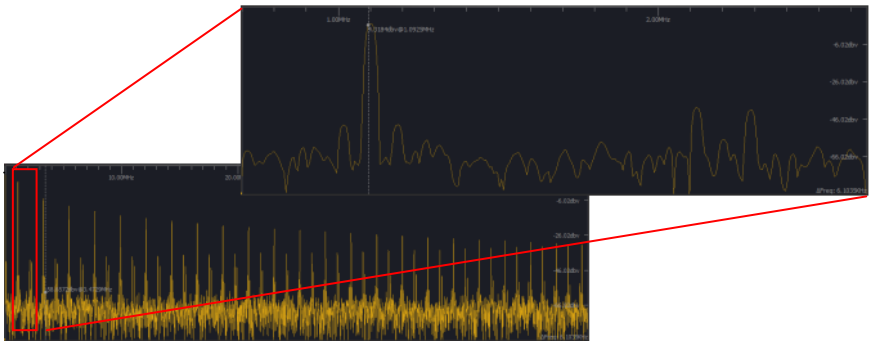


Figure 3-29

Mouse Measurement: As Figure 3-30 shows, in spectrum window, move mouse, the amplitude at the mouse point will be displayed.

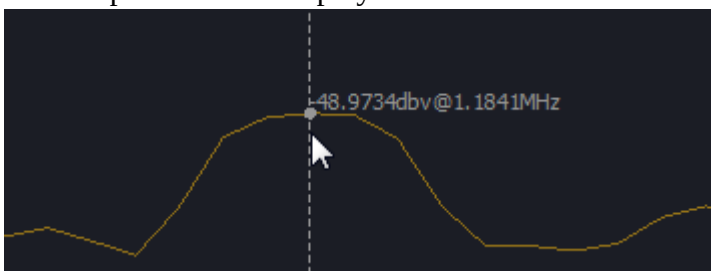


Figure 3-30

Window Panning: after zoom in, press the left button of mouse, and move mouse left/right, spectrum window will panning left/right.

3.6 File Operations

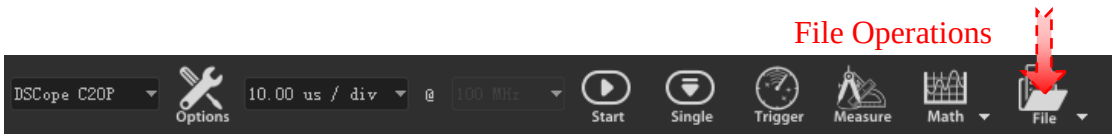


Figure 3-31

Click **File** button, file related operations will be popped up, as Figure 3-31 shows. DSView support settings store/load, data save/open, data export, screen shot operations.

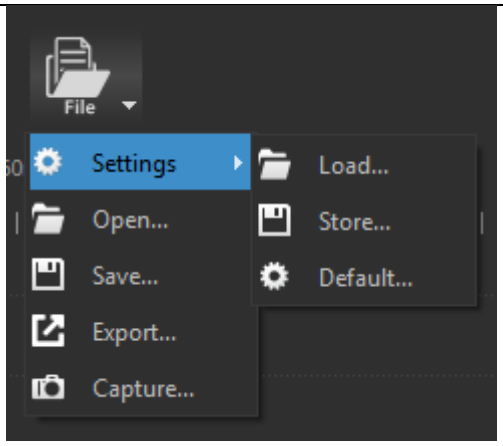


Figure 3-32

3.6.1 Setting Store/Load

Settings are current configurations; include device options, enable, color, name, vertical scale, time scale, coupling of channels and trigger setting. Click **Settings** > **Store** will save current settings to file. When click **Settings** > **Load**, select corresponding settings file, saved settings will be loaded in current session.
Settings > **Default** will load default configurations, used to recovery to factory default condition. Meanwhile, DSView support auto save of settings. When open software, last settings before previous close will be loaded automatically.

3.6.2 Save

File > **Save** will save current data to be a resolvable file format. So DSView can open it later.

3.6.3 Open

DSView only support open file with dsl suffixes, which generated by DSView itself. Just click **File** > **Open**, select *.dsl file, data will be reload, and rendered in the wave window.

3.6.4 Export

DSView also support export current data to be a common file format. So captured data can be loaded into other software. In DSO mode, only csv format is supported when using **File** > **Export**.

3.6.5 Screen Shot

If want to save current window to be a picture, click **File** > **Capture**. This will generate a PNG file.