

# Acute Logic Analyzer



Version: 2.7.8

Publish: 2016/2

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## Table of Contents

<b>Chapter 1</b>	<b>Installation</b>	<b>1</b>
	Hardware	2
	Software	4
	Driver	5
	Accessories	6
<b>Chapter 2</b>	<b>Operations</b>	<b>7</b>
	Window	8
	Auxiliary	12
	Easy Start	17
	Cursors	18
	Field Adjustment	19
	Hot Key Definition	20
	Data Storage	21
	Using External Clock to analysis state synchronizing	25
<b>Chapter 3</b>	<b>Functionality</b>	<b>27</b>
	File	28
	Label	34
	Waveform	40
	View	49
	Device	56
	Tools	94
	Help	99
<b>Chapter 4</b>	<b>Digital Data Logger</b>	<b>100</b>

How to use Digital Data Logger? .....	101
<b>Chapter 5 Miscellaneous .....</b>	<b>104</b>
Release Note .....	105
Notes .....	106
Tips .....	108
Questions .....	109
Troubleshooting .....	110

# Chapter 1 Installation

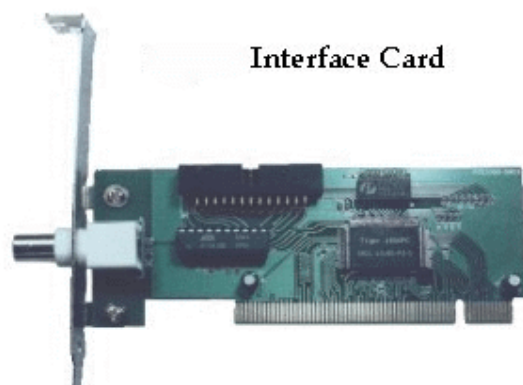
## Hardware

### The TravelLogic series or the PKLA1616+:

Connect the device with the PC. (USB port)

Insert the driver installation disc when the Windows OS detects the device.

### The LA2164P-2M with the PCI interface:



Open the PC case.

Insert the PCI interface card into the PCI bus of the PC.

Insert the device mainframe into the 5.25" floppy disk slot of the PC.



Connect the PCI interface card with the Data Port of the device. (PCI cable)

Plug the PC power connector (5V, 12V) into the power connector of the device. (4PDC-Jack cable)

**The LA2164P-2M with the USB interface or the printer port interface:**

Connect the device with the PC (printer round cable or USB2Printer cable).

Plug the power adapter into the LA power connector.

(For USB interface) Insert the driver disc for installation when the Windows OS detects the device.

(For Parallel interface) The parallel configuration is EPP mode in the BIOS setting.

**External Interface for the Pocket-LA/TravelLogic**

Connect the PC with the device. (USB port)

Insert the driver disc for installation when the Windows OS detects the device.

## Software

Insert the software disc into the CD-ROM drive.

Run Setup.exe.

## Driver

The driver setup for different combinations of the interface and Microsoft Windows OS is:

### **The printer port interface + Windows XP/ Vista/ 7/ 8:**

Run the software setup but the driver setup is needed.

### **The PCI/USB interface + Windows XP/ Vista/ 7/ 8:**

Follow step a-j below,

- a.** Turn on the PC after the hardware installation.
- b.** Insert the installation disk into the CD-ROM drive.
- c.** Double click "Add/Remove Hardware" in the Control Panel.
- d.** Choose "Add a Device", the Windows OS will check the PC's hardware device.
- e.** If there is no available hardware device, please select "Add a new device".
- f.** Choose "Display all devices" under Windows XP etc.
- g.** Click "Have Disk...".
- h.** Choose "Acute EPP & ISA Interface Driver" from the installation disk.
- i.** You will find the "Acute PC-based Instrument" item in the Device Manager.
- j.** If you still can't set up the driver, please check the FAQ on our web site at [www.acute.com.tw](http://www.acute.com.tw).



## **Accessories**

Connect the signal (A, B, C and D) to the LA2164P-2M ports A, B, C and D.

Connect the signal cable (16 pins) and the ground cable (2 pins) to each signal pod.

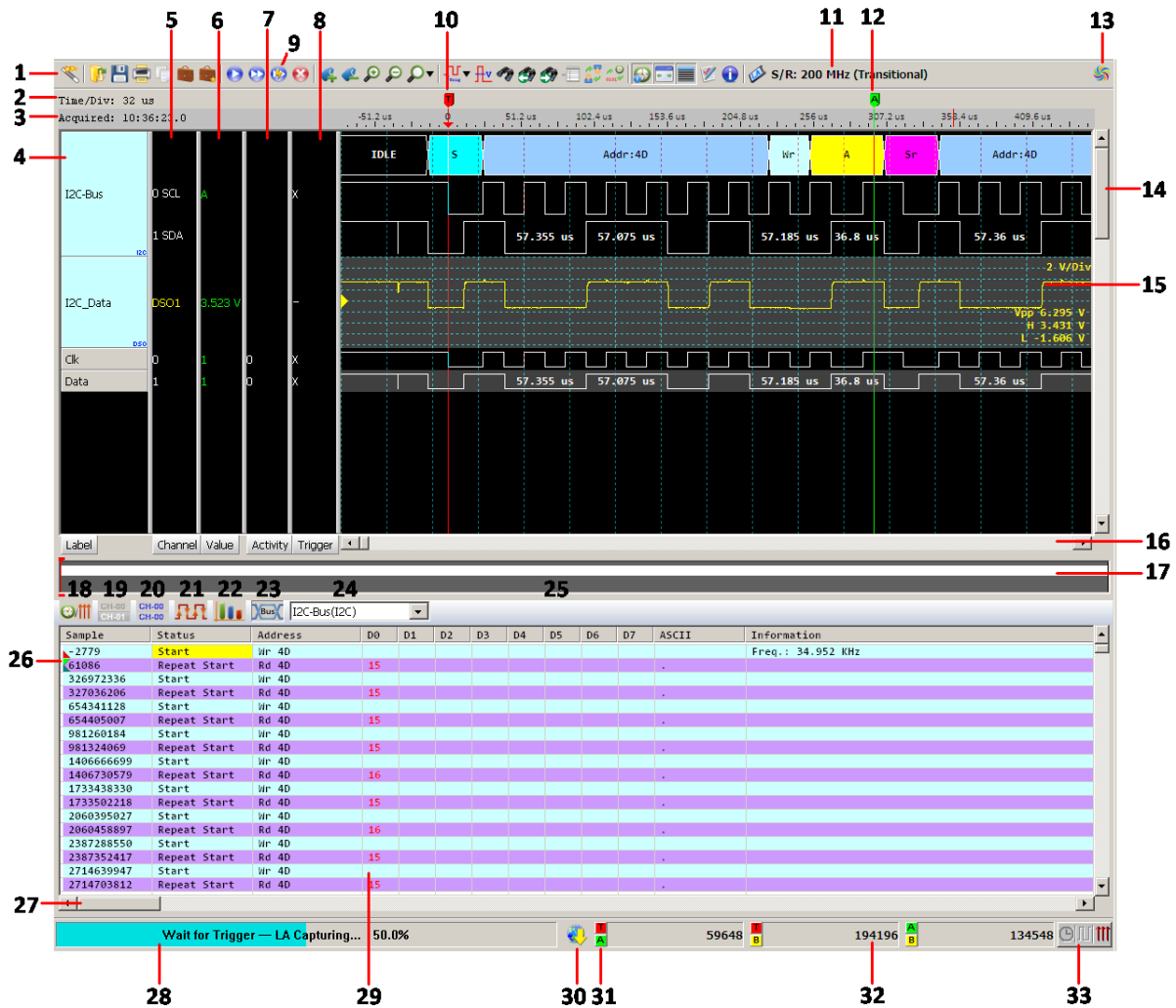
Connect the probes to the signal cable and the ground cable.

Connect the probes to the subject under test (the ground probes must be connected to the ground of the subject under test).

## Chapter 2 Operations

## Window

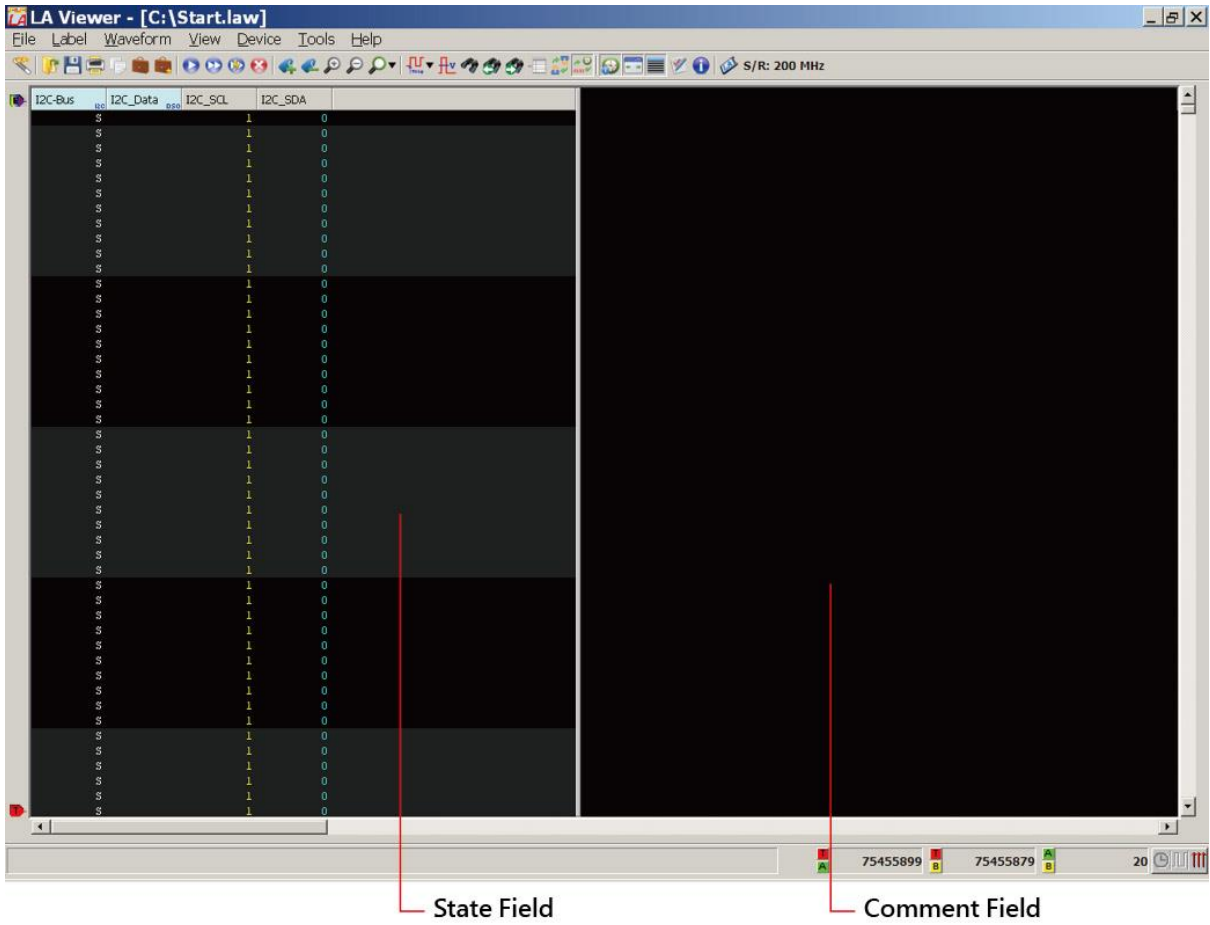
### Timing Analysis:



- |                   |                            |
|-------------------|----------------------------|
| 1. Toolbar        | 8. One Level Trigger Field |
| 2. Time division  | 9. Quick Repetitive Run    |
| 3. Acquired time  | 10. Trigger position       |
| 4. Label Field    | 11. Sample Rate            |
| 5. Channel Field  | 12. Time indicator         |
| 6. Value Field    | 13. Acquire Status         |
| 7. Activity Field | 14. Vertical Scroll bar    |

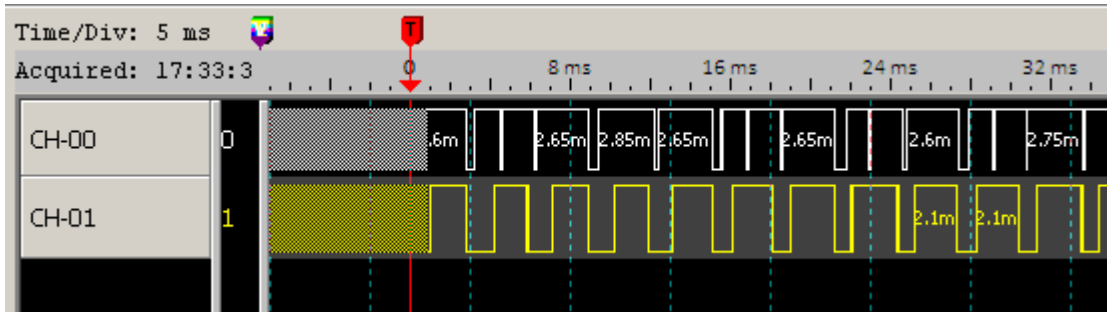
- |   |  |
|---|--|
| 15. Waveform                            | 25. Report toolbar                             |
| 16. Horizontal Scroll bar               | 26. Cursor position                            |
| 17. Zoom Window                         | 27. Status Field                               |
| 18. Timestamp / Sample                  | 28. Field Splitter                             |
| 19. Selected channel                    | 29. Report Window                              |
| 20. All channel                         | 30. Update                                     |
| 21. Transition number of all<br>channel | 31. Cursor Button                              |
| 22. Data measurement                    | 32. Frequency/ Timing/ Sample<br>Clocks Switch |
| 23. Bus decoder                         | 33. Frequency/ Time                            |
| 24. Choose bus                          |  |

**State Analysis:**

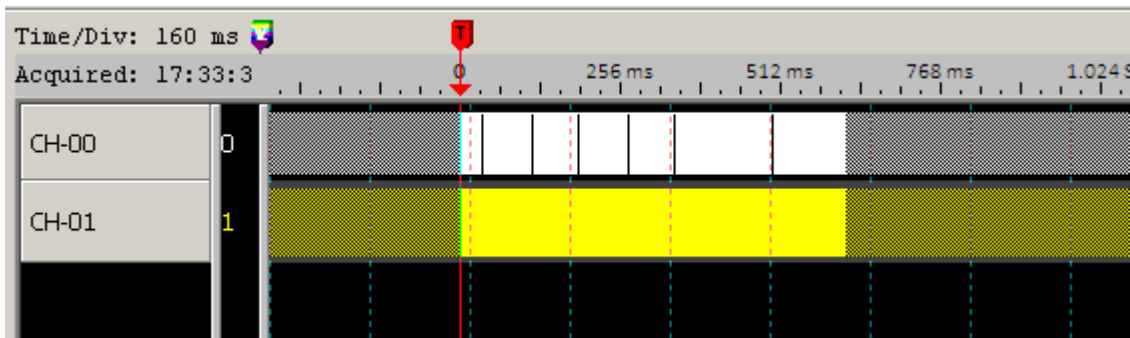


## Mark the invalid waveform

If the Pre-Trigger is not enabled, then the waveform before the trigger cursor is invalid will be marked as dots.



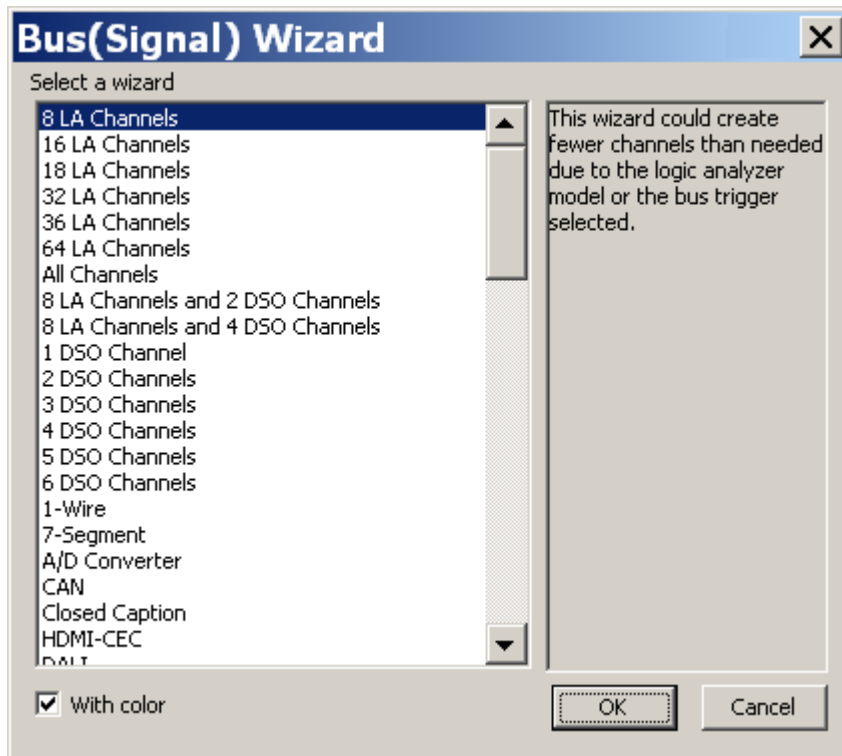
If the logic analyzer is stopped when capturing data, then the waveform on the right of the waveform window is invalid and will be marked as dots.




## Other

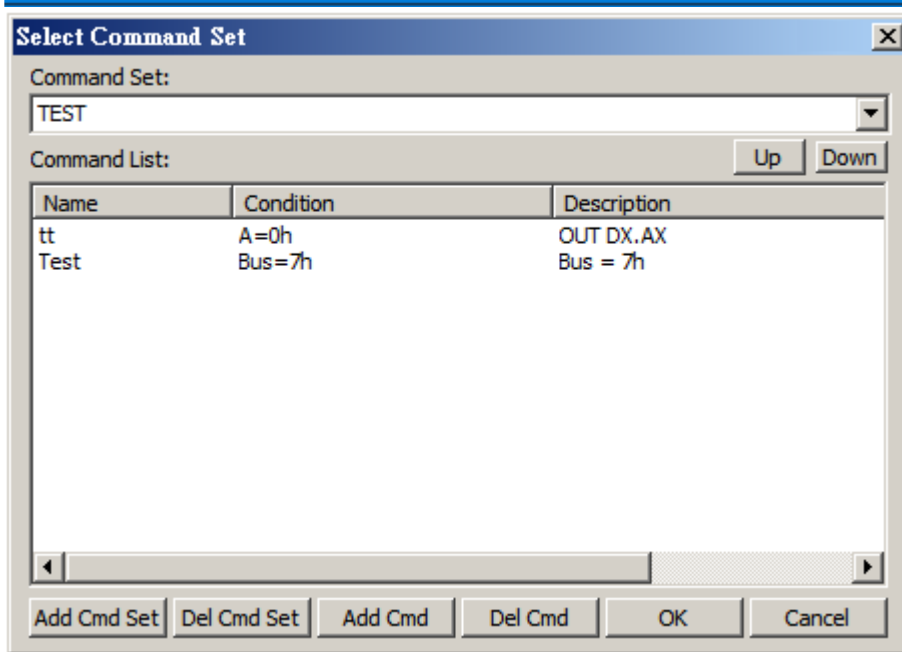
### Create Bus(Signal) Wizard

Click Create Bus (Signal) Wizard button (  ) on Toolbar to show the dialog box below.



### Select Command Set

Select Command Set (  ) is for the state analysis but not a default button on the Toolbar menu.

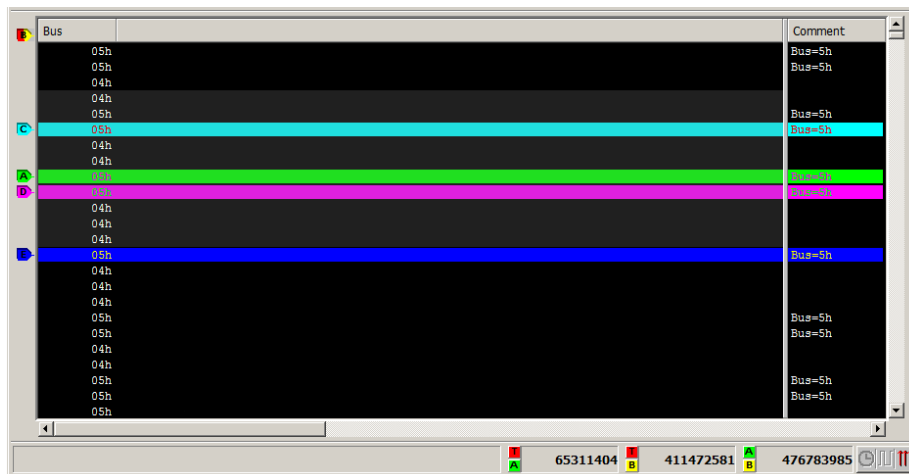


Add Select Command Set button from Toolbar → Toolbar Buttons and click it to show the dialog box below; there are 4 quick settings - add command set (Add Cmd Set), delete command set (Del Cmd Set), add command (Add Cmd) and delete command (Del Cmd). The command set must be saved as \*.CMS, similar to the Windows Excel file \*.CSV, so you can edit the command set in Windows Excel and load it into the LA Viewer.

A command set has three fields:

**Name:** The command name that must be exclusive.

**Condition:** A command has up to 3 conditions, where each condition has its own label and value.



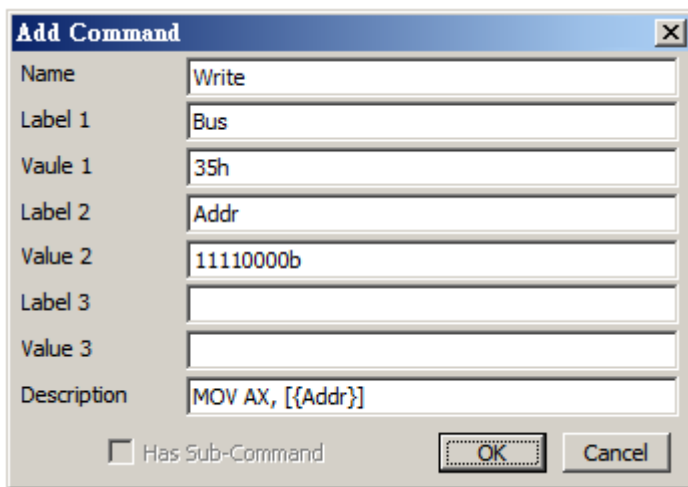
**Description:** The constant or variable in the Description field will be shown in the State




analysis on the Waveform Window when the command conditions are met. A variable contains a label name within the bracket { } or will be seen as a constant; also, the label name must be a label name in the current project or will be shown as "\*\*\*". One command can have three variables at most.

### Add Command


Only decimal (xxx), hexadecimal (xxxh), octal (xxxo), or binary (xxxb) values can be entered in the value columns (Value 1 ~ 3).



### Time/State Switch

The Time/State Switch button () is a switch between the timing analysis and the state analysis shown on the Waveform Window.

### Thumb Track Scroll

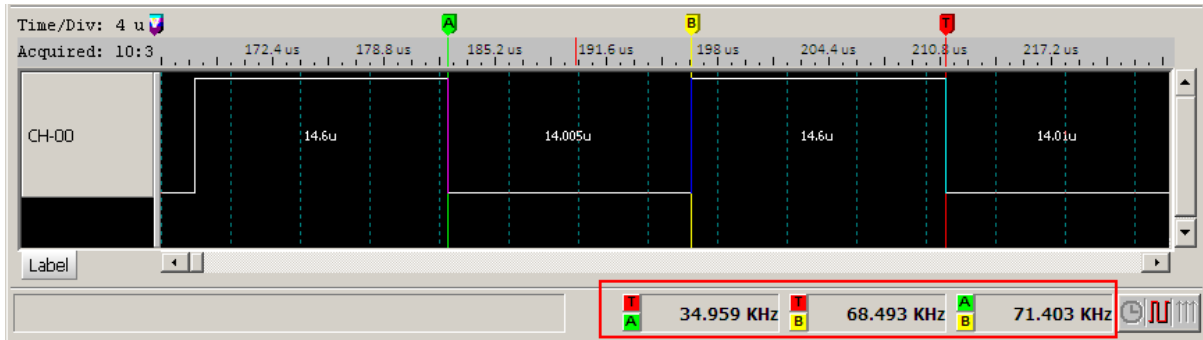
The Thumb Track Scroll button () is to drag the horizontal scroll bar and the waveforms simultaneously. If disabled, the waveforms only move until you stop dragging the horizontal scroll bar.

### Measure Frequency, Timing or Sample Clocks

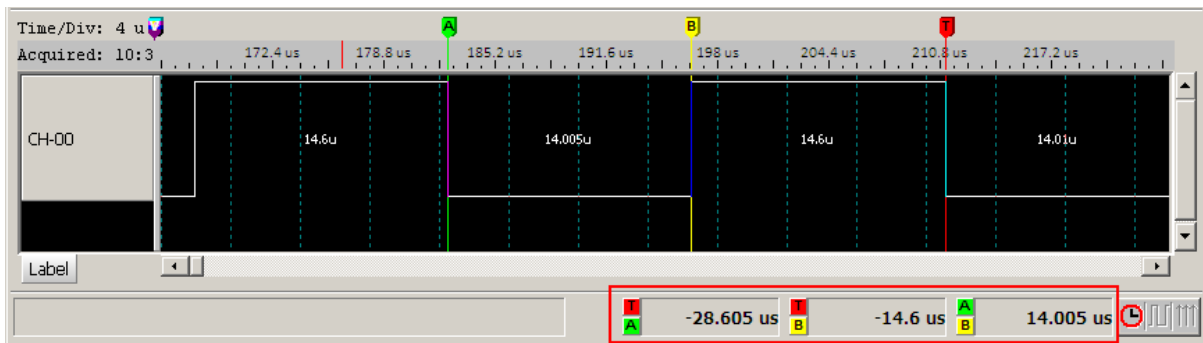
You may check the frequency, timing, or sample clocks between any two cursors on the

Waveform Window as the three windows below. There are three display fields at the bottom of each window; the switch button (🕒) on the lower-right corner of each window is to switch among frequency, timing, or sample clocks.

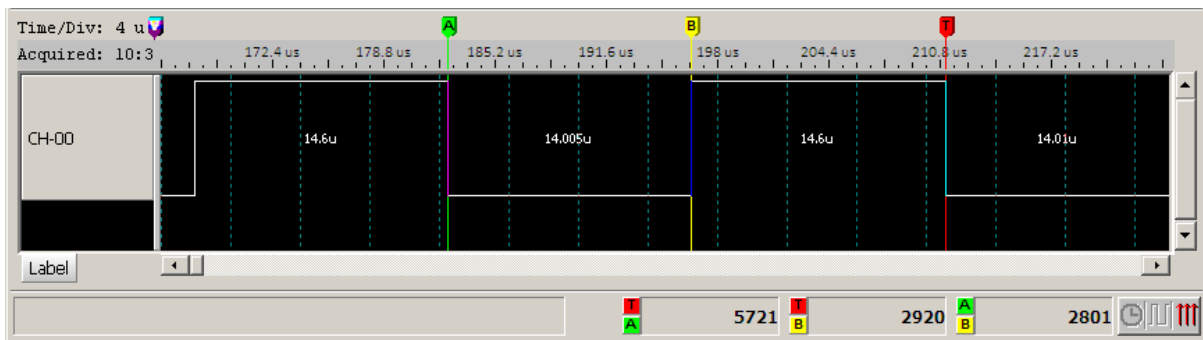
Frequency:



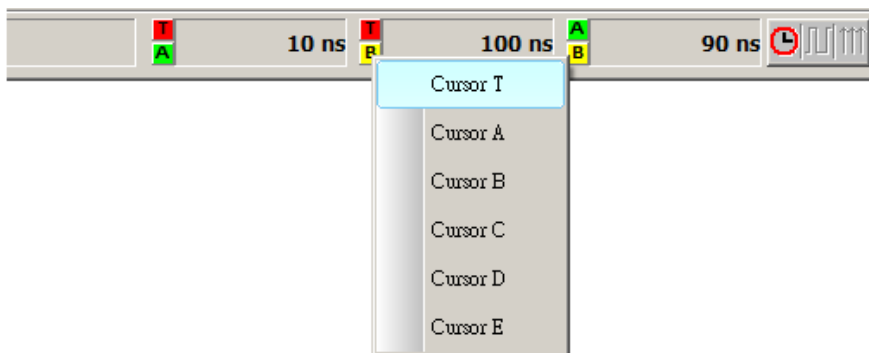
Timing:



Sample Clocks:



Click any cursor button to display the cursor menu below to choose any two buttons to measure the frequency, timing, or sample clocks between them.



## Zoom In/Zoom Out

There are several ways to zoom in and/or zoom out:

Click Waveform →, click Zoom In/Zoom Out.

Zoom In or Zoom Out toolbar buttons.

Press +/- on the keyboard to zoom in/zoom out.

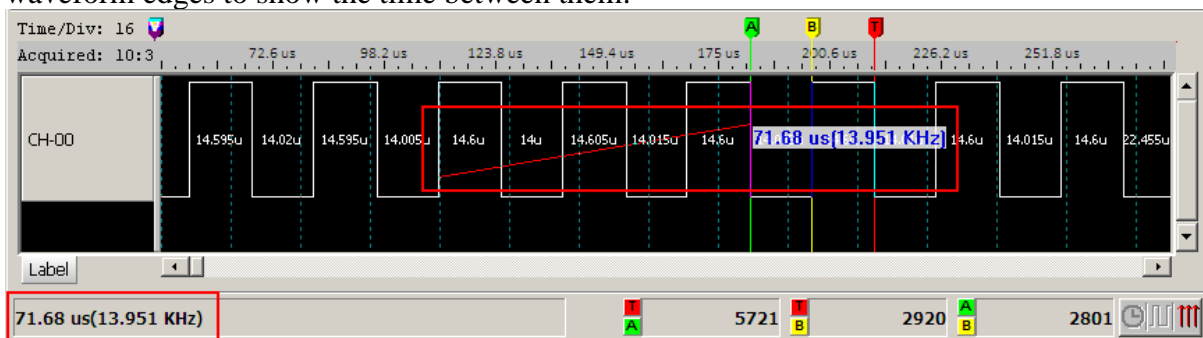
Scroll the mouse wheel on the waveforms to zoom in/zoom out.

Right-click on the waveforms and click Zoom Area to zoom in.

## Waveform Window

Drag or flick the waveforms.

Measure the time between two waveform edges: Press Ctrl + drag the mouse between two waveform edges to show the time between them.

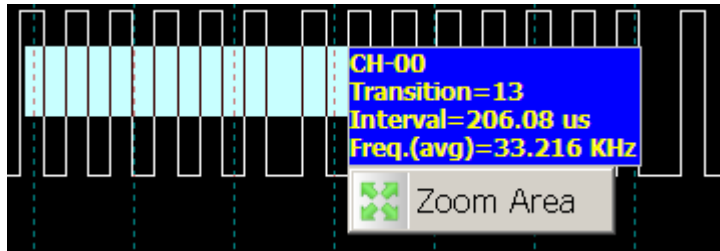


Scroll the mouse wheel to zoom in/out waveforms centered on the mouse cursor.

Right-click and drag the selected waveforms to see the number of transition, time interval, and frequency between the two waveform edges.

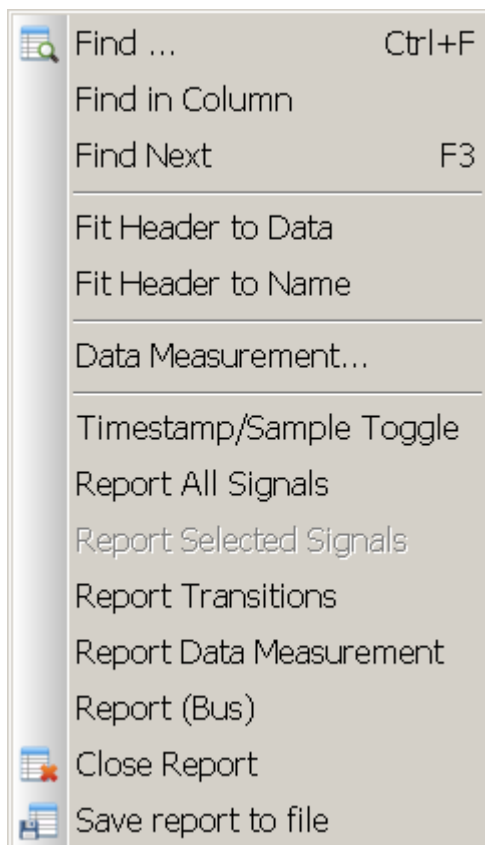
Zoom Area will display on the lower-right corner of the selected waveforms; click Zoom

Area to zoom in the selected waveforms.



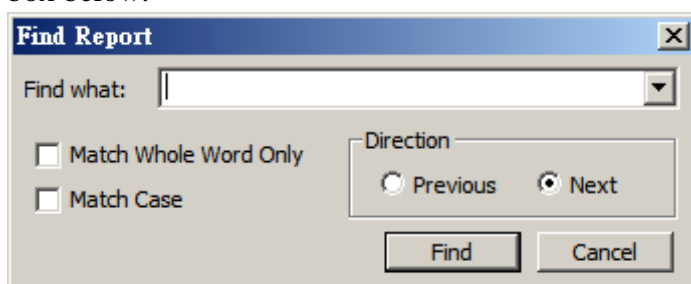
## Report Window

Right-click the Report Window to show the menu below.



## Find

Find data in the Report Window; click Find to set more parameters in the Find Report dialog box below.



Match Whole Word Only: Match all characters in Find What.

Match Case: "A" and "a" represent different characters in Find What.

Direction: Find the previous/next-matched data.

**Find in Column "XX"**

Find data in a certain column.

**Find Next**

Find the next-matched data.

**Fit Header to Data**

Adjust the column width according to the data width.

**Fit Header to Name**

Adjust the column width according to its name width.

**Report All Signals**

Display all data except bus decode in the Report Window.

**Report Selected Signals**

Display the selected data in the Report Window.

**Report Transitions**

Display the transitions and rising edges and falling edges in the Report Window.

**Report Data Measurement**

Display the channel measurement in the Report Window.

**Report ( )**

Display the bus decode data in the Report Window.


**Close Report**

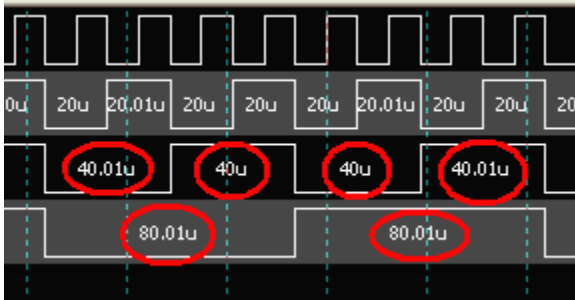
Close the Report Window.

**Save report to file**


Save the report as a file.

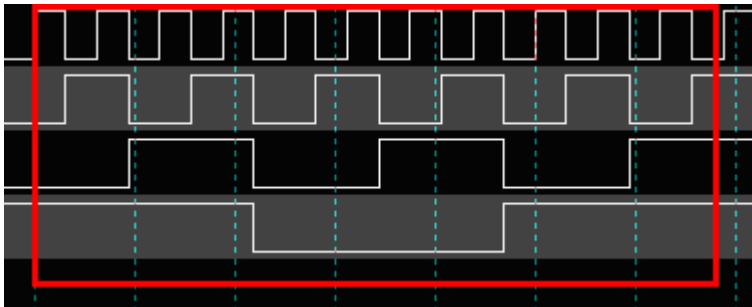
**Show the timing in the Waveform Window**

Click the Show the timing in the Waveform Window button () to show the time between waveform transitions in the Waveform Window.



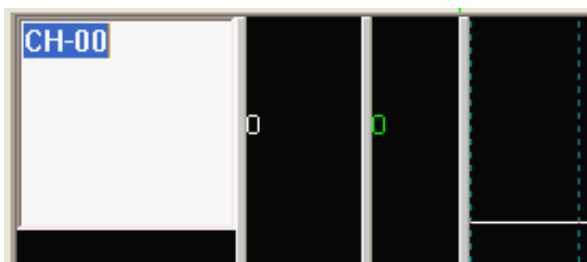
### Shade Alternate Channels

Click the Shade Alternate Channels button (  ) to shade alternate channels with 2 different colors to better view the waveforms.




### Modify the label name


Click the Label Name for 1 second to modify the label name.



### Generate a Bitmap File

Click the Generate a Bitmap File button (  ) to save the waveforms in format like PNG, JPG, GIF, BMP, or TIFF.

### Copy to clipboard

Click the Copy to clipboard button (  ) to copy the waveforms to the clipboard.

## Auxiliary

### Auxiliary Label Menu

Right-click the label field to show the auxiliary label menu below.

**Undo:** Undo the previous changes on labels.

**Add A Signal:** Create a channel.

**Add Group(Bus):** Create group channels (bus).

**Add Bus Decode:** Create a bus decode channel.

**Add All Labels:** Create all channels. The "Delete the current labels?" dialog box will show, if click yes, the exiting labels will be deleted.



**Delete Unused:** Delete the unused (shaded) labels.

**Delete Selected:** Delete the selected label. Right-click the selected label to delete or click the selected label and press the Delete key.

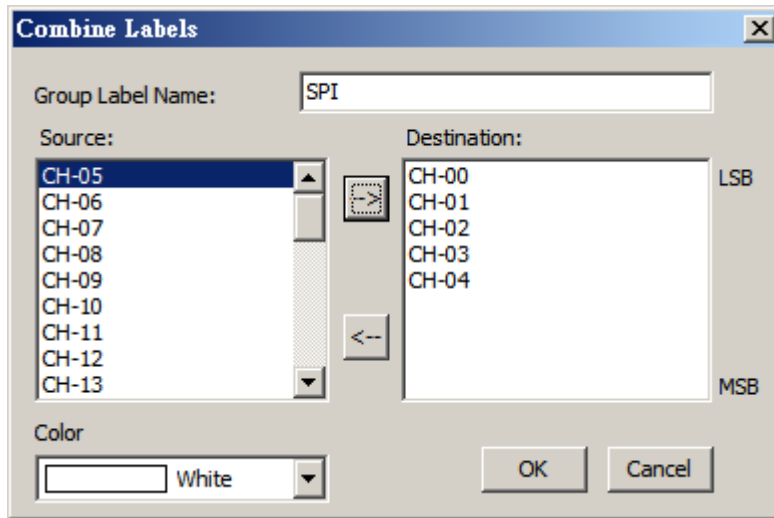
**Delete All Label:** Delete all labels.

**Modify Name:** Modify the label name. Any label name must be exclusive with no more than 31 characters including symbols like [, ], \_, -, !, ~, and are case sensitive.

**Configure:** Configure the labels.

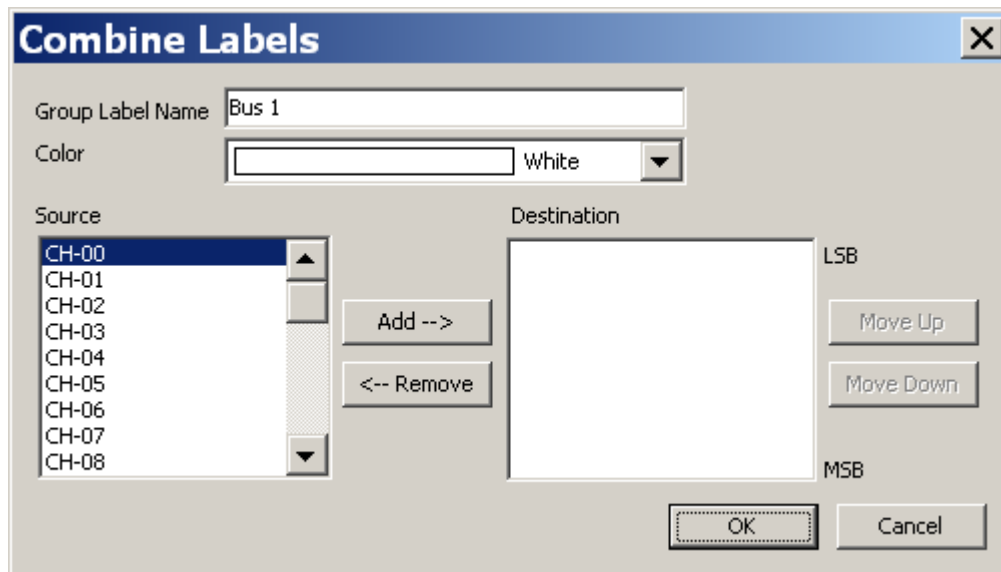


**Combine:**



Combine the selected labels to form a group channels (bus). Select labels in Source (Destination) and click → (←) to add (remove) labels to (from) the group.

**Arrange:**



Arrange the order of all labels in a group channels (bus).

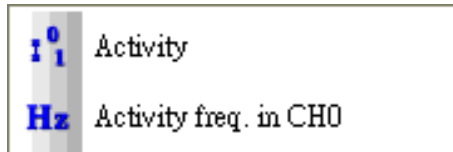
**Decompose:** Right-click the group channels (bus) to decompose into individual labels with new names.

**Sort:** Sort all labels in alphabetical order.



## Activity Auxiliary

Right-click the Activity Field to show the menu below.



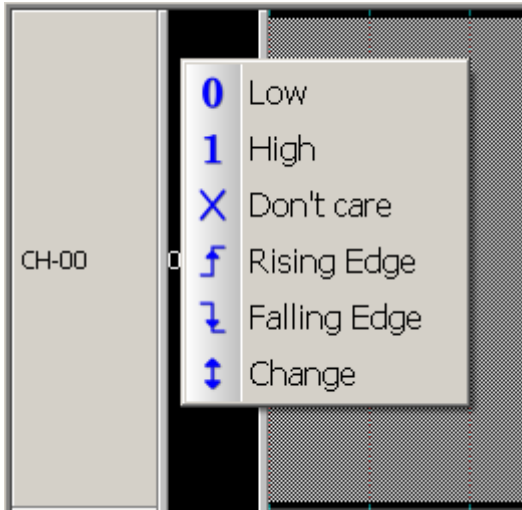
**Activity:** Show the state of the selected channel.

**Activity freq. in CH-X:** Show the frequency of the selected channel and one channel ONLY.

## Simple Trigger Auxiliary

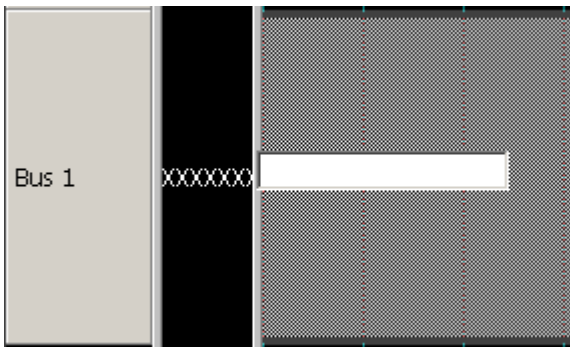
Right-click any Trigger field to show one of the two menus below to set the trigger:

### Signal



Only one trigger (channel) can be set as Rising Edge ↑, Falling Edge ↓ or Change ↕.

### Group



Only five types of codes can be entered:

Hexadecimal code (nnh), e.g. 3Ah.

Octal code (nno), e.g. 57o.

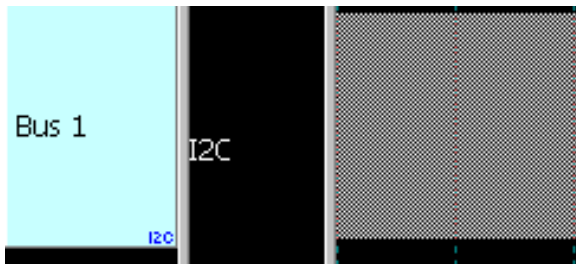
Binary code (nnb), e.g. 110010b.

ASCII code ('X'), e.g. 'A'.

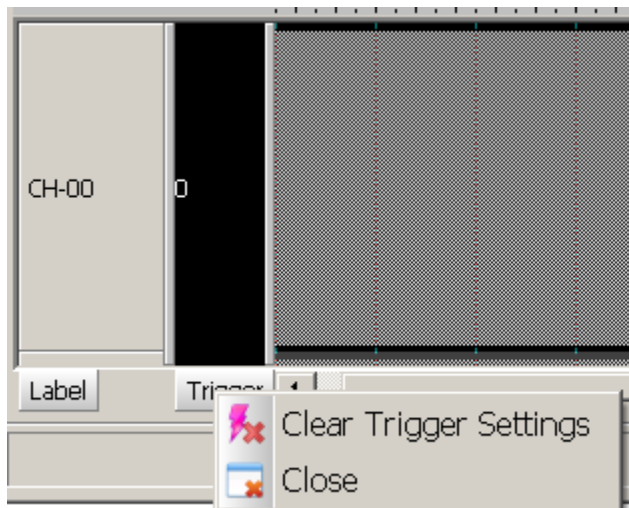
Decimal code (nn), e.g. 35.

Blank cancel settings.

## Bus



Right-click the Trigger button to show the menu below.










**Clear Trigger Setting:** Clear the trigger settings.

**Close:** Close the Trigger field.

## Easy Start

Follow the steps below to easily run the LA Viewer.

- a. Execute the LA Viewer programs (  ).
- b. Click the **Threshold Settings** button (  ) to set the threshold voltages according to the target system signals.
- c. Right-click the label field to show the label menu.
- d. Set up labels with names, channel numbers, and colors. The label name must be no more than 31 characters that can be text, numbers, or symbols.
- e. Click the Hardware Settings button (  **S/R: 100 MHz** ) to set the sampling rate which ideally should be 5-10 times of the frequency of the target signal.
  - a. Click the **Trigger Settings** button (  ) to set up trigger conditions.
  - b. Connect the instrument's ground lines to the grounds of the target system.
  - c. Connect the grippers to the target system according to the defined label names.
  - d. If you want to measure the state, select External (synchronizing) from the Hardware Settings (  **S/R: 100 MHz** ) and connect the clock channel to the target system as the clock source, then click the Time/State Switch button (  ) to the state analysis on the Waveform Window.
  - e. Move the trigger cursor (T) to the Waveform Window.
  - f. Click the Acquire Data button (  ).

## Cursors

There are 26 (A~Z) cursors available, but only 6 cursors (T, A, B, C, D, E) are shown on the Waveform Window by default.

Click the Add Cursor/Delete Cursor button (  /  ) to add/delete cursors or press Shift + key to add the cursor.

There are several ways to move cursors in the Waveform Window.

Drag the cursor tag.

Drag the cursor.

Use ← or → (↑ or ↓) to move the cursor in the timing (state) window.

Press A - Z to display cursor A-Z in the center of the Waveform Window.

Press Shift + A-Z to move cursor A-Z to the mouse cursor.

Press Ctrl + drag any cursor except cursor E to move two cursors (any dragged cursor and cursor E) together. The default of the tracking cursor is cursor E. You can also change the tracking cursor in the System Environments, to set the tracking cursor specified with A-E.

## **Field Adjustment**

Move the field splitter to adjust the size of any field (Label, Channel, Value, Activity, Simple Trigger in timing analysis, or Channel, Comment in state analysis) or the Waveform Window.

## Hot Key Definition

	Items	Hot Key
1.	Display the waveform window centered on cursor A - Z	A-Z
2.	Display cursor A ~ Z at the mouse cursor position	Shift+A-Z
3.	Zoom In	+
4.	Zoom Out	-
5.	Find Report	Ctrl+F
6.	Hardware Settings	Ctrl+H
7.	Search Next Pattern	Ctrl+N
8.	Print Waveform	Ctrl+P
9.	Search Pattern	Ctrl+S
10.	Trigger Settings	Ctrl+T
11.	Threshold Settings	Ctrl+V
12.	Undo	Alt+BackSpace
13.	Delete Labels	Delete
14.	Stop Acquisition	Escape
15.	Find Next Report	F3
16.	Run	Enter
17.	Repetitive Run	Ctrl+Enter
18.	System Environments	Alt+Enter
19.	Frequency, Timing or Sample Clocks Switch	Space
20.	Zoom In/Zoom Out	Mouse Wheel (Waveform Window)
21.	Moves data up or down	Mouse Wheel (Report Window)
22.	Move labels up or down	Mouse Wheel (Label Field)
23.	Measure Waveforms	Ctrl+Drag Mouse (Waveform Window)
24.	Drag Waveforms	Drag the Mouse (Waveform Window)
25.	Measure and Zoom Waveforms	Right-drag the Mouse (Waveform Window)

## **Data Storage**

There are three ways to store the captured data: 1. Conventional, 2. Transitional and 3. Qualified.

### **Conventional Storage**

This is the most common way to store the captured data, 1 bit by bit, and the logic analyzer will stop when its memory buffer is full.

### **Transitional Storage**

The logic analyzer will only store the transitional data (rising or falling) and record the time duration of the non-transitional data which is also called Timestamp. Only the TravelLogic series supports the transitional storage.

## **Features**

### **Long Duration**

The logic analyzer only records the transitional data, so the recorded time can be long duration as long as the data is not in transition.

### **32 Channels available**

32 channels are available for the transitional storage. 8 channels and 32 channels of transitional storage are available for the series of TL2x36, but the series of TL2x18 only support 8 channels of transitional storage.

### **Captured data will not be lost even interrupted**

The captured data will not be lost even when the logic analyzer is stopped when capturing data.

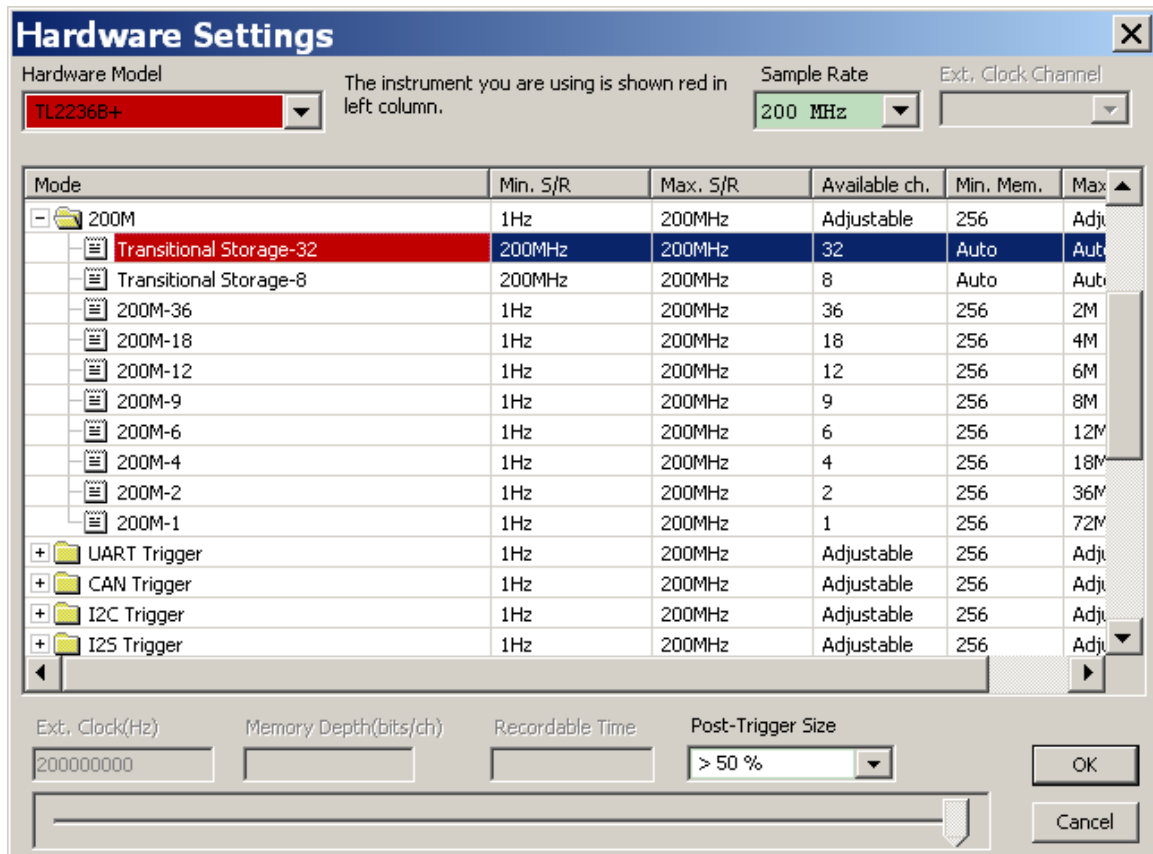


## Display the used memory buffer

The LA Viewer will display the percentage of the memory buffer is being used.

## How to use the Transitional Storage

Click Hardware Settings (  **S/R: 100 MHz** ) on Toolbar (or Device menu) to show the Hardware Settings dialog box below.



### Quick tips:

If there many transitions in the captured data, then do NOT use the Transitional Storage.

The maximum memory buffer will be set as default, not available for change. Also, only the transitional data of the channels on the LA Viewer window can be stored.

The LA Viewer will set the trigger position in percentage, which means the data after the trigger position as a percentile of the total captured data. The trigger cursor can't be input (moved) on the waveform window as the conventional storage.

The Pre-Trigger is not available for the Transitional Storage.

## Qualified Storage

The Qualified Storage is only available for the Transitional Storage. It works as a filter to store data (in read or write status) in the Transitional Storage to further expand the efficiency of the memory buffer. The Qualified Storage is only available for the TravelLogic series.

## Features

### Save/Don't Save qualified data

You may set conditions to save or not to save the qualified data.

### Available for multi channels or the bus decodes.

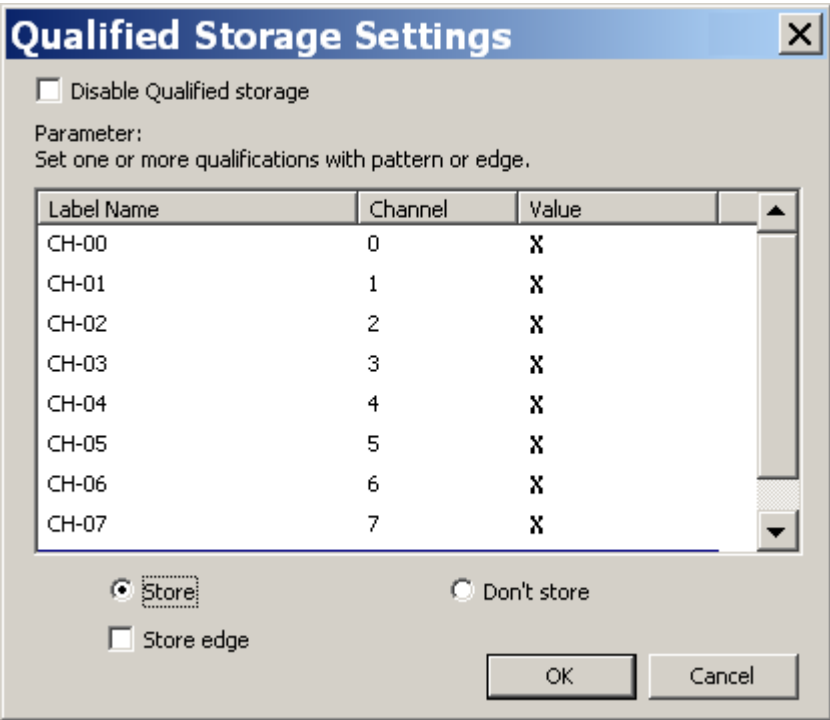
### Multi-conditions

Conditions can be 1, 0, rising, falling, or transition.

### Continuous time

The time of the waveform of the qualified storage is continuous.

## Qualified Storage Settings



The dialog box titled "Qualified Storage Settings" contains the following elements:

- Disable Qualified storage
- Parameter:  
Set one or more qualifications with pattern or edge.
- A table with the following data:

Label Name	Channel	Value
CH-00	0	X
CH-01	1	X
CH-02	2	X
CH-03	3	X
CH-04	4	X
CH-05	5	X
CH-06	6	X
CH-07	7	X

- Store
- Don't store
- Store edge
- OK button
- Cancel button

**Disable Qualified storage**

The Qualified storage is disabled when the column checked.

**Parameter**

Double click on Value to show the conditions (rising, falling, or transition).


**Save/Don't Save**

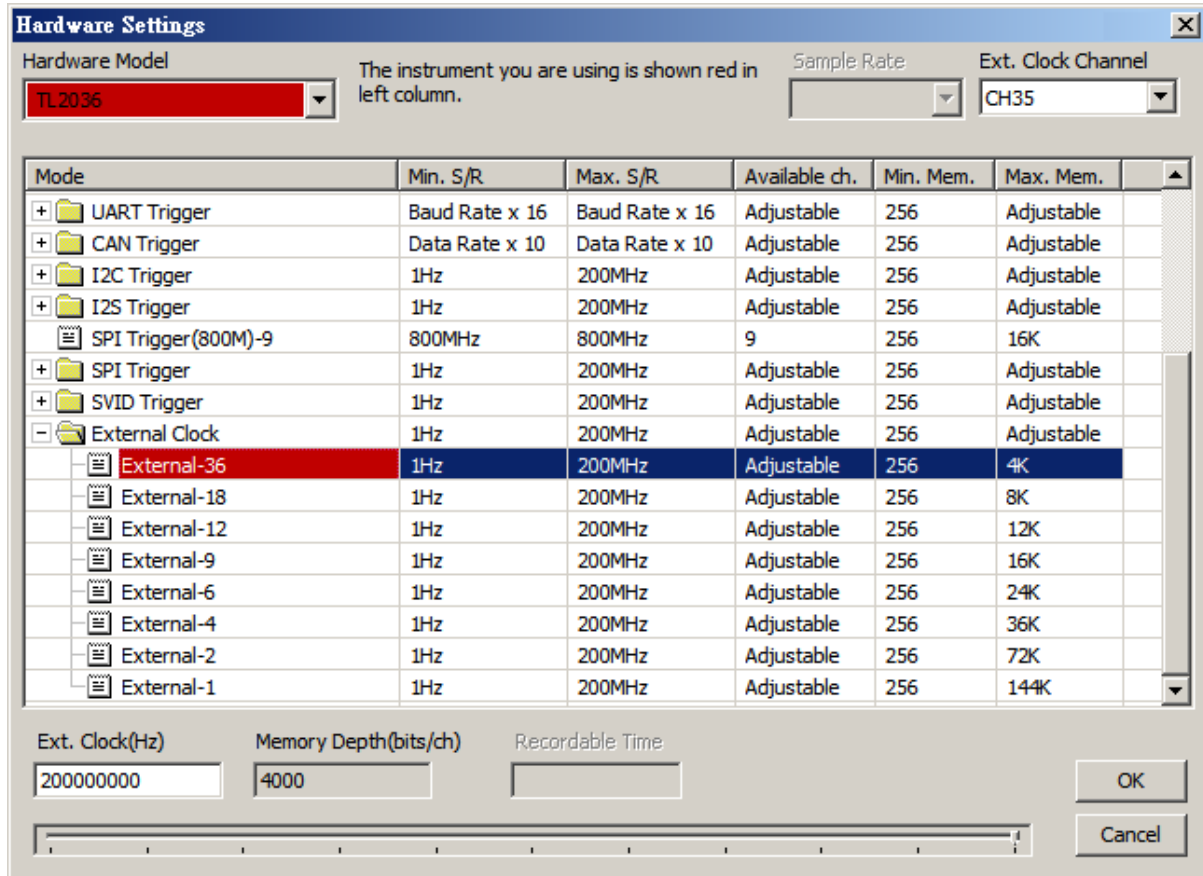
Click to save or don't save the qualified data.

**Store edge**

Store the edges.

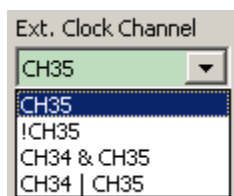
## Using External Clock to analysis state synchronizing

Click Hardware Settings (  **S/R: 100 MHz** ) on Toolbar (or Device menu) to show the Hardware Settings dialog box below.



### Ext. Clock Channel

Select External-36 where "-36" means 36 channels and select channels from Ext. Clock Channel on the upper-right corner of this dialog box.



**CH35:** ONLY the last channel (CH35) can be set as the external clock channel for the selected External-36.

**!CH35:** Invert the waveform of CH35.

**CH34 & CH35:** Both CH34 and CH35 together serve as the clock qualifier to qualify what data should be acquired.

**CH34 | CH35:** Either CH34 or CH35 serves as the clock qualifier to qualify what data should be acquired.

**Ext. Clock(Hz):** Set the external clock speed (1000000 Hz e.g.) on the lower-left corner of this dialog box.

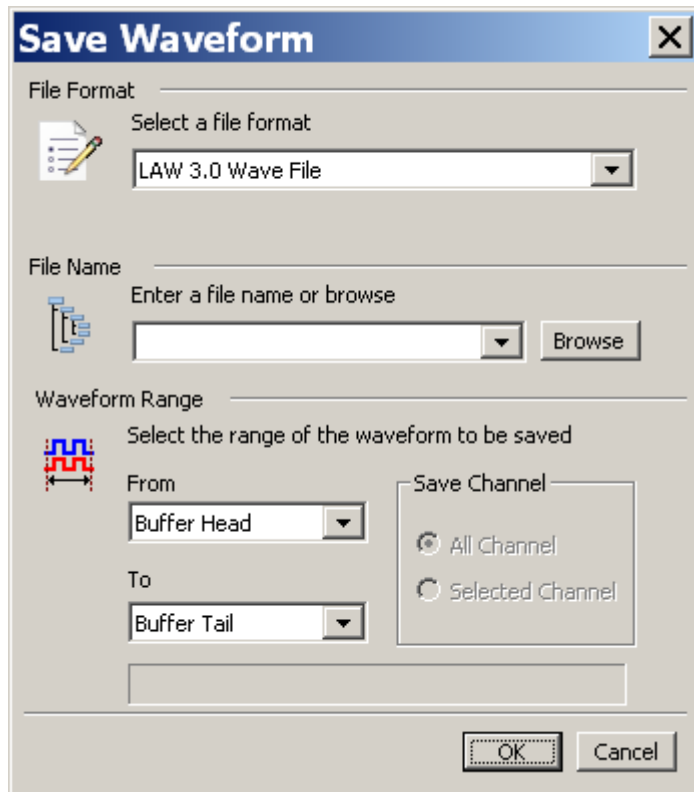
## **Chapter 3    Functionality**

## File

### Open Waveform File

Load a waveform file (\*.law). Waveform files can also be opened when dragged to the waveform field

### Save Waveform



**Format:** You can save the acquired data in four different formats:

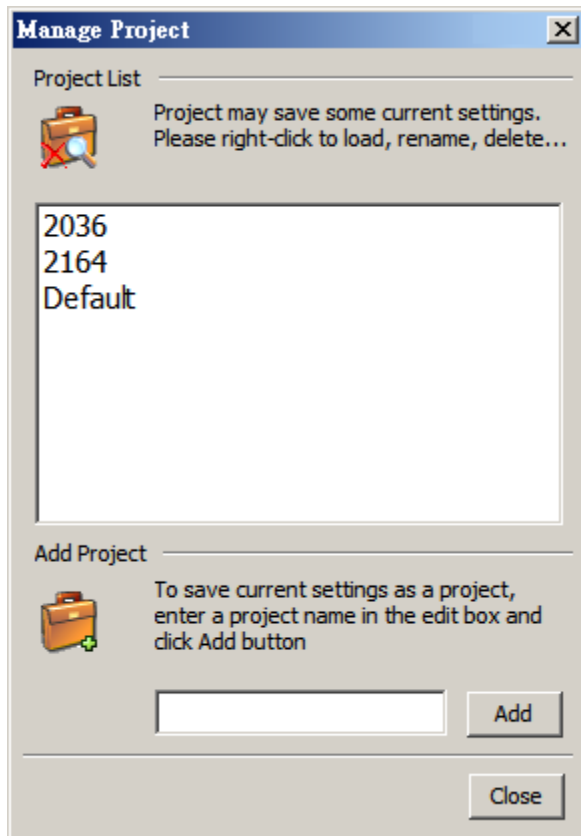
Format	Type
*.law to be used by the LA Viewer.	a. LAW 3.0 Wave File.
*.pgw to be used by the PG Editor for the Acute digital pattern generator.	a. PGW 1.0 Wave File
*.txt to be saved as a text file.	a. Transitional Text File (.txt) Normal Compression. b. Text File (.txt) No Compression. c. Include File Header: save the parameter in the file header.
*.VCD to be saved as a Value Change Dump file.	a. .VCD File (.VCD)

**File Name:** Enter an exclusive file name or press Browse.

**Range:** Select the range of the waveforms to be saved.

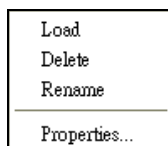
**Channel:** Channels to be saved.

## Manage Project



### Project List

The project list displays current projects that contain label names, trigger parameters and threshold settings etc. Right-click the project name to show the menu below.



**Load:** Load a project from the Project List.

**Delete:** Delete a project in the Project List.

**Rename:** Rename a project in the Project List.

**Properties:** Show the contents of a project.

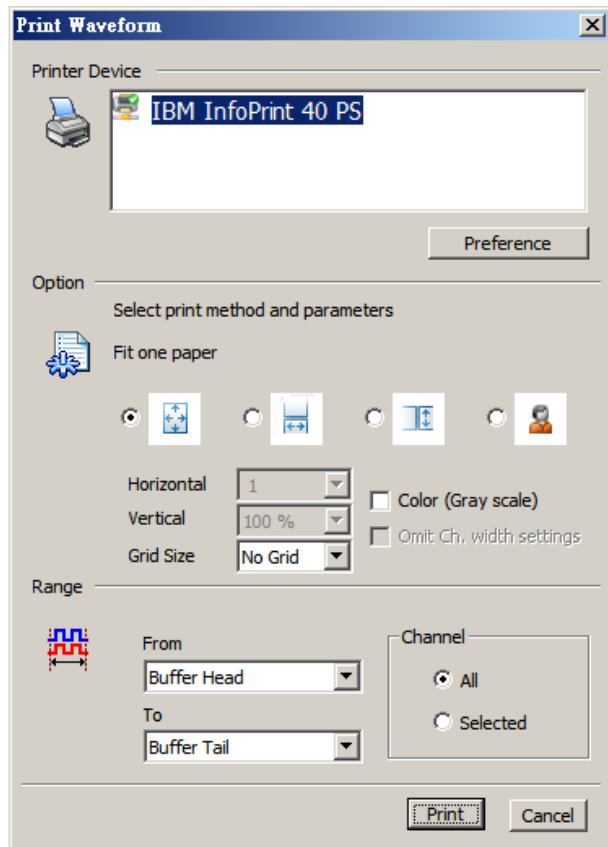
**Add Project:** Create a new project.




## Load Last Project


The LA Viewer, when exited, will automatically save the current working environments as a project file. You can load this project file next time when start the LA Viewer.


## Print Waveform




**Printer Device:** Select a printer in Printer Device.

**Fit one paper** (  ): The height and width of the selected waveforms will be printed as those of a page.

**Horizontal** (  ): The width of the selected waveforms will be printed as that of a page.

**Vertical** (  ): The height of the selected waveforms will be printed as that of a page.

**Custom Size** (  ): The selected waveforms will be printed in the customized height and width.

**Grid Size:** Grid size is adjustable, but not available for printing the state data.

**Color (Gray scale):** Print the selected waveforms in their original (gray) colors for color (non-color) printers; the background is always white color for all printers.

**Omit Ch. width setting:** This function is only available for printing the State data and will cut the length of label names to the same as that of the State data in order to print as many data in one page.

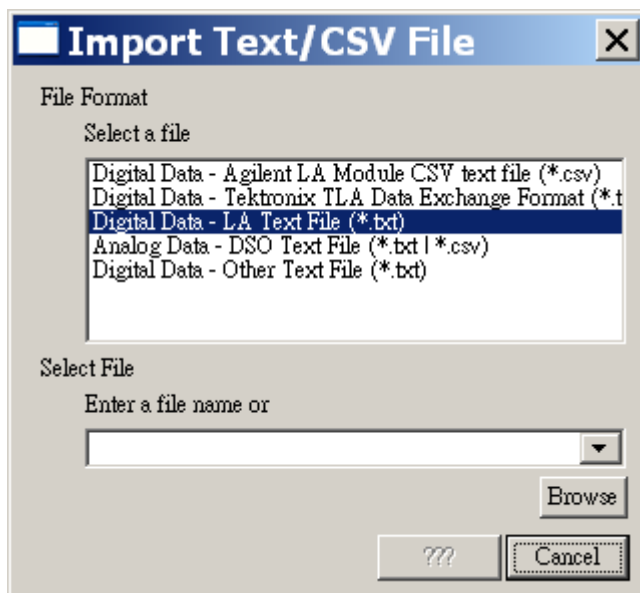
**Range: From** Start point of the range **To** End point of the range.

**Channel:** Print the selected channels.

## Import

(only available in TL2236B+)

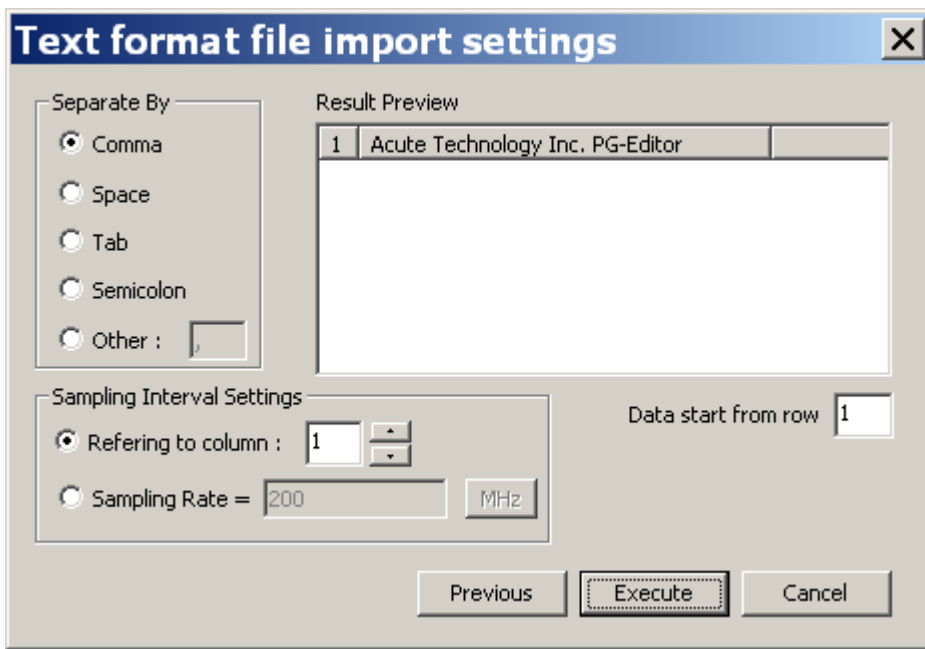
Translate the digital or analog text file into .law format from the other device.



**Agilent LA Moduled CSV text file:** The file export from Module CSV text file.

**Tektronix TLA Data Exchange Format:** The file must save as the TLA Data Exchange Format.

**LA Text File:** The first column will be the label name.

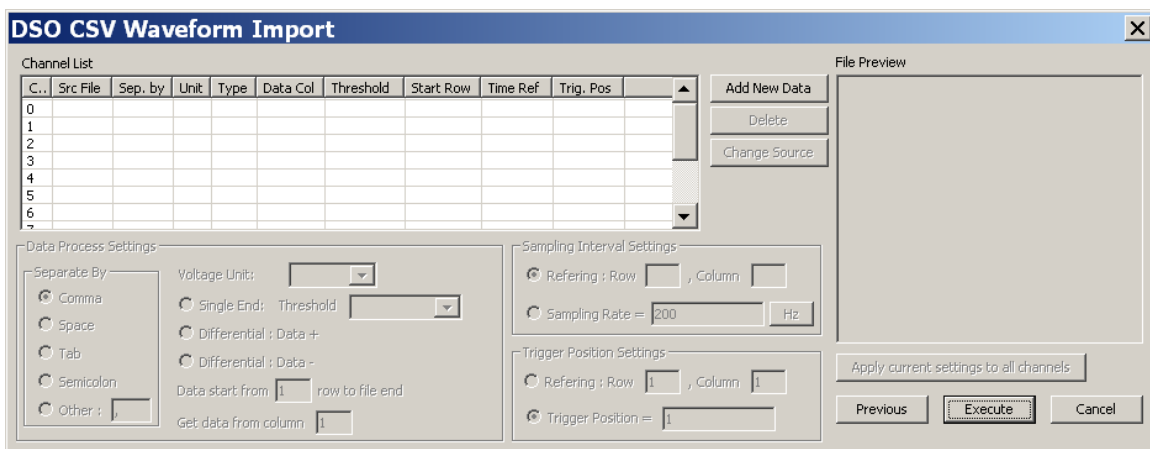


**DSO Text File:**

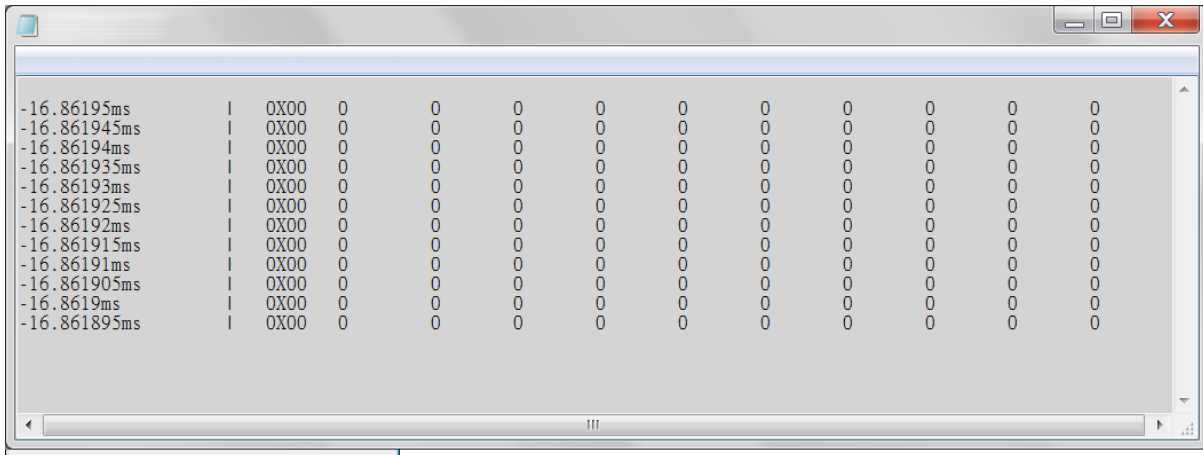
Support import multi files and setting individually. LA software will check over the sample rate/sample interval and trigger position of the first ten column

The unit value setting: If the unit is mV, 1357 will express as 1.357V. If the unit is uV, 135790 will express as 0.13579V.

When import differential signal, the settings between the two channels must be the same settings.



**Other Text File:** User edit its waveform data and it should reference the data format in the figure.

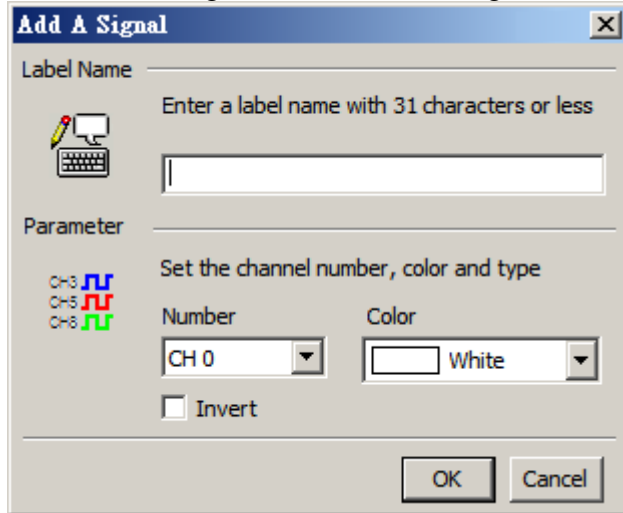


It supports single-line comments preceded by two forward slashes (/).

## Label

### Add A Signal

Click Add A Signal to show the dialog box below.



**Label Name:** Enter the label name with no more than 31 characters. (Chinese word expresses two characters.)

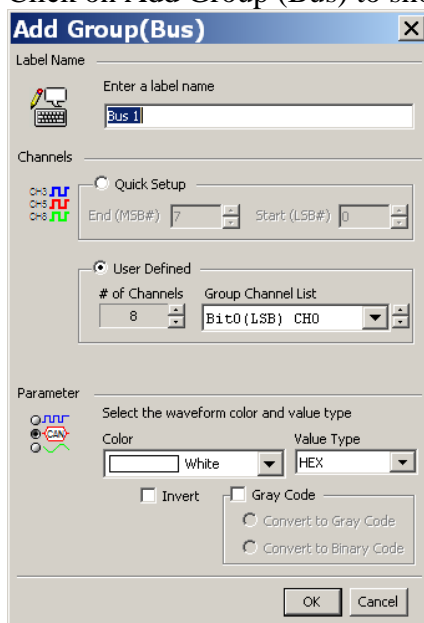
**Channel Number:** Set the channel number.

**Color:** Set the waveform color.

**Invert:** Invert the waveforms.

### Group(Bus)

Click on Add Group (Bus) to show the Add group (bus) dialog below.



**Label Name:** Enter the label name for the group (bus) with no more than 31 characters.

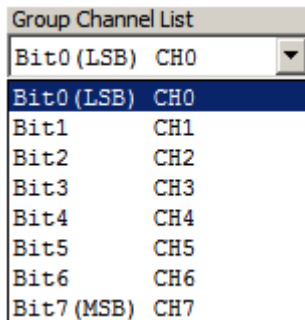
(Chinese word expresses two characters.)

**Auto Increment:** Set group channels between Start and End channels on numeric order.

### User Defined

**# of Channels:** Set the group (bus) channels in the dialog box below.

### Group Channel List:



Group Channel List	
Bit0 (LSB)	CH0
Bit1	CH1
Bit2	CH2
Bit3	CH3
Bit4	CH4
Bit5	CH5
Bit6	CH6
Bit7 (MSB)	CH7

Set each channel as Add A Signal.

**Color:** Set the waveform color.

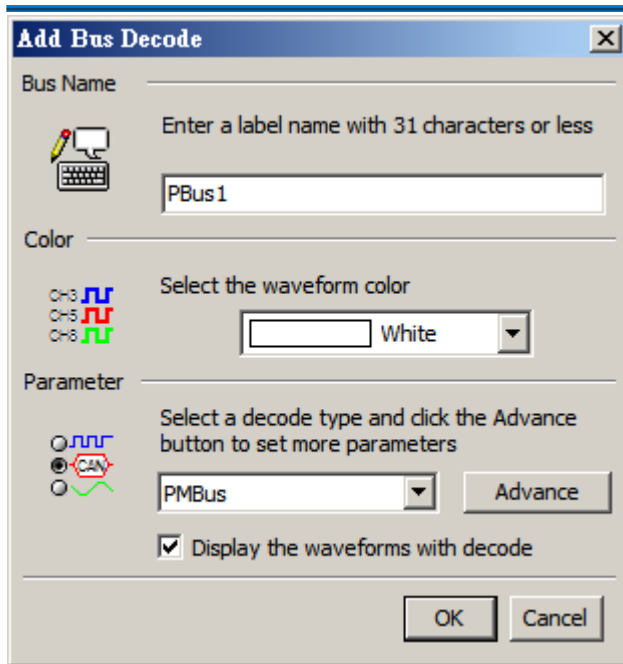
**Value Type:** Set the value type in HEX (hexadecimal), DEC (decimal), OCT (Octal), BIN (Binary), ASC (ASCII), Analog (2's comp. (complement)), Value (2's comp. (complement)).

**Invert:** Invert the waveforms.

**Gray Code:** Show the waveforms in Gray code.

### Bus Decode

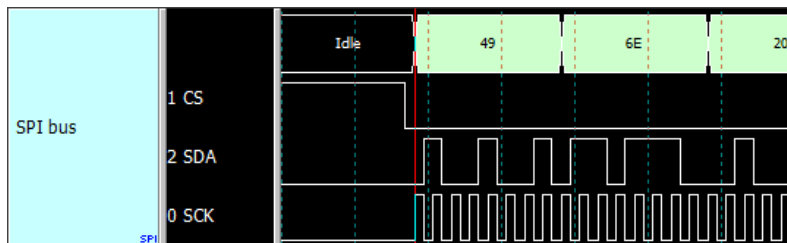
Click on Add Bus Decode to show the dialog box below.



**Bus Name:** Enter the label name with no more than 31 characters. (Chinese word expresses two characters.)

**Color:** Set the waveform color.

**Display the waveforms with decode:** Display the waveforms with its decode together.



**Advance:** Set the decode parameters or press **OK** to use default settings.

## Label Settings

**Label Name:** Enter the label name with no more than 31 characters. (Chinese word expresses two characters.)

**Channel Number:** Set the channel number.

**Value Type:** Set the value type in HEX (hexadecimal), DEC (decimal), OCT (Octal), BIN (Binary), ASC (ASCII), Analog (2's comp. (complement)), Value (2'comp (complement)).

**Color:** Set the waveform color.

**Invert:** Invert the waveforms.

**Gray Code:** Show the waveforms in Gray code.

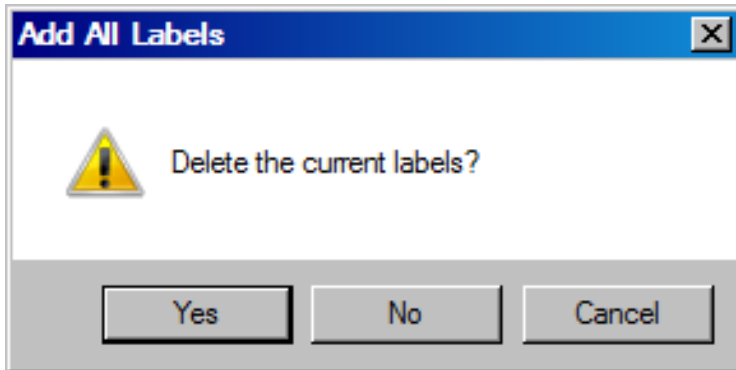
**Display the waveforms with decode:** Display the waveforms with its decode together.

**Advance:** Set the decode parameters or press **OK** to use default settings.



## Add All Labels

Create all new channels. The "Delete the current labels?" dialog box will show, if click yes, the exiting labels will be deleted.



## Delete All Labels

Delete all labels.

## Import Labels

You may edit the label names in a .CSV file and import the file into the LA Viewer.

Ex1: edit in an Excel file

Bus	0..7				
data	3				
NAND	9,10,11,12,13,14,15,16,19,20,18,21,24,23				
Bus2	1	3	5	7	9

Ex2: edit by an editor

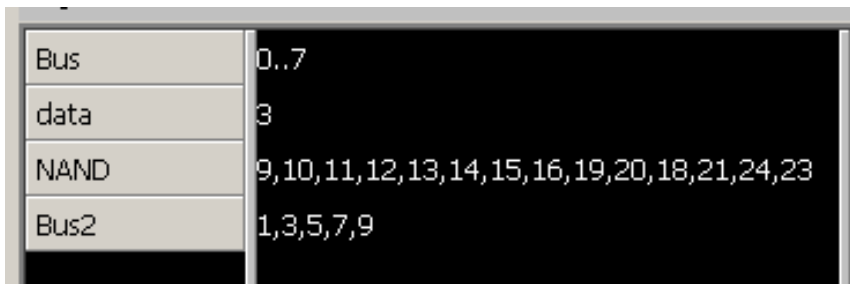
Bus,0..7

data,3

NAND,"9,10,11,12,13,14,15,16,19,20,18,21,24,23"

Bus2,1,3,5,7,9

Result:



Bus	0..7
data	3
NAND	9,10,11,12,13,14,15,16,19,20,18,21,24,23
Bus2	1,3,5,7,9

The first column is the Label name, which can be in English characters or with alphabetic numbers; the second column is the Channel number which can be “0..7” to represent a bus form channel 0 to channel 7 or in a number “2” to represent the channel 2.

## Waveform

### Zoom ALL

Display all waveforms in the Waveform Window.

### Zoom 1:1

One sample is shown as one point on the Waveform Window.

### Zoom In

Zoom in the waveforms centered on the mouse cursor.

### Zoom Out

Zoom out the waveforms centered on the mouse cursor.

### Find Trigger Marker (T)

Display the trigger cursor as the center of the Waveform Window. Click Find Trigger Marker or press T.

### Find Cursor A, B, C, D, E

Display cursor A-E as the center of the Waveform Window. Click Find Cursor A~E or press A-E.

### Generate a Bitmap File

Save the waveforms in format like PNG, JPG, GIF, BMP, or TIFF.


### Copy to clipboard

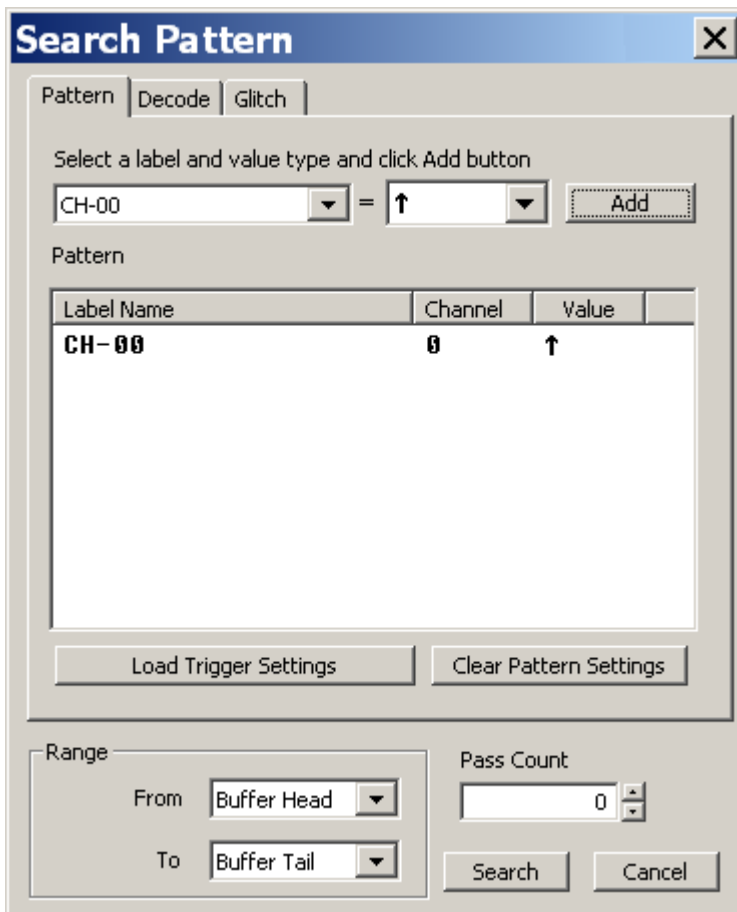
Copy the waveforms to the clipboard.

### Invert Waveform

Invert the waveform. Click the Invert Waveform button () on Toolbar.

### Search Pattern

The LA Viewer can search two kinds of acquired data: 1. Pattern, 2. Decode. Click the Search Pattern button () to search the acquired data in the same pattern or decode.



## Pattern

**Add:** Select a label (or group) and its value 0, 1, ↑ or ↓ (Hex).

**Load Trigger Settings:** Load the trigger settings.

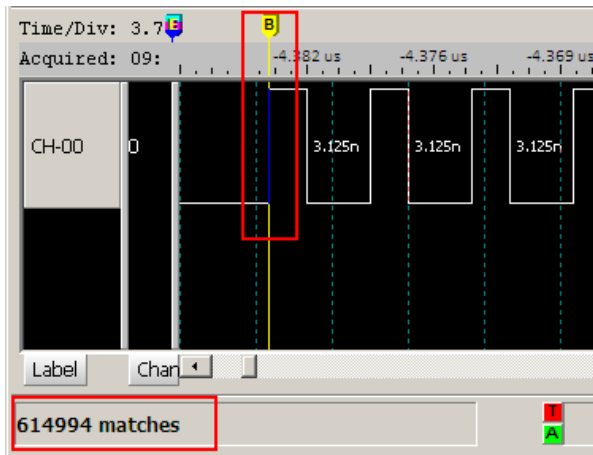
**Clear Pattern Settings:** Clear all pattern settings.

**Range:** The range within the acquired data you want to search for the same pattern.

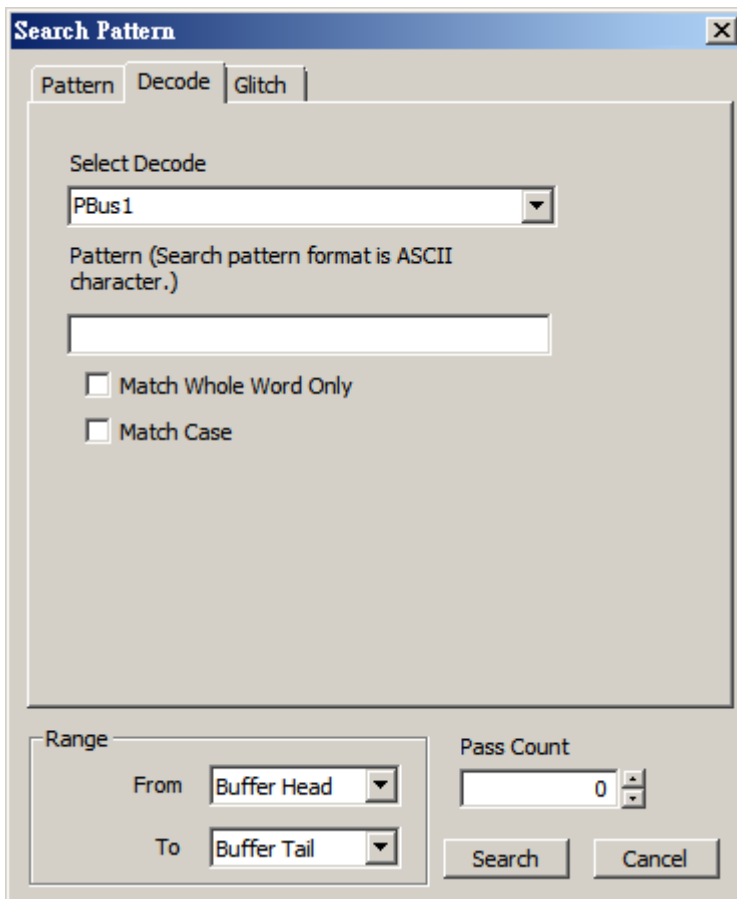
**Pass Count:** Pass Count will pass N times that triggers occurred.

**Result:** Click Search to run Search Pattern and the LA Viewer will show the number of matches on the Status field below or "Cannot find the specified waveform!" if no matches;

Cursor B will show on the first matched data



### Decode (Bus Decode)



**Select Decode:** Label Select a label name.

**Pattern:** Pattern must be ASCII characters.

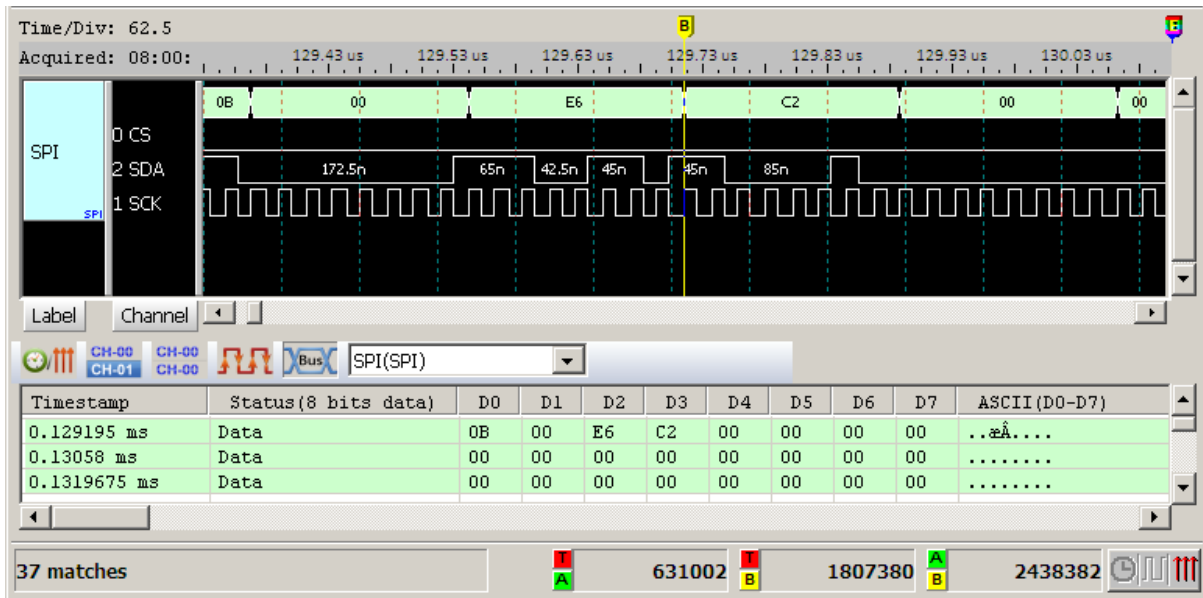
**Match Whole Word Only:** All characters in Pattern must be met.

**Match Case:** "A" and "a" represent different characters.



**Range:** The range within the acquired data you want to search for the same pattern.

**Pass Count:** Pass Count will pass N times that triggers occurred.


**Result:** Click Search to run Search Bus Decode and the LA Viewer will show the number of matches on the Status field below or "Can not find the specified waveform!" if no matches; Cursor B will show on the first matched decode.



## Search Previous / Next Pattern

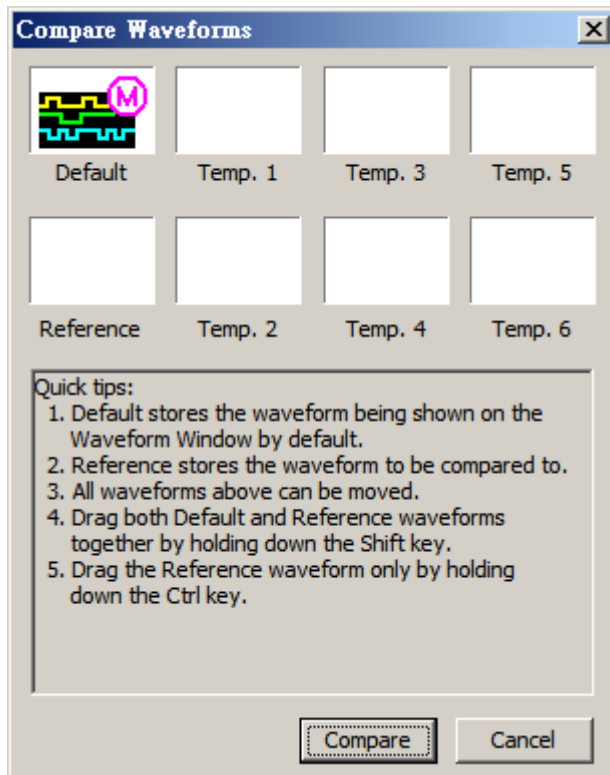
Click the Search Previous / Next Pattern button (  /  ) to search the previous / next matched pattern starting from Cursor B. The Pass Count function is not available in Search Next

## Go to Report Window

Click the Go to Report Window button (  ) to show the data of the waveforms on the Report Window.

## Compare Waveforms

Click Compare Waveforms in the Waveform menu or push F8, you will see the Compare Waveforms dialog box as below.

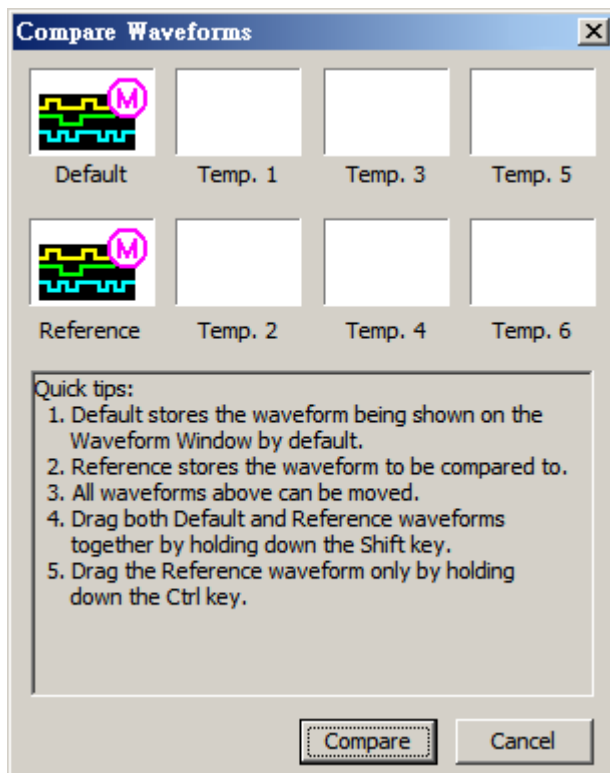


**Default** – it stores the waveforms on the Waveform Window by default.

**Reference** – it stores the waveforms to be compared to.

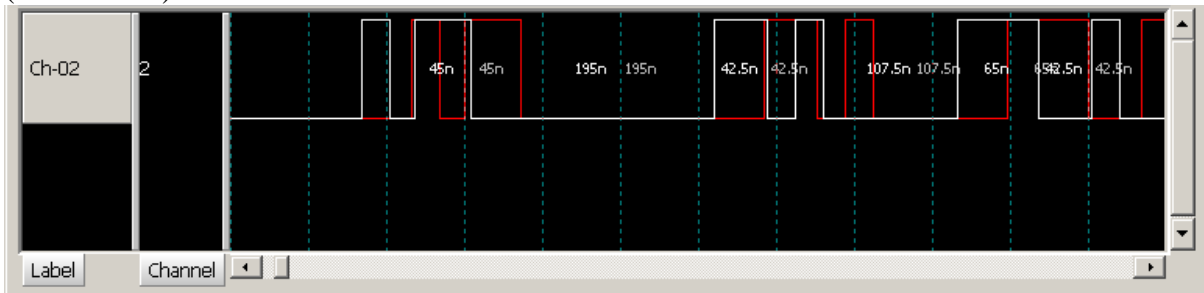
**Temp. 1 ~ Temp. 6** store another 6 temporary reference waveforms.

All 8 waveforms can be moved.



Click Compare to see the Default waveforms (in white color) and the Reference waveforms

(in red color) below.



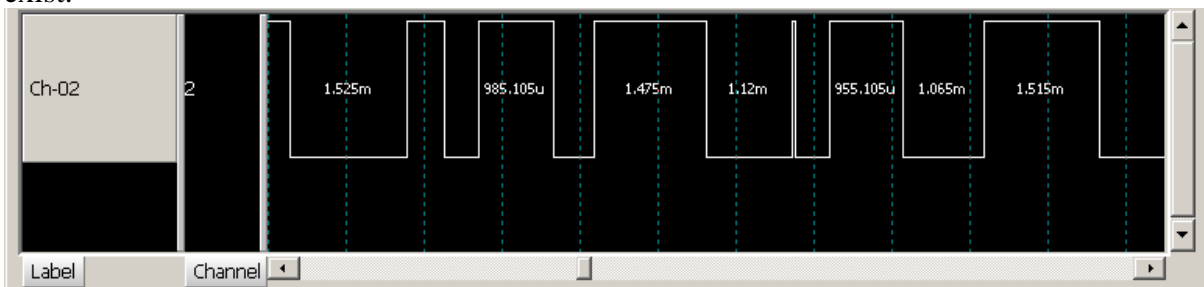
There are three ways to compare these two waveforms:

**Drag the Default waveforms only** - drag the white waveforms.

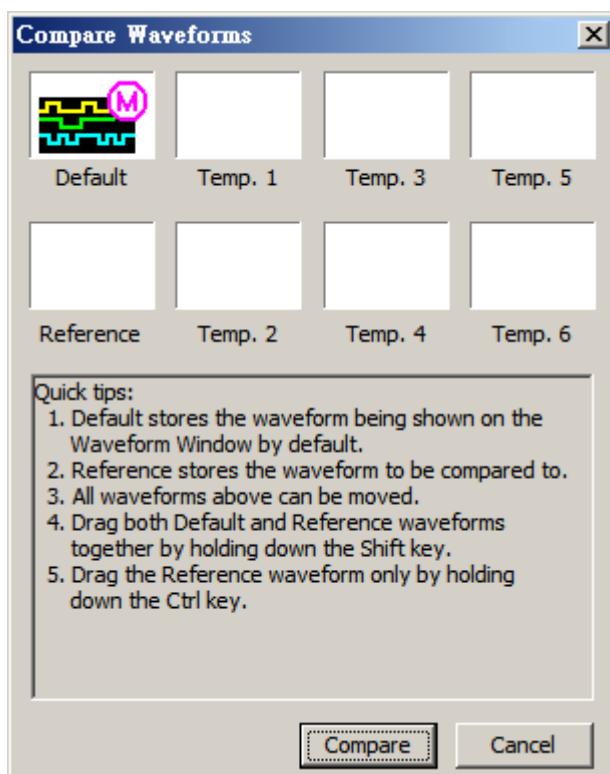
**Drag the Reference waveforms** - hold down the Ctrl key and drag the red waveforms.

**Drag the two waveforms together** - hold down the Shift key and drag the two waveforms.

F9 is the hotkey to compare two waveforms if the Default and Reference waveforms already exist.



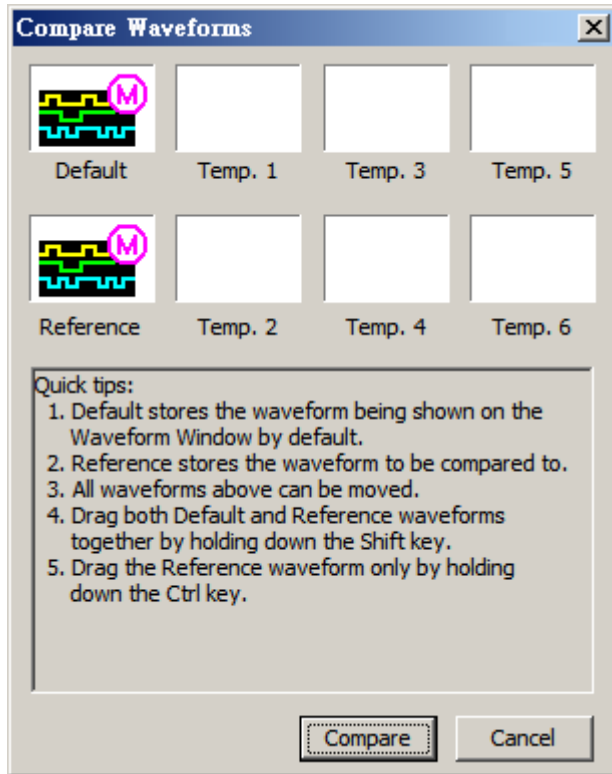
You can also compare two waveform files (Test1.law and Test2.law e.g.). Open the first waveform file (Test1.law) as below.





Then push F8 to show the Compare Waveforms dialog box below with the Test1 file as the Default waveform.

Drag the Default waveforms to the Reference below.



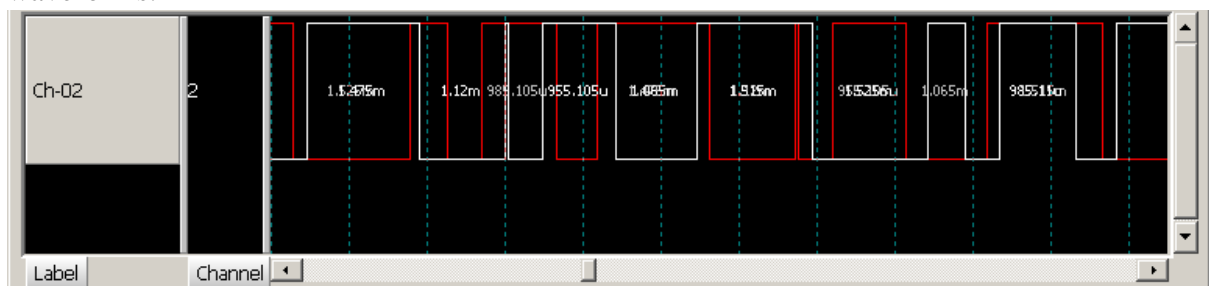
Then click Compare to return to the LA Viewer window and open the second waveform file (Test2.law), you will see the Test1 as the Reference waveforms and the Test2 file as the Default waveforms.

There are three ways to compare the two waveforms:

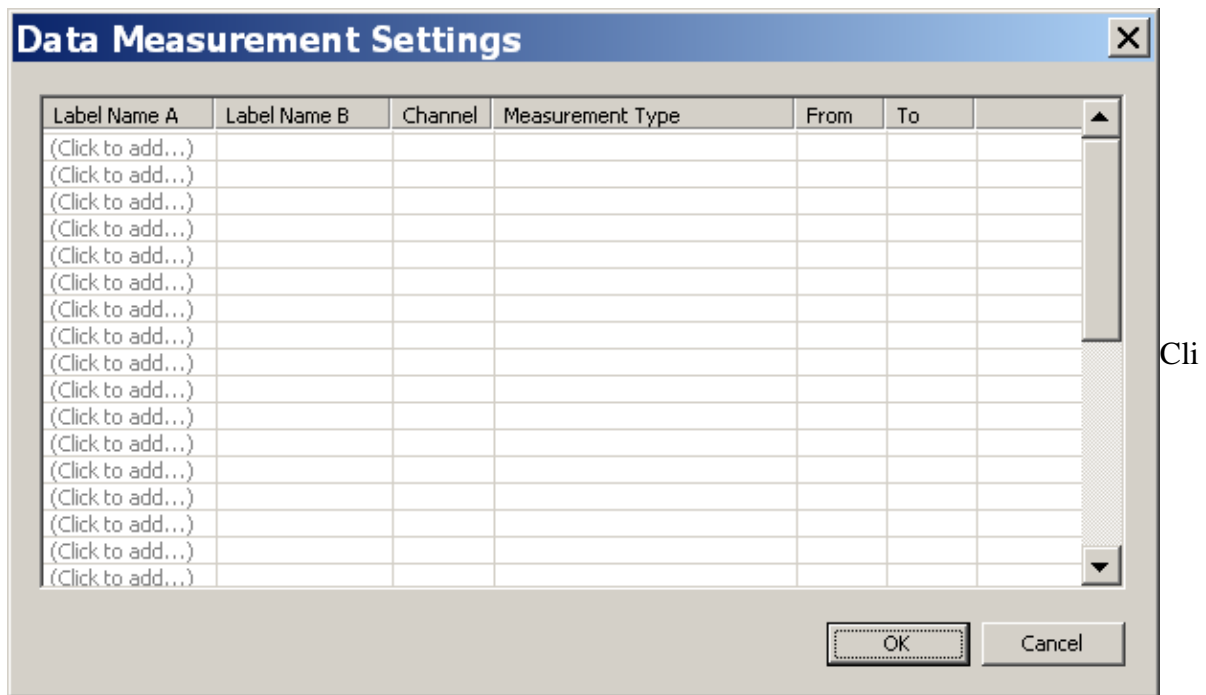
Drag the Default waveforms: drag the white waveforms.

Drag the Reference waveforms: hold down the Ctrl key and drag the red waveforms.

Drag the two waveforms together: hold down the Shift key and drag the two waveforms.



## Data Measurement

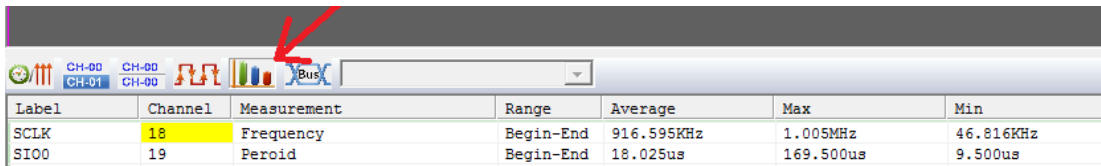


Add the measurement by the label/type/range on the Report Window.

You can drag exit measurement item in the dialog to add the same item.

Type	Channels
Period	1
Frequency	1
Edge Count	1
Cycle Count	1
Positive Cycle Count	1
Negative Cycle Count	1
Positive Pulse count	1
Negative Pulse count	1
Positive Pulse Width	1
Negative Pulse Count	1
Channel-to-Channel Rising Delay	2
Channel-to-Channel Falling Delay	2
Channel Rising to Channel Falling Delay	2
Channel Falling to Channel Rising Delay	2
Phase Delay	2

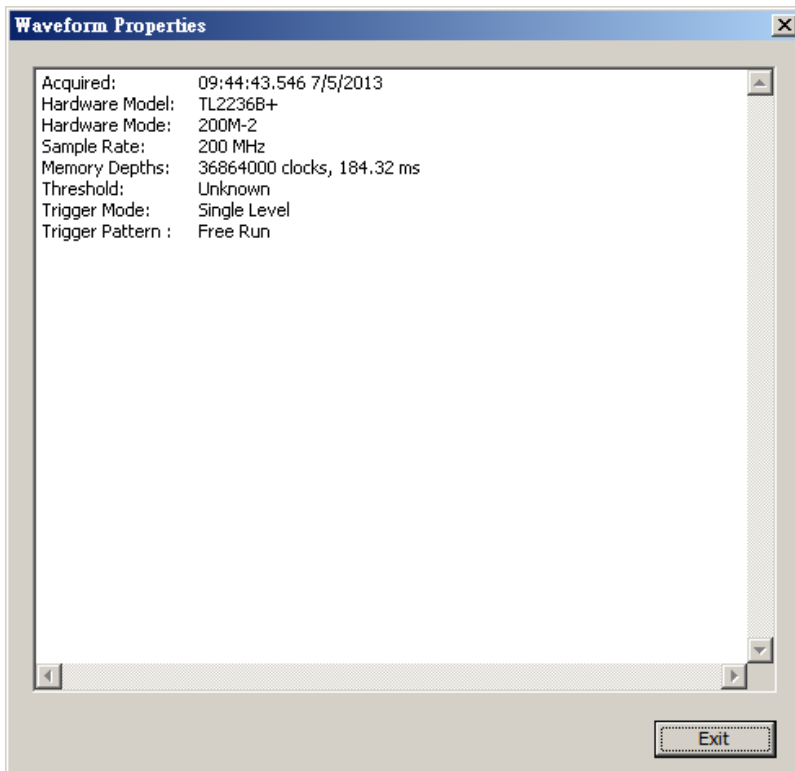
**Result:** Click the report icon to check the measurement result.



Label	Channel	Measurement	Range	Average	Max	Min
SCLK	18	Frequency	Begin-End	916.595KHz	1.005MHz	46.816KHz
SIO0	19	Peroid	Begin-End	18.025us	169.500us	9.500us

## Waveform Properties

Click Waveform Properties to display all parameters' settings saved by default for the last data acquisition.



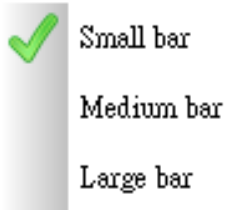
## View

### Toolbar

Display all the buttons below.



Right click the mouse to change the size of tool bar.



### Channel

Display the selected labels' channel numbers below.

CH-00	0
CH-01	1
CH-02	2
Label	Channel

The channel name will be displayed if “Display the waveform with decode” is checked when adding a bus decode.

I2C	0 SCL
	1 SDA
Label	Channel

### Value

Display the selected labels' value below.

CH-00	0
CH-01	0
CH-02	0
Label	Value

## Activity

Display the channels' activities (frequency or state) below.

CH-00	0
CH-01	0
CH-02	0
Label	Activity

## Simple Trigger

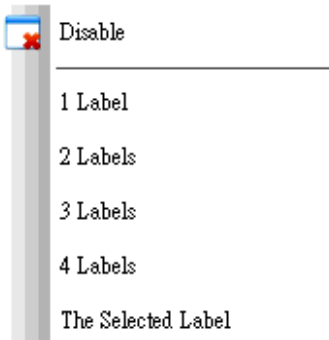
Display the selected channels' trigger settings below.

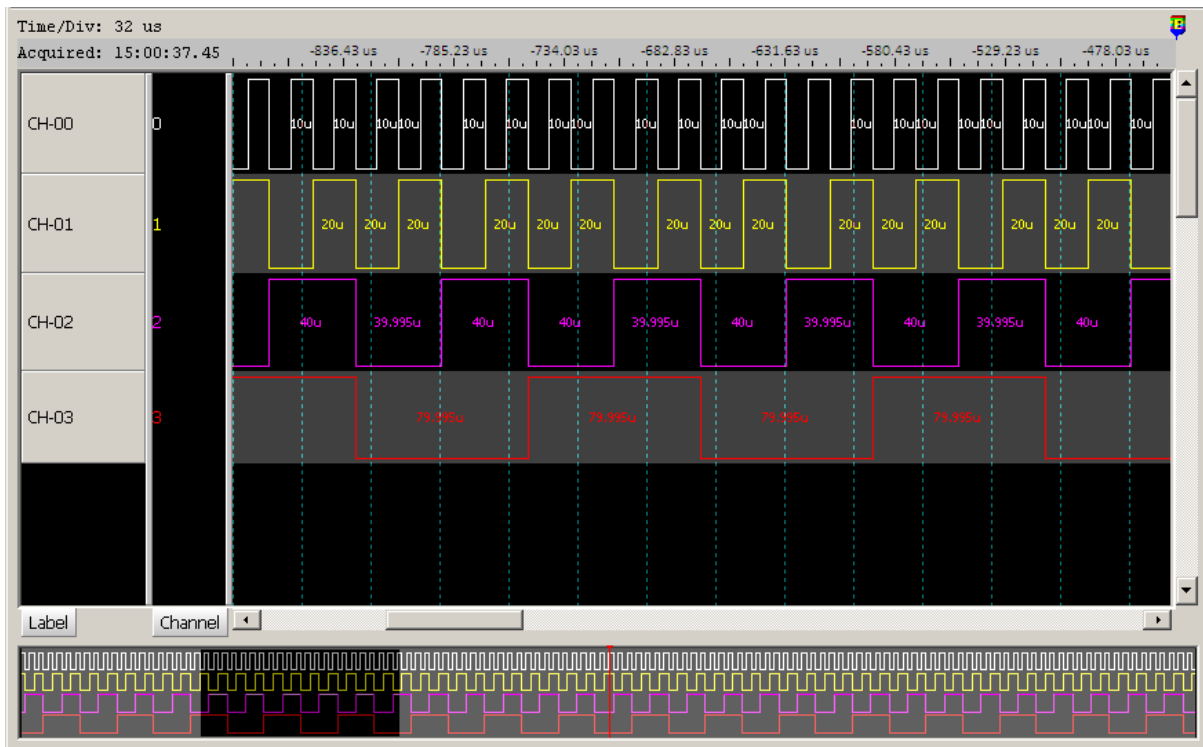
CH-00	X
CH-01	↓
CH-02	X
Label	Trigger

## Zoom Window

Display the acquired waveforms of the top 4 channels or the selected channel in the Zoom

Window to pan the same waveforms on the Waveform Window.





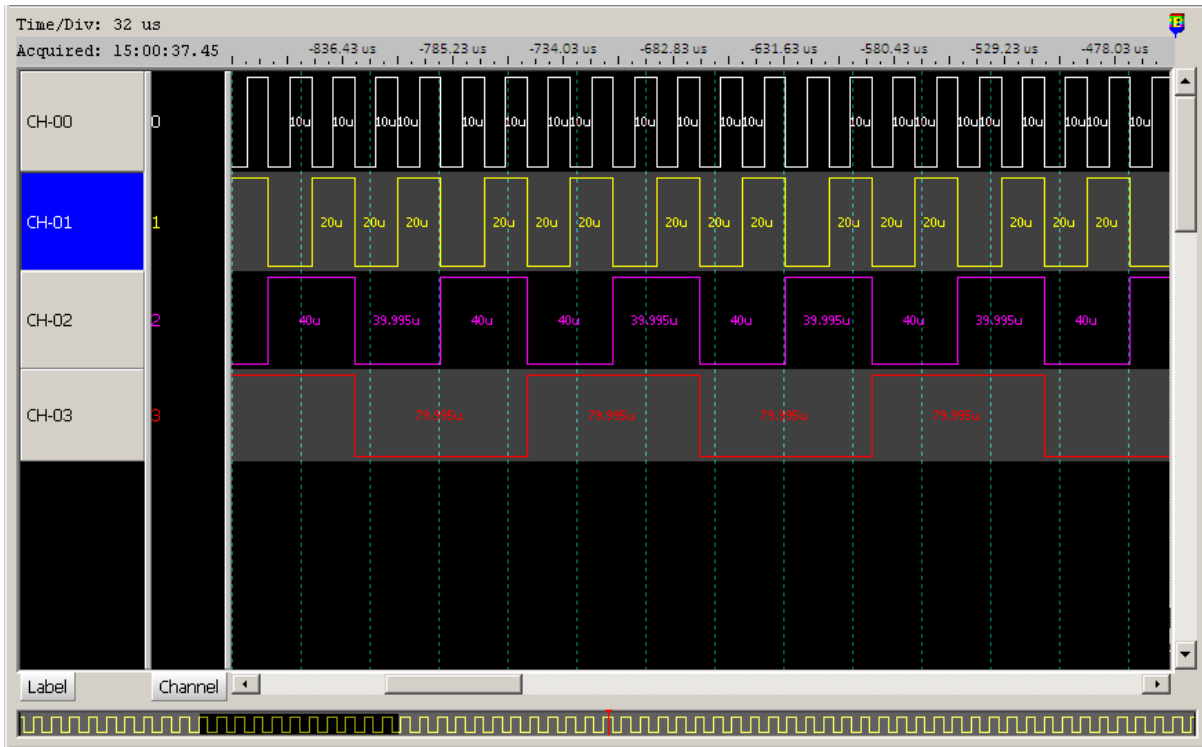
These 4 labels MUST be the top 4 labels in the label field.

The transparent area in the Zoom Window denotes its position in and relative size of the entire waveforms. Move or Zoom the transparent area by mouse will move or zoom the waveforms in the Waveform Window. Click in the Waveform Window to move the transparent area.

There will be a red bar on the top and bottom of the transparent area when it is too small to see.

### The Selected Label

Select the label you want to see in the Zoom Window; click View → Zoom Window → The Selected Label.



## Report Window

Display the labels' value. Click View → Report Window to show the menu below. Move the waveforms in the Waveform Window and those waveforms' values will move accordingly in the Report Window.

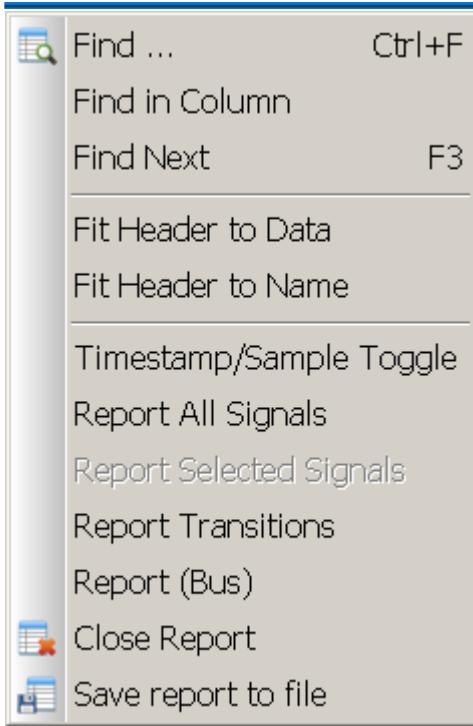
The cursor in the waveform window marked in the report window. There are three type:

Upper triangle: In the middle of current transition and prev transition

Triangle: In the current transition.

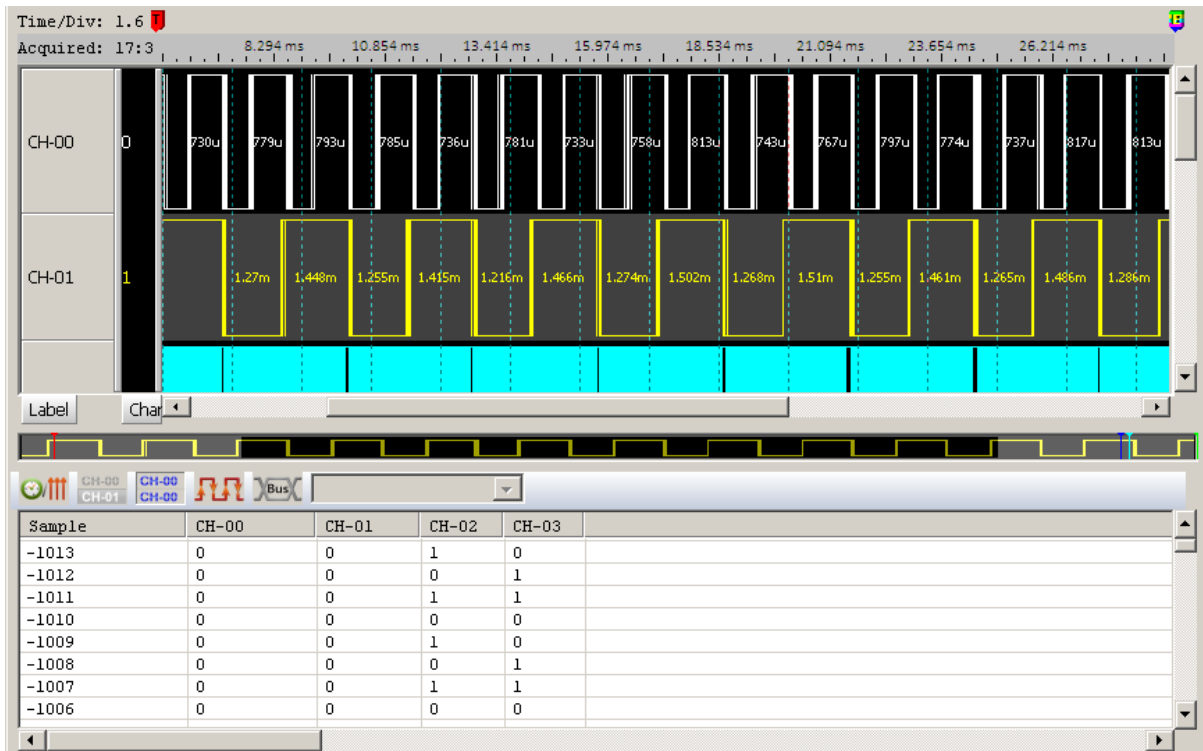
Lower triangle: In the middle of current transition and next transition

Timestamp	Status	Address	D0	D1	D2	D3	D4	D5	D6	D7	ASC
-0.000013895 S	Start	Wr 4D									
0.00030543 S	Repeat Start	Rd 4D	15								.
1.63486168 S	Start	Wr 4D									
1.63518103 S	Repeat Start	Rd 4D	15								.
3.27170564 S	Start	Wr 4D									
3.272025035 S	Repeat Start	Rd 4D	15								.
4.90630092 S	Start	Wr 4D									
4.906620345 S	Repeat Start	Rd 4D	15								.
7.033333495 S	Start	Wr 4D									



### All Labels

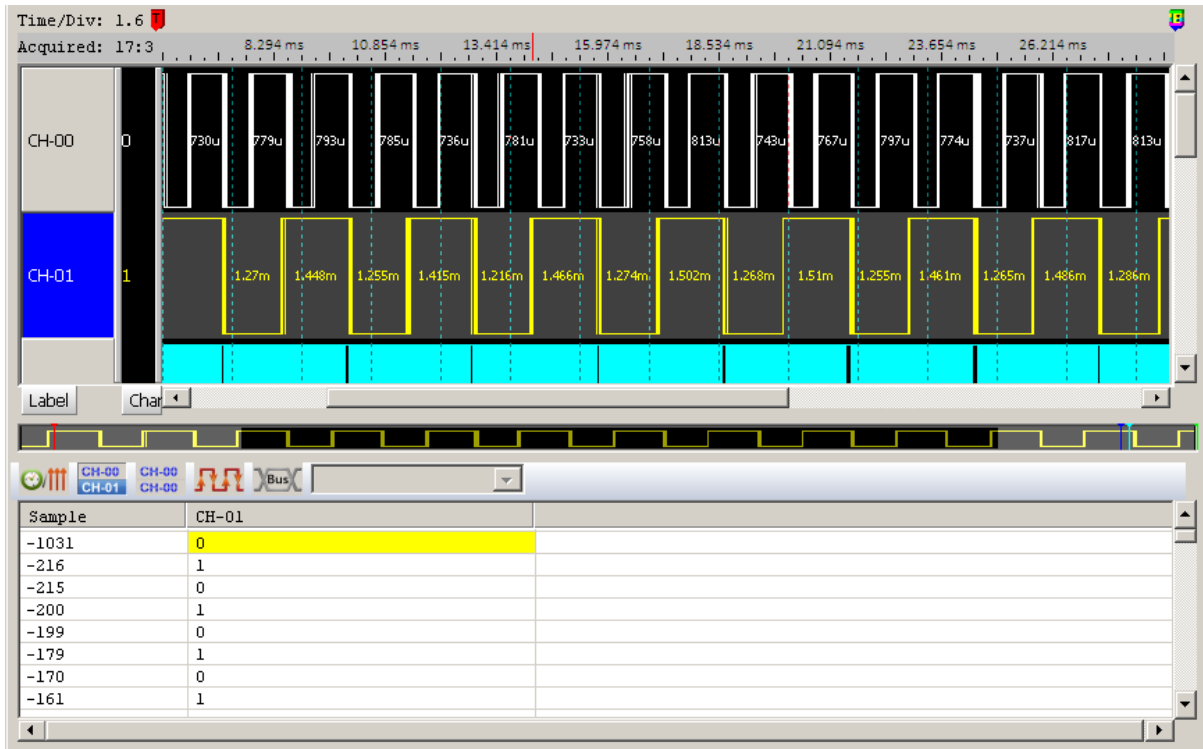
Show all labels' values in the Report Window below.





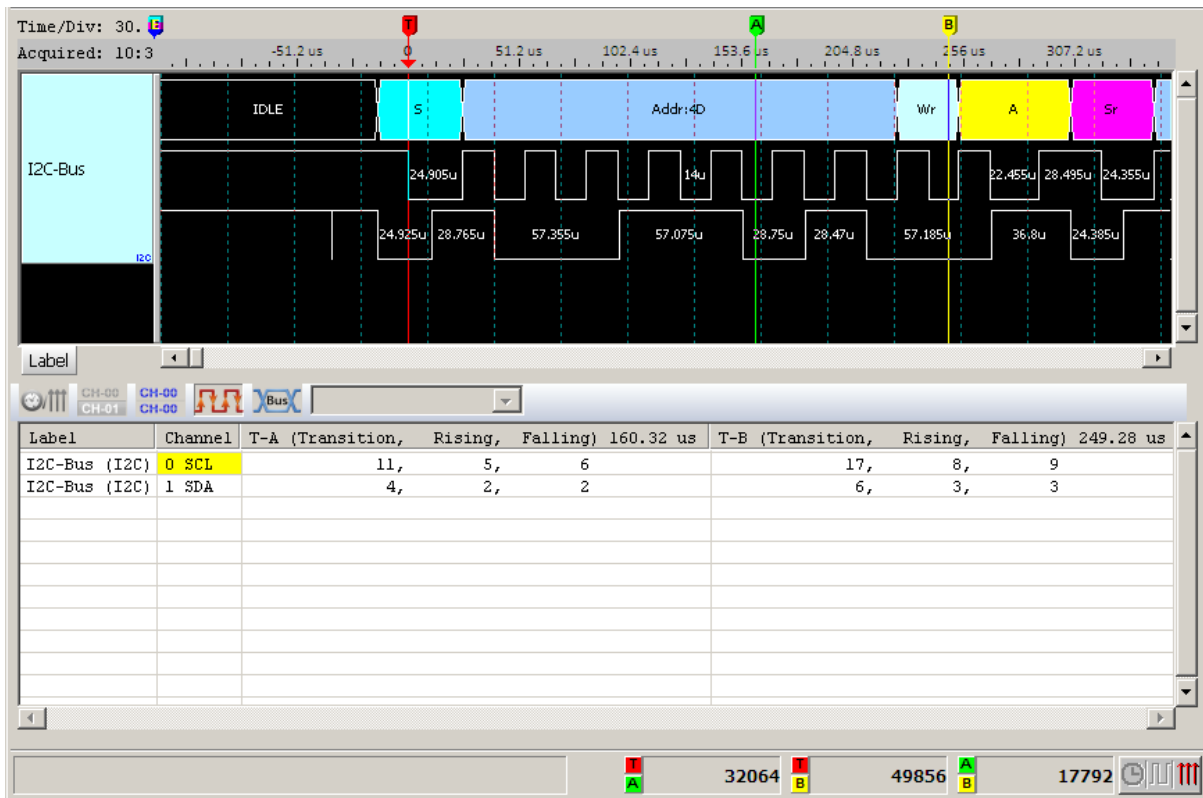
## Selected Labels

Show the selected labels' values in the Report Window.

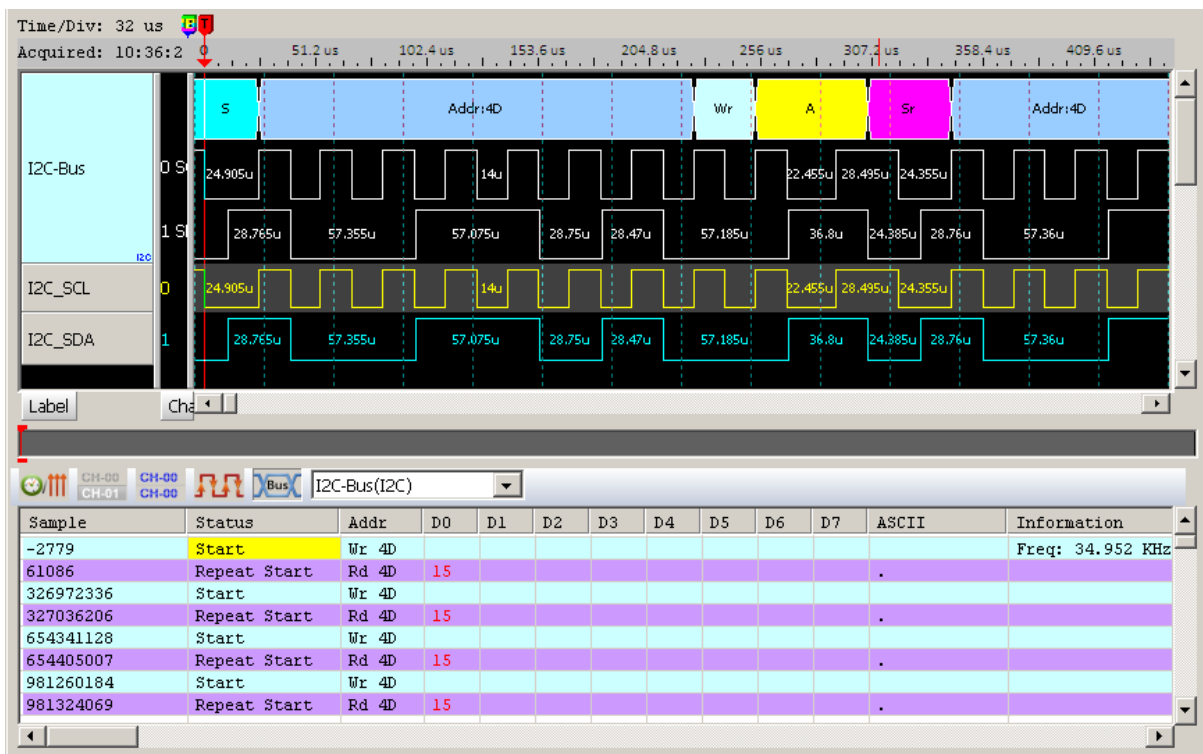


## Transitions Labels

Show the transitions / rising / falling number between the cursors.



**Bus Decode shows a bus decode in the Waveform Window and the Report Window.**



### Save report to file


Save the report as a .CSV or text file, it can choose “No Sample/Timestamp” when save as .CSV file.

### Waveform/Report Tracking

Dragging the waveform, the Report Window will automatically follow the movement, so that Waveform Window and Report Window can be displayed simultaneously.

## **Device**

### **Run**

Acquire data and fill the memory buffer when the trigger occurs and stop when the memory buffer is full. The running status icon () on the upper-right corner of the software window will flash while some toolbar buttons are disabled (in gray color) during the data acquisition.

### **Repetitive Run**

Acquire data continuously and only stop when you press the Stop Run button.

### **Quick Repetitive Run**

Acquire data continuously and save to “work directory” until press the Stop Run button.

### **Stop Run**

Stop acquiring data.

## Hardware Settings

### Field Description

Field Name	Description
Mode	<p>Each mode represents an independent firmware.</p> <p><b>a. LA1000P、LA2000P and PKLA1000 Series</b></p> <ul style="list-style-type: none"> <li>• <b>Single</b> Original memory depth per channel for all channels.</li> <li>• <b>Double</b> Double memory depth per channel for a half channels used.</li> <li>• <b>External Clock</b> Use the device-under-test's clock as source to sample (synchronize) analysis.</li> </ul> <p><b>b. TravelLogic Series</b></p> <ul style="list-style-type: none"> <li>• <b>PicoVu 4G/PicoVu 2G/1.6G/800M/400M/200M</b> Available sampling rates (Hz).</li> <li>• <b>PicoVu 4G Glitch</b> Set the glitch as the trigger condition.</li> <li>• <b>PicoVu 4G Transitional/Transitional Storage</b> Record the transitional data only (rising or falling edge) and the time between two edges.</li> <li>• <b>CAN/I<sup>2</sup>C/I<sup>2</sup>S/LPC/SPI/SVID/UART... Trigger</b> Set the bus decode as the trigger condition.</li> <li>• <b>External Clock</b> Use the device-under-test's external clock as source to sample (synchronize).</li> </ul>
<b>Min. S/R</b>	Minimum sampling rate.
<b>Max. S/R</b>	Maximum sampling rate.
<b>Available ch.</b>	Select the number of channels to be used.
<b>Min. Mem.</b>	Minimum memory depth.
<b>Max. Mem.</b>	Maximum memory depth.

**Ext. Clock(Hz)**

Enter the timing for the external clock when it is used as the sampling rate.

**Custom Memory Depths(bits/ch)**

Customize the memory depth per channel manually.

**Recordable Time**

The LA Viewer will calculate and display the time to record the captured data based on the sampling rate and custom memory depth.

## **Trigger Settings**

Trigger is to use the logic analyzer's electronic circuits to capture the data that matches the pre-set criteria.

### **Trigger Mode:**

#### **Pre-Trigger**

Click Pre-Trigger to record the acquired data in the memory buffer between its beginning and the trigger position until full even when triggers occurred in between.

#### **Post-Trigger**

Click Post-Trigger to record the acquired data in the memory buffer between its beginning and the trigger position until full and then stop.

#### **Delay-Trigger**

Delay the trigger N nanoseconds (ns) after the trigger position.

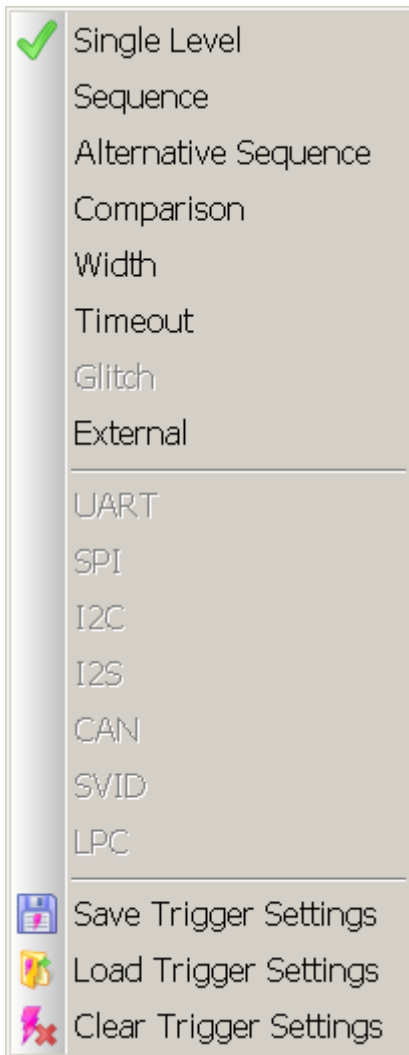
#### **Pass Count**

Pass count will pass N times that triggers occurred.

### **Common Trigger Settings:**

#### **Select trigger**

Click Trigger Settings on Toolbar or Device menu



**Reset**

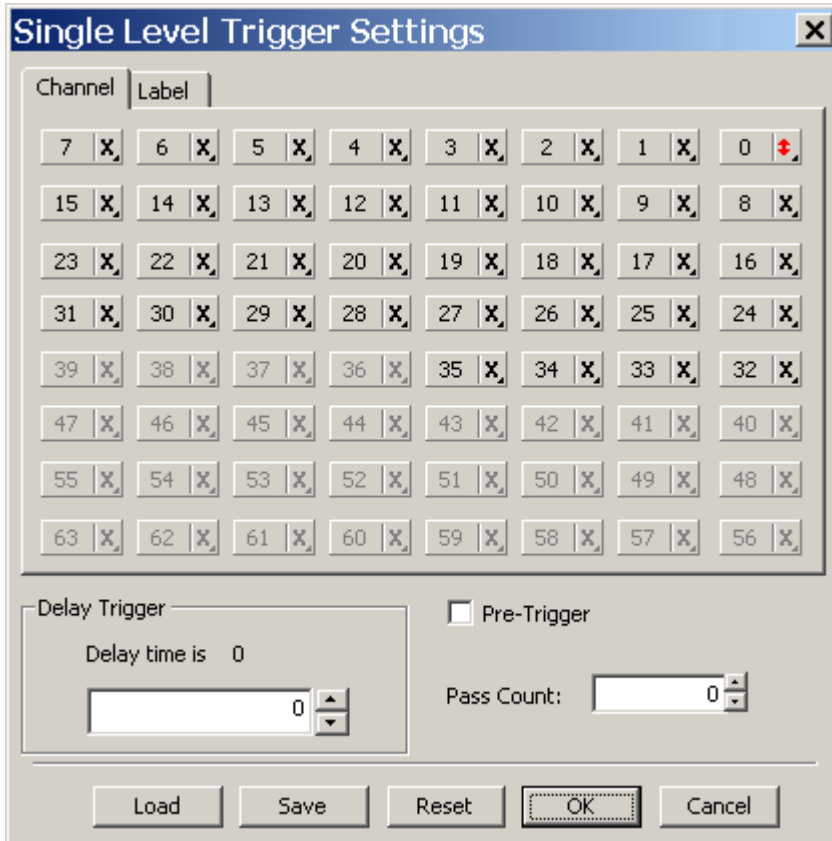
Clear all trigger settings.

**Save/Load**

Save/Load the current triggers settings.

## Single Level Trigger

The single level trigger is available for all logic analyzers. Settings dialog box below.



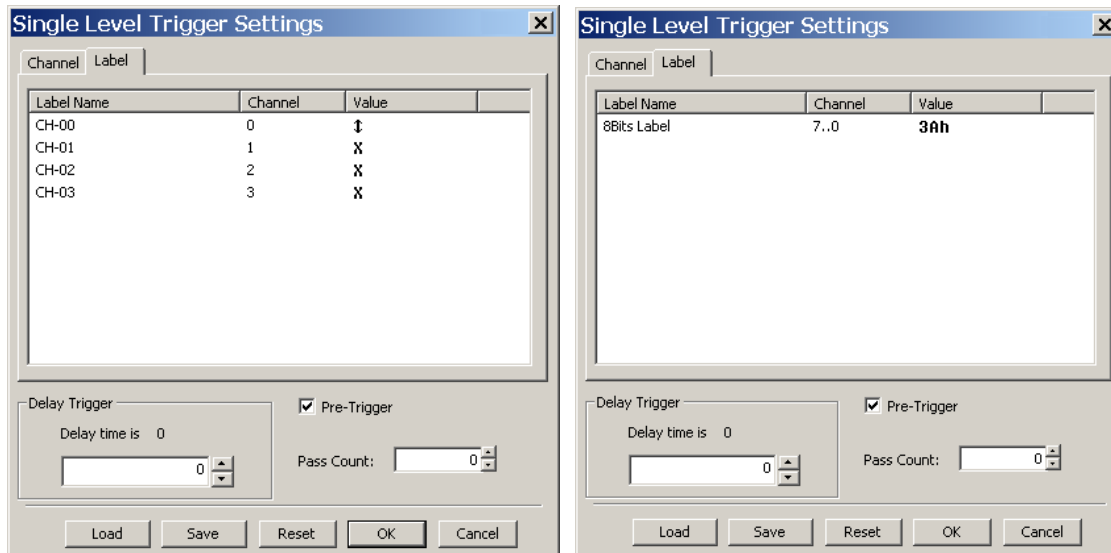
**Channel:** (Use the channel numbers to be set.)

Click on the channel to set its value (x is the default) as the menu below, but **ONLY** one channel can be set as Rising Edge ↑, Falling Edge ↓, or Change ↕.

0	Low
1	High
X	Don't care
↑	Rising edge
↓	Falling edge
↕	Change

**Label:** (Use the channel name to be set.)





Double click or right-click on the label name, channel, or value of any single channel to set its value (x is the default) as the menu below, but **ONLY** one channel can be set as Rising Edge ↑, Falling Edge ↓, or Change ↕.

0	Low
1	High
X	Don't care
↑	Rising edge
↓	Falling edge
↕	Change

**If a label represents multi channels (8 bits e.g.), its value can be set as:**

Hexadecimal (3Ah e.g.)

Octal (57o e.g.)

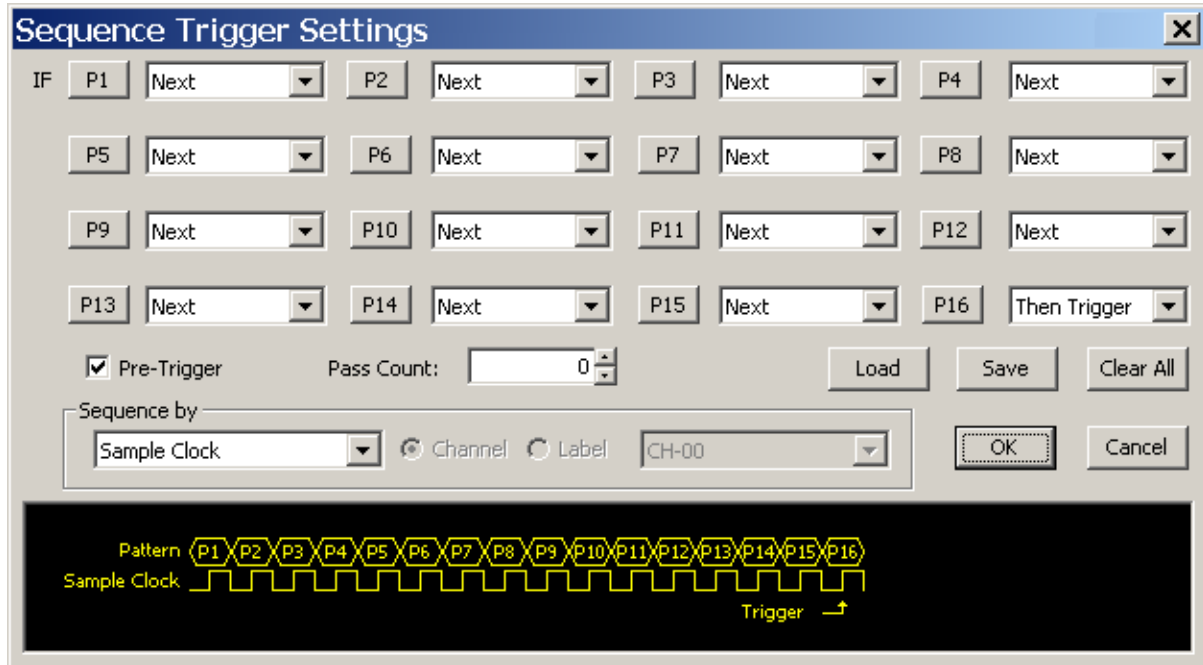
Binary (110010b e.g.)

Decimal (35 e.g.)

ASCII ('A' e.g.).

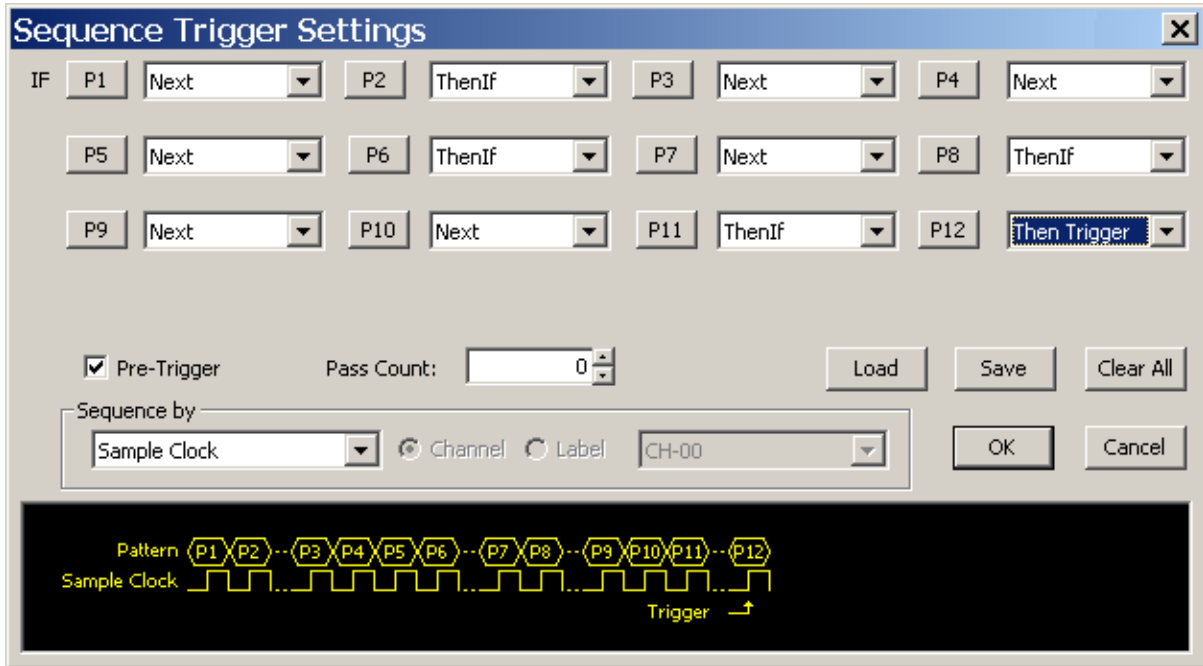
## Sequence Trigger

This feature is only available in TravelLogic Series. Sequence Trigger Settings dialog box below.



## Sequence Trigger Settings

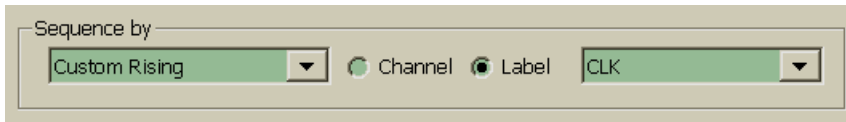
The Sequence Trigger has 16 levels and the last level is the trigger; the Pre-Trigger and Pass Count settings are the same for all levels. For example, a 12-levels sequence trigger is set as the dialog box below: Next (P1, P3 ... P5, P10 and P11) means continuous trigger condition, Then If (P2, P6,..., P9) means discontinuous trigger condition and Then Trigger (P12) means trigger.



### Sequence by the selected channel

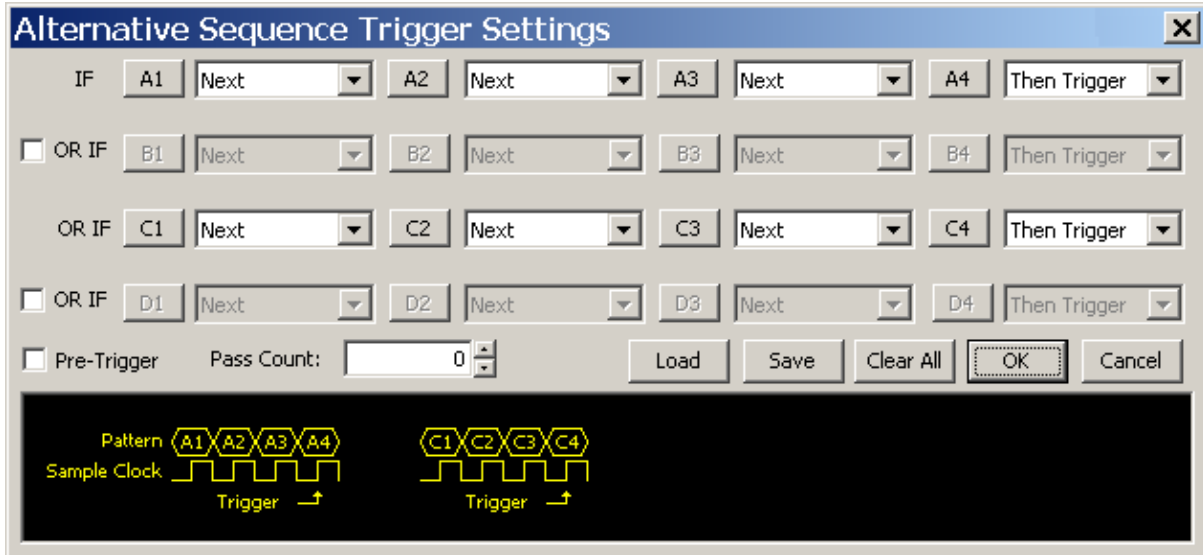
You may set the sequence trigger condition on your selected channel only to avoid trigger conditions in wanted channels.

For instance, you can set rising signal as the trigger condition only in the Clock channel and ignore the rising signals in another 4 data channels.



## Alternative Sequence Trigger

This feature is only available in TravelLogic Series. Alternative Sequence Trigger Settings dialog box below.



## Comparison Trigger

This feature is only available in TravelLogic Series and only available at or under 200Mz, so you must select the 200M-36 mode in the Hardware Settings dialog box below. The comparison trigger is designed to compare group bus but not for the bus decode.

## Trigger Setting

Comparison Trigger Settings dialog box below.

### Label

Select a label with two values (Value1, Value2) for comparison.

### Value1, Value2

The values can be up to 32 bits. Input can be in binary, decimal, hex code or don't care.

### Comparison conditions

The instrument will trigger when one (only) of the conditions below is matched.

“Pattern == Value1 or Pattern == Value2”,

“Pattern != Value1 and Pattern !=Value2”,

“Pattern > Value1”,

“Pattern >= Value1”,

“Pattern < Value1”,

“Pattern <= Value1”,

“Pattern  $\geq$  Value1 and Pattern  $\leq$  Value2” (Value2 must  $>$  Value1),

“Pattern  $<$  Value1 or Pattern  $>$  Value2” (Value2 must  $>$  Value1).

### **Chip Select Channel**

The instrument will trigger only when WR is high.

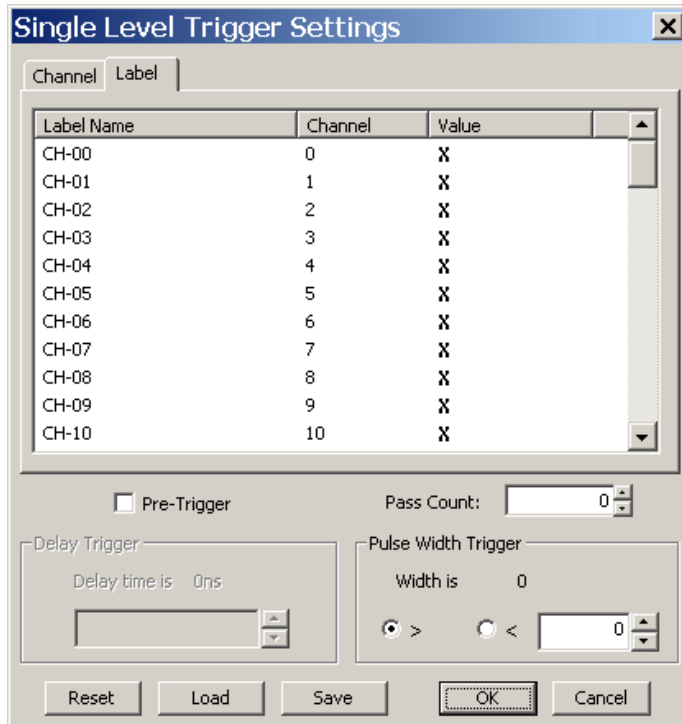
### **Latch Channel**

The instrument will trigger only when CS is rising.

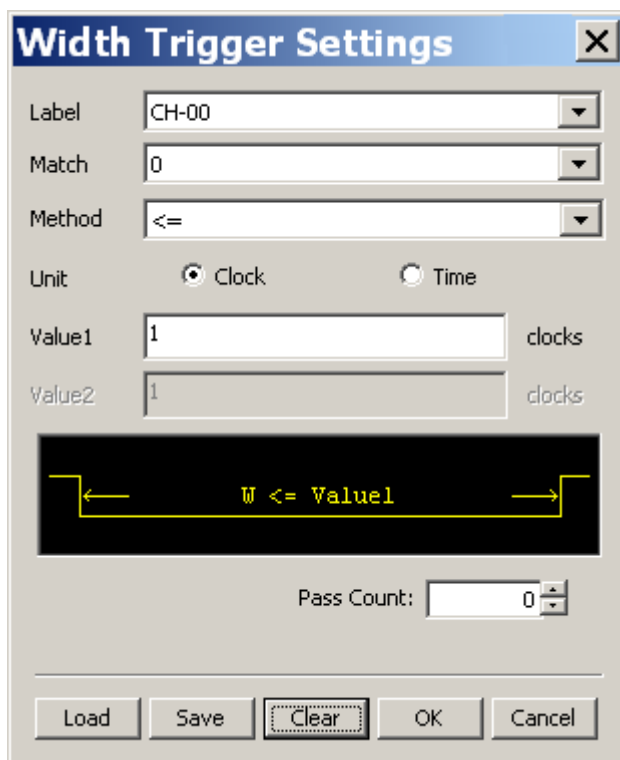
## Width Trigger

Only the TravelLogic series and the LA2164P support the width trigger. Settings dialog box below.

LA2164P:



TravelLogic series:



### **Pulse Width Trigger**

Pulse Width condition can be set as > (or <) N nanoseconds (ns). For example, set the Clock Pulse Value at 1 (high) and Pulse Width Trigger > 50 ns, the instrument will trigger when the clock pulse is High and its pulse width > 50 ns.

Samples = pulse width/sampling rate.



## Timeout Trigger

Only the TravelLogic support the Timeout trigger in the dialog box below.

**Timeout Trigger Settings** [X]

Label: CH-00

Match: 0

Unit:  Clock  Time

Value1: 0 clocks

Pass Count: 0

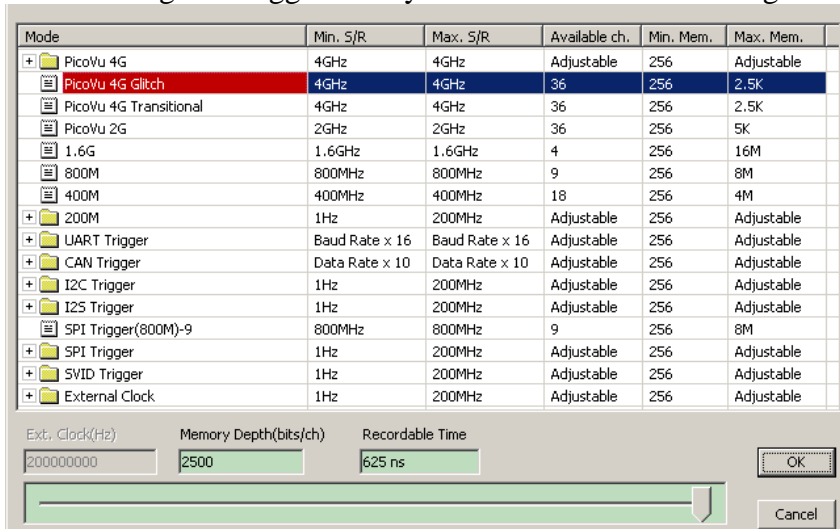
Buttons: Load, Save, Clear, OK, Cancel

## Timeout Trigger

Trigger when clock/time holds and out of the time value.

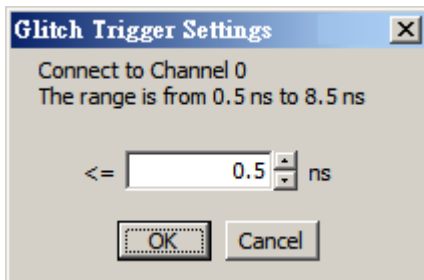
## Glitch Trigger

The feature glitch trigger is only available for the TravelLogic Settings dialog box below.



## Trigger Setting

Select PicoVu 4G Glitch. The Glitch Trigger Settings dialog box below.



ONLY Channel 0 (default) can be the glitch trigger channel. Parameter range: 0.5 ~ 8.25 nanosecond (ns) with a 0.25 ns interval.

Click OK to trigger the glitch and the result will show on the Waveform Window below.

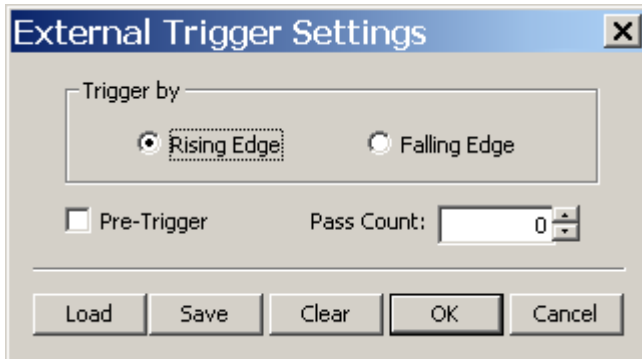
## Result



## External Trigger

Only the TravelLogic and the PkLA1616+ support the External Trigger.

The settings dialog box below.



The TravelLogic series support all four trigger conditions: Rising Edge, Falling Edge, Pre-Trigger and Pass Count; the PkLA1616+ only supports Rising Edge.

## Trigger connection

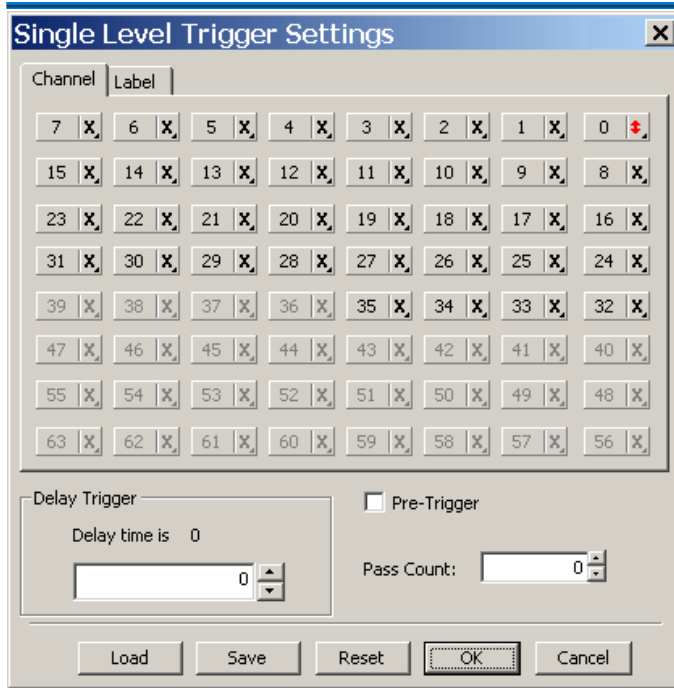
Connect the MCX cable to the trigger in (Trig-In) port of the logic analyzer.

## Delay Trigger

The Delay trigger is only available for the LA2164P.

## Trigger Setting

Click Single level to show the Single Level Trigger Settings dialog box below.



## Delay Trigger

Delay the trigger N nanoseconds (ns) after the trigger position.

## Save/Load/Clear Trigger Table

### Save

Save the trigger settings as a file with subsidiary file name \*.aqt.

### Load

Load the trigger settings file, which must fit for the trigger selected in Hardware Settings.

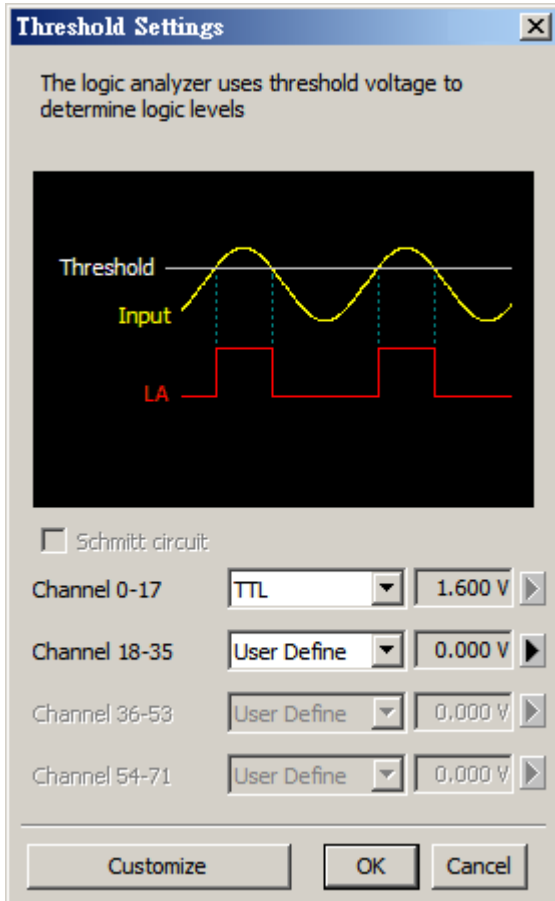
### Clear

Clear the trigger settings.

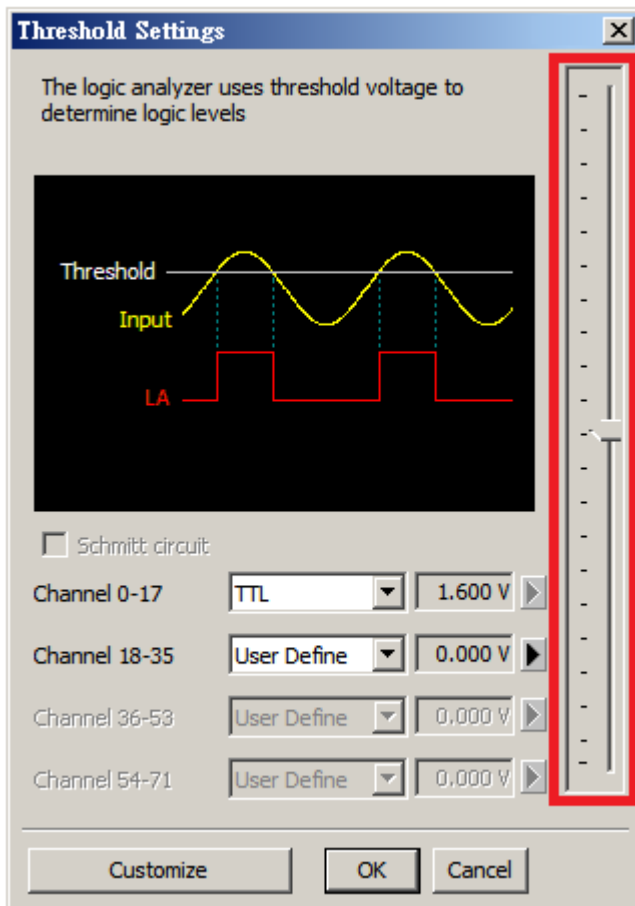
## Threshold Settings

### Single Threshold

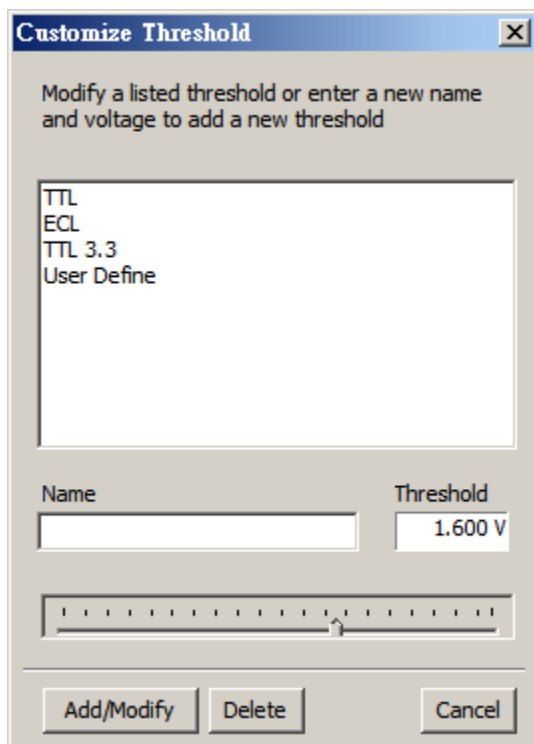
The logic analyzers use threshold voltages to determine logic levels.



You can use the default threshold or customize it (User Define).

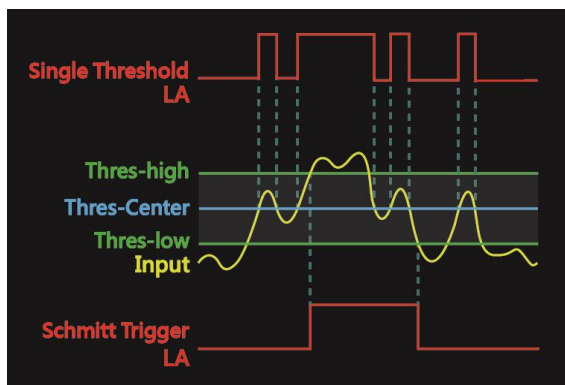
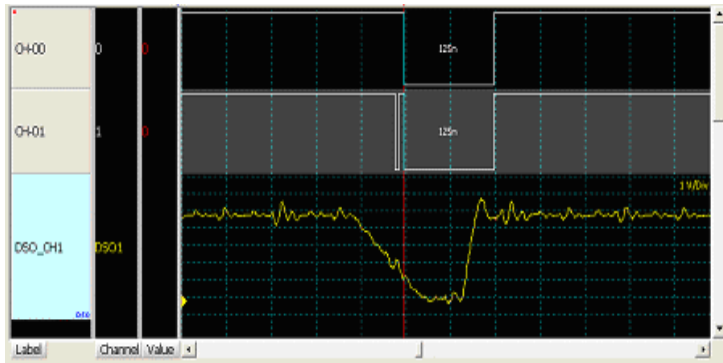


Set the range of +6V - -6V. Click Customize to add, modify, or delete the thresholds.



## Schmitt Circuit

When the target signal transits slowly and bounces, then the logic analyzer might see many noises as the diagram below. The Schmitt circuit offers two thresholds to prevent such noises.



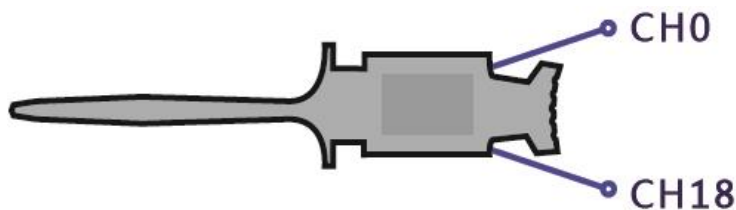
**Method:**

Only available for TravelLogic and sample rates at or below 200 MHz.

Two thresholds: Threshold-High and Threshold-Low are represented by group 1 (Channel 0-17) and group 2 (Channel 18-35).

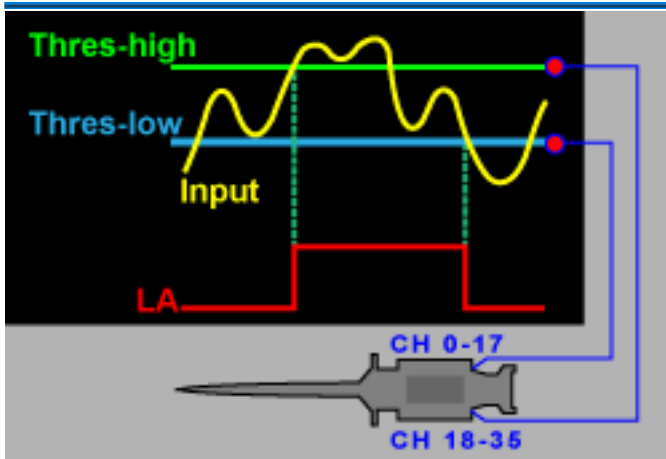
Threshold setting rules

Channel 0 and Channel 18 are a pair, Channel 1 and Channel 19 are a pair, ...



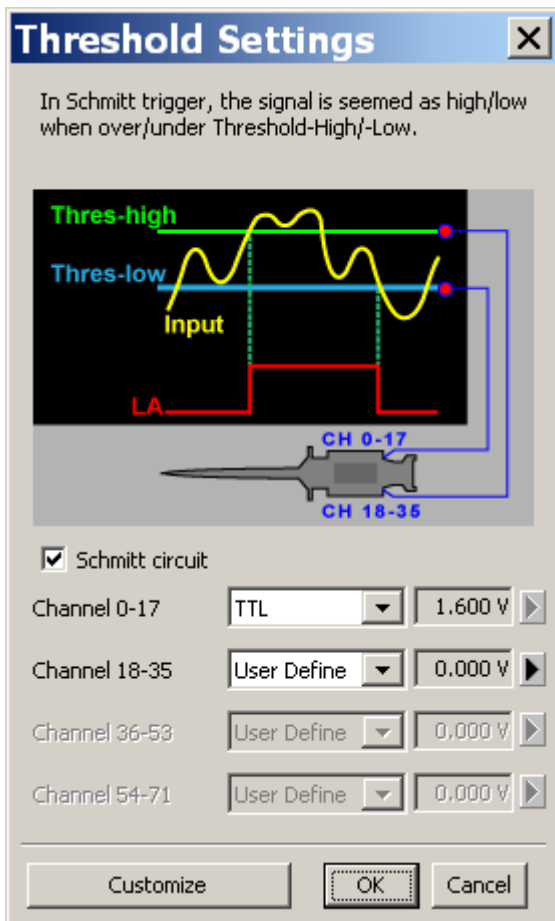
Group 1 (Channel 0-17) can be Threshold-High or Threshold-Low.

When the target signal is rising, it must pass over the Threshold-High to turn to logic 1 from logic 0; when the target signal is falling, it must pass over the Threshold-Low to turn to logic 0 from logic 1.



### Threshold Settings Window

If the Schmitt circuit is checked, then it is Schmitt trigger model.



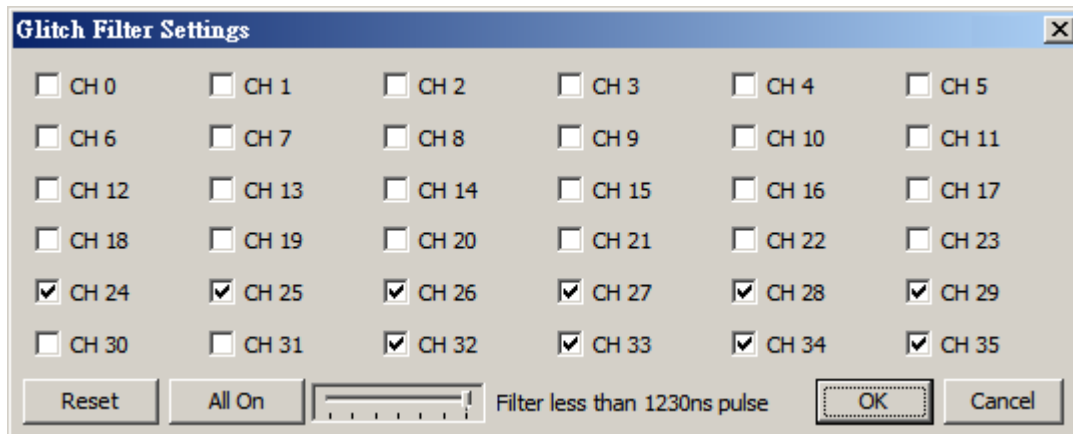


## Glitch Fitter Settings

The TravelLogic series offers this glitch filter to filter those glitches in low speed transitions. This function works for all signals in front of triggers because it is a firmware filter, but only available for sample rates at or below 1.6 GHz.

### Trigger Setting

Click Glitch Filter Settings on the Device menu to show the dialog box below.



### CH0 ~ CH35

Check the channel(s) to be filtered.

### Reset

Clear all settings.

### All On

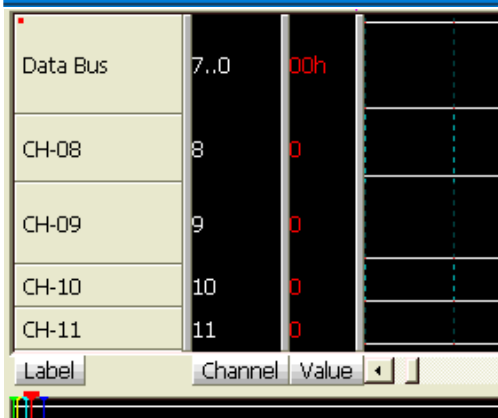
Select all channels to be filtered.

### Filter less than XX ns pulse

Set the pulse width of the filter.

### Red Spots

The filtered (Data Bus) channel will be marked by red spot on the upper-left corner of its label field.



## Applications

### Example 1 Filter glitches caused by bouncing signals.

#### Hardware

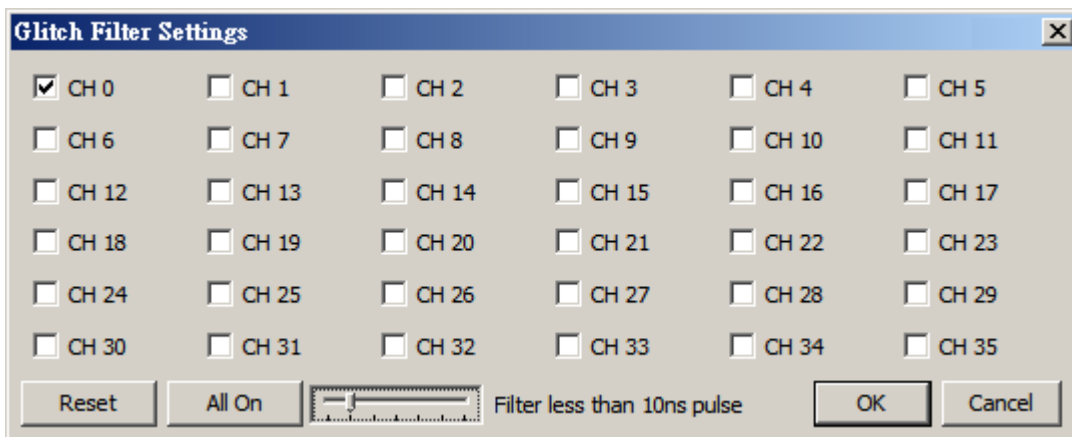
Signal source: Tektronix AFG3252

DSO: Tektronix MSO2024

LA: Acute TL2236B

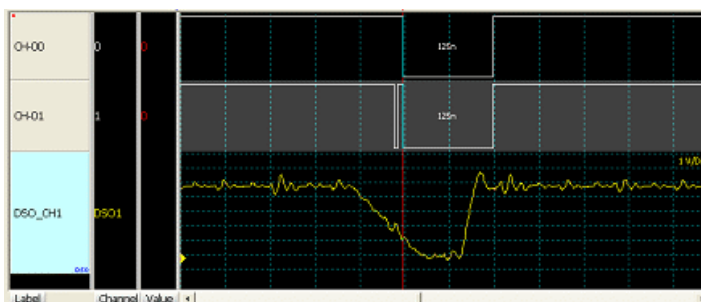
#### Software

Measure CH 0 with a 10ns-pulse filter and CH 1 without any filter.



## Result

Click OK to run the LA Viewer and see CH00 (no glitch) and CH01 (glitches).



## Example 2 Filter glitches caused by crosstalk.

### Hardware

Signal source: Crosstalk between circuit lines of a target system.

DSO: Acute DS-1302

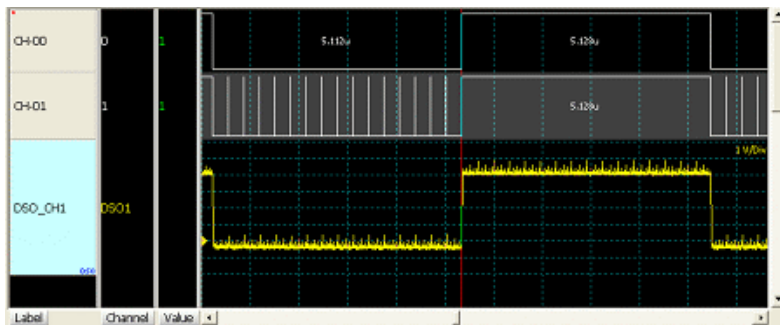
LA: Acute TL2236B

### Software

Measure CH 0 with a 10ns-pulse filter and CH 1 without filter.

### Result

Click OK to run the LA Viewer and see CH00 (no glitch) and CH01 (multiple glitches).



## Stack with the DSO

The software to stack DSOs of different brands is different:

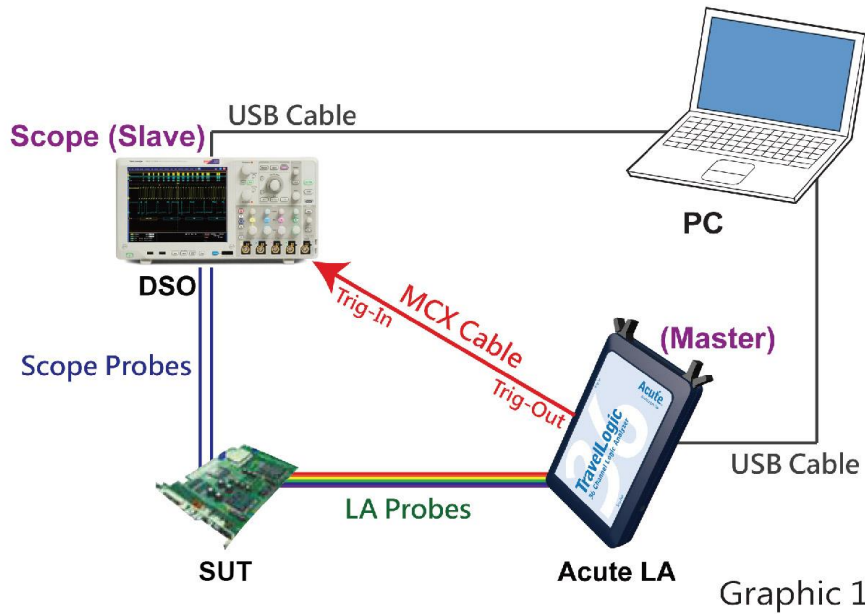
DSO brand	Software
Acute	Any Acute software CD-R (DSO software).
Tektronix	Please download the <b>TEKVISA CONNECTIVITY SOFTWARE</b> from the Tektronix website.
Agilent Keysight	Please download the <b>KEYSIGHT IO LIBRARIES SUITE</b> from the Keysight website.
GW Instek	Please download the <b>Windows USB Drives</b> form the GW Instek website.
LeCroy	Please download the <b>NI-VISA</b> and <b>Drivers</b> from the NI website.
HAMEG	Please download the <b>NI-VISA</b> and <b>Drivers</b> from the NI website.
R & S	Please download the <b>NI-VISA</b> and <b>Drivers</b> from the NI website.

DSOs that can be stacked:

DSO brand	Model	USB	TCP/IP
Acute	● DS-1000/TravelScope	V	
Tektronix	<ul style="list-style-type: none"> <li>● TDS1000B/1000C/2000B/3000/3000B/3000C/5000B/7000</li> <li>● DPO2000/3000/4000/4000B/5000/70007000C/70000/70000B</li> <li>● DSA70000/70000B</li> <li>● MSO2000/3000/4000/4000B/5000</li> <li>● MDO4000</li> <li>● TPS2000/2000B</li> </ul>	V	V
Agilent	<ul style="list-style-type: none"> <li>● DSO1000A/5000A/DSO6000A/6000L/7000A/7000B/9000A</li> <li>● MSO6000A/7000A/7000B/9000A</li> <li>● DSO-X 4000A/MSO-X 4000A series</li> <li>● DSO-X 3000A/MSO-X 3000A series</li> <li>● DSO-X 2000A/MSO-X 2000A series</li> </ul>	V	V
Keysight	<ul style="list-style-type: none"> <li>● DSO-X 3000T series</li> <li>● MSO-X 3000T series</li> </ul>	V	V
GW Instek	● GDS1000A/2000/3000 series	V	
LeCroy	<ul style="list-style-type: none"> <li>● WaveRunner / WaveSurfer</li> <li>● HDO4000 / 6000 series</li> <li>● SDA 8 Zi-A / DDA 8 Zi-A series</li> </ul>		V
HAMEG	● HMO3000/2000/1000 series	V	V
R & S	● RTO1000 series		V

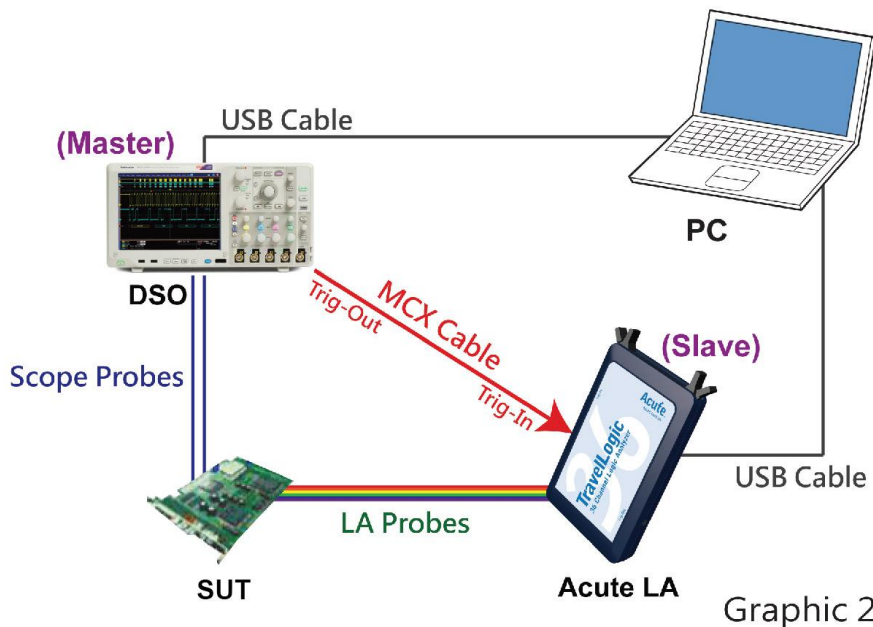
**The stack diagram:**

The logic analyzer is the Master and the DSO is the Slave (Diagram 1).



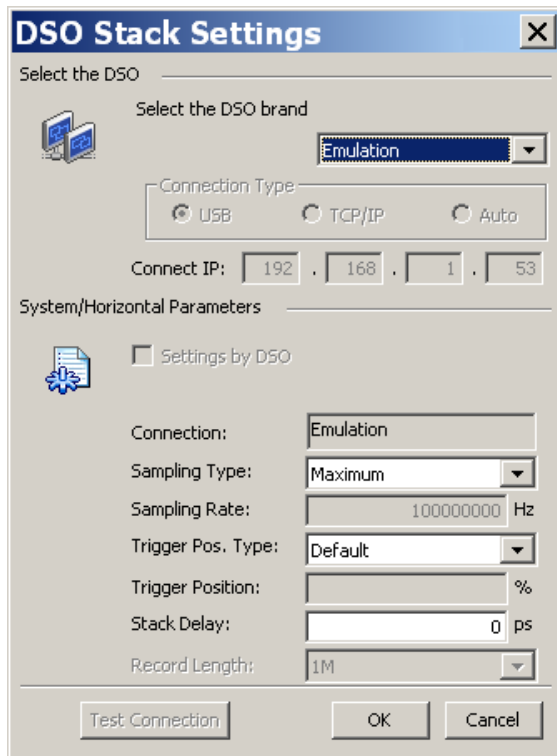
Connect the logic analyzer (Trig-Out) with the DSO (Trig-In or Ch4 for Tektronix MDO4000 serial) over a MCX-BNC cable for the Tektronix/Agilent/GW Instek DSO (MCX-MCX cable for Acute DSO); connect the DSO with the PC over an USB or Ethernet cable.

The DSO is the Master and the logic analyzer is the Slave (Diagram 2).



Connect the DSO (Trig-Out) with the logic analyzer (Trig-In) over a MCX-BNC cable for the Tektronix/Agilent/GW Instek DSO (MCX-MCX cable for Acute DSO); connect the DSO with the PC over an USB or Ethernet cable.

Click DSO stack settings on the Device menu and see the dialog box below.



### Select the DSO Brand

HAMEG, Tektronix, Agilent, Acute, LeCroy, Instek or Emulation (no DSO stacked).

### Connection Type

USB, TCP/IP, Auto. If the DSO model is the Tektronix TDS5000B or DPO7000, use its built-in Windows OS to run the VXI-11 Server, then install the LA Viewer in the DSO and select Auto to stack.

### Connect IP

Enter the IP address if the connection type is TCP/IP. If the stack cable is the Ethernet crossover cable, please set the IP addresses for the logic analyzer (192.168.1.1) and the DSO (192.168.1.2).

### System/Horizontal Parameters

#### Settings by DSO

It's for the DS1000/TravelScope to the master device.

#### Connection

Display the DSO model.

## Sampling Type

Sampling Type can only be adjusted by but the Tektronix/Agilent /GwInstek/LeCroy DSO:

### Maximum

The maximum sampling rate of the DSO.

### Manual

Set the sample rate manually, only available for the Tektronix/Agilent /GwInstek/LeCroy.

### LA X 1

The ratio of the sample rate of the DSO and the logic analyzer is 1:1.

### LA X 10

The ratio of the sample rate of the DSO and the logic analyzer is 10:1.

### Edit

Set the sample rate of the DSO manually.

**The sample rate of the DSO should be set as 10 times of that of the logic analyzer (highly recommended).**

## Sampling Rate

Only available when the Sampling Type is “Edit”.

## Trigger Pos. Type

### Default

The trigger position of the logic analyzer is the same position set manually for the Tektronix or Agilent DSO and is in the middle by default for the Acute DSO.

### Smart(Auto)

Set the trigger position of the DSO automatically. It is only available for Tektronix

DPO7000/7000C.

### Manual

Set the trigger position of the DSO manually.

## Trigger Position



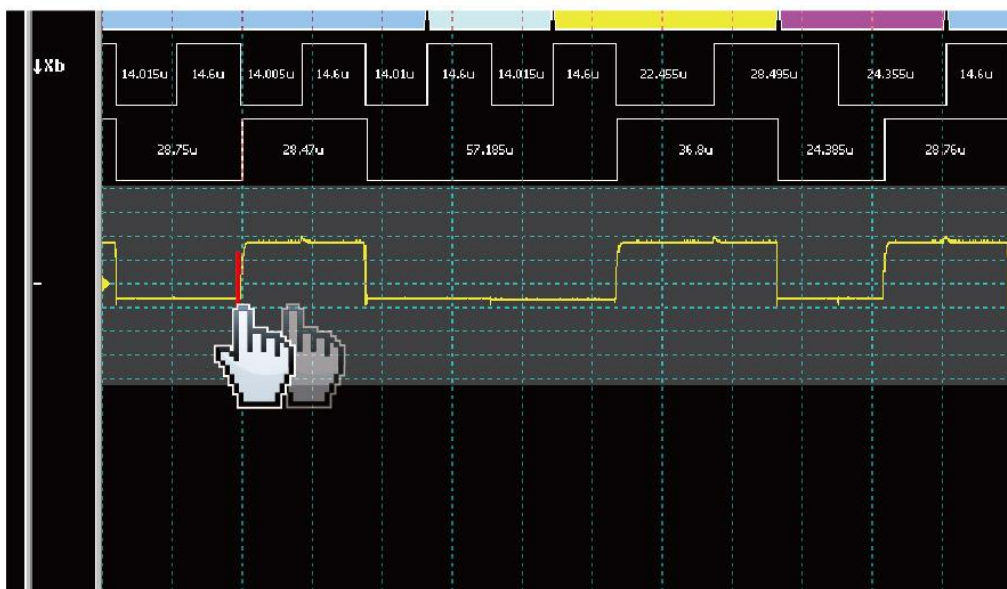
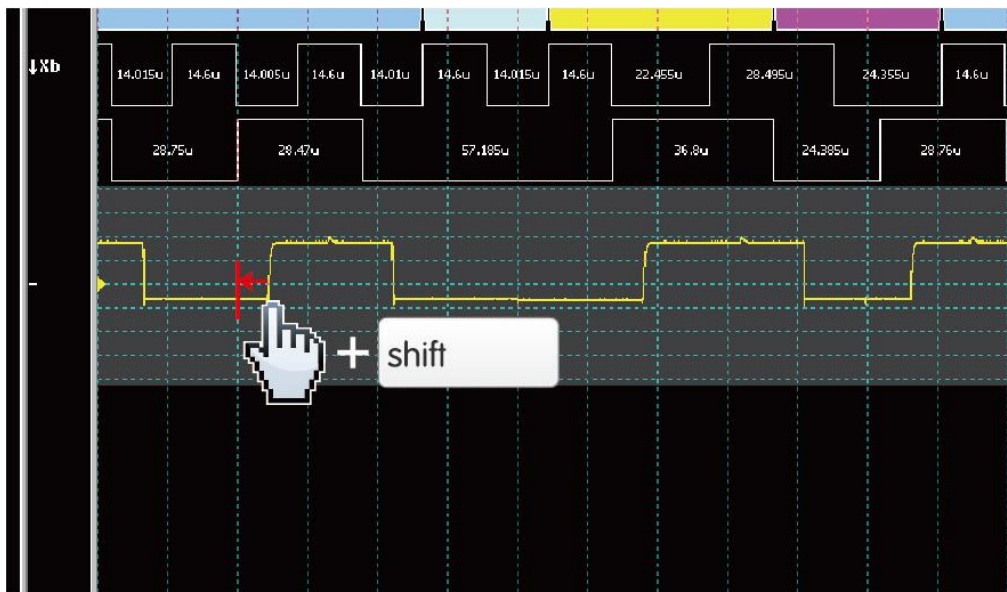
Set the DSO trigger position.1

The memory depth of the stacked Tektronix or Agilent DSO is set manually; if the memory depth is set as 10Kb, then only 10Kb data will be shown in the LA Viewer.

### **Stack Delay**

There will be time delay between the logic analyzer and the DSO due to stack; so, you can compensate the delay by entering the delay time between the two stacked instruments. There is time delay between the stacked DSO and logic analyzer; you can fix the delay by pressing the Shift key and dragging the DSO waveform on the Waveform Window. Click OK after all settings.

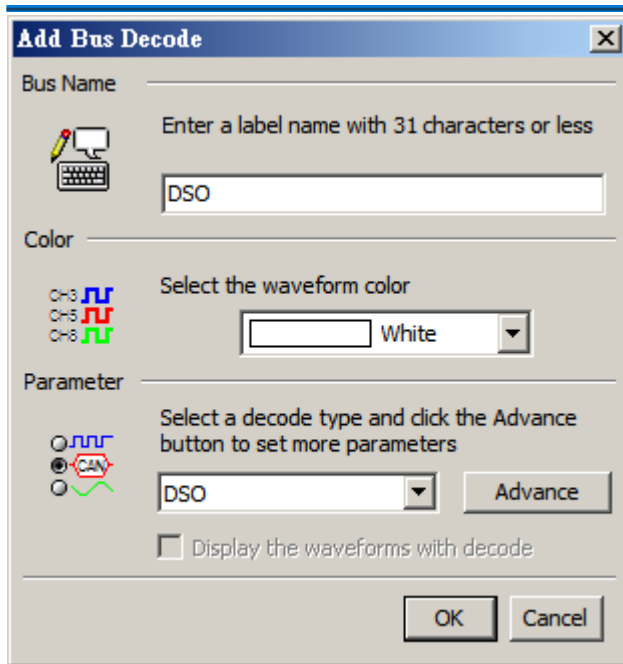
Click Add Bus Decode in the Label menu or right-click on the label field to show the dialog below.



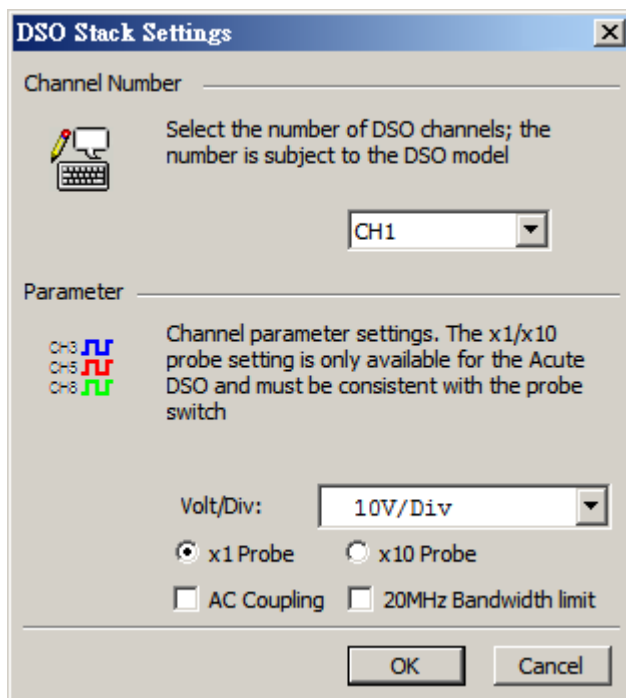
HAMEG DSO can set Stack Delay only.

## Record Length

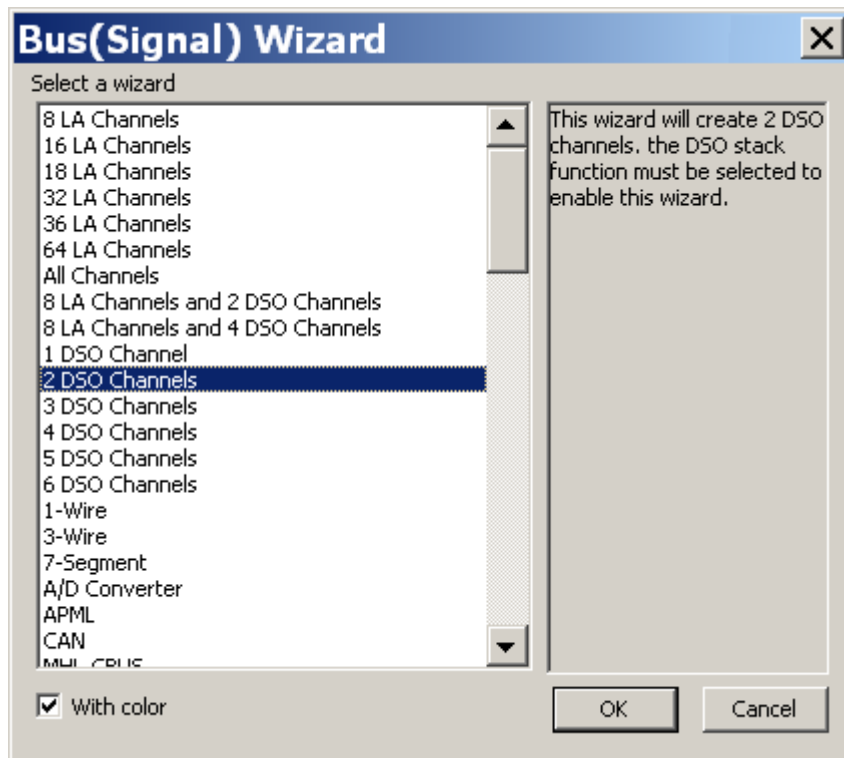
It's for TravelScope to select the record length.



Set more parameters like Bus Name (DSO), Color (White), Parameter (DSO), and check Display the waveforms with decode, then click Advance to show the DSO Stack Settings dialog below.



User can also click “Create Bus (Signal) Wizard” to add many DSO channels at one time.



## DSO Stack Settings

### Channel

Select the number of the DSO channels.

### Parameter

### Volt/Div

Set the threshold voltages according to the working voltages of the target system. If the range of the measuring voltage is 1V, then set the amplitude of each grid as 1V. 1V/Div means one grid is 1V, and 2V/Div means one grid is 2V.

### x1 Probe/x10 Probe

Only available for the Acute DSO.

### AC Coupling

If checked, the coupling is AC or the default is DC.

### 20MHz Bandwidth limit

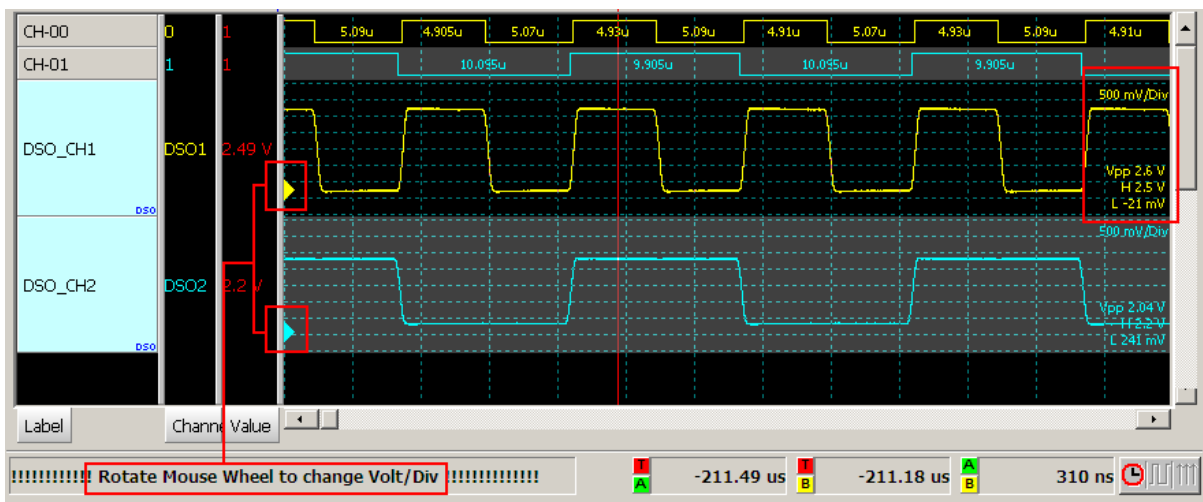
If checked, the 20MHz filter is enabled for the DSO.

Connect CH1 and CH2 of the DSO with CH-00 and CH-01 of the logic analyzer respectively.

Move the mouse cursor on the left edge of the Waveform Window to adjust the waveform height; move the mouse wheel on the right edge of the Waveform Window to adjust the voltage per division (V/Div).

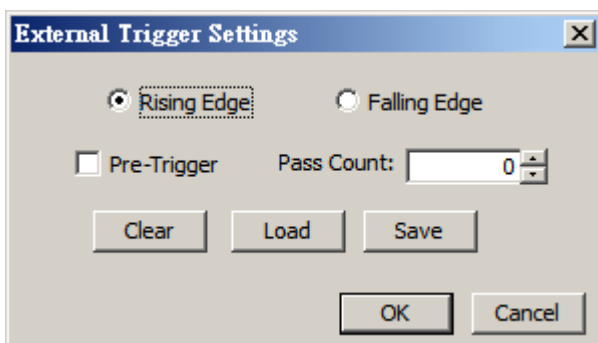
### Display the voltage

Put the cursor on the left side of the waveform and left-click to drag the voltage amplitude vertically. This will display the Vpp, Vhigh, and Vlow on the right side of the waveform. The following figure is an example of 1MHz, 8 bits counter measured by the logic analyzer stacked with the DSO.



### Set the DSO as the Master and the logic analyzer as the Slave.

In order to set the DSO as the Master, you also need to set the rising edge/falling edge as the trigger condition in the External Trigger dialog window below. Click the Hardware Setting to find the External Trigger dialog.

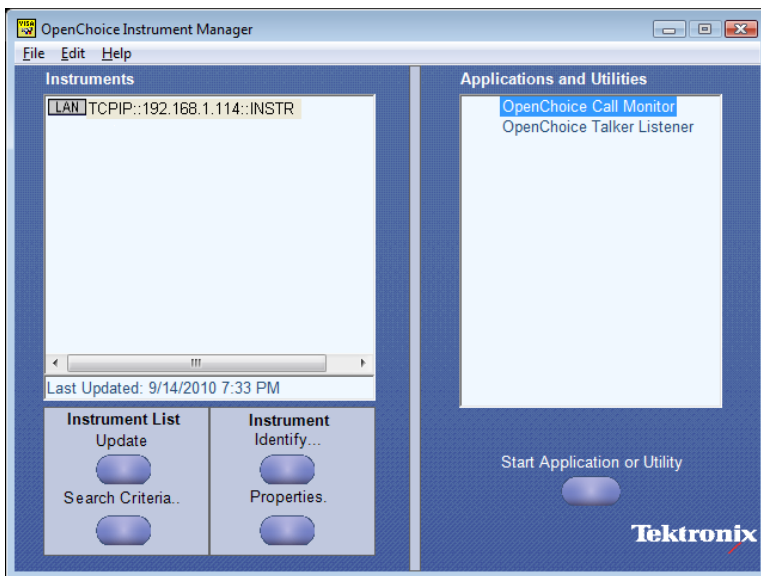
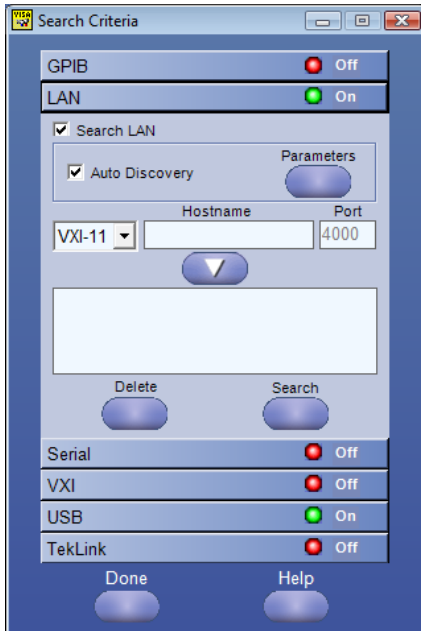


### How to stack with the Tektronix TDS5000B/DPO7000(Windows-based)

Set the VXI-11 Server control on the right-bottom of the Windows as Start VXI-11 Server.

Use the crossover cable (Ethernet) to connect the logic analyzer (recommended).

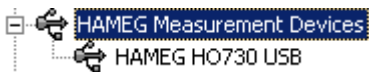
Open the TekVisa Resource manager\ Instrument manager to find the instrument list to show TCP/IP::192.168.1.114::INSTR.



**HAMEG Software Installation:**

Please download NI-VISA 5.4 software from NATIONAL INSTRUMENTS and install it.

Please install USB driver if you select USB interface. Device Manager will show the following result when you install it completely.




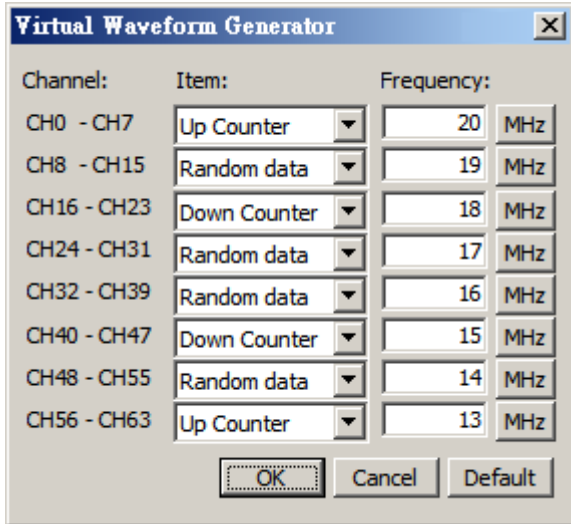
Because of connection HAMEG HMO3000 series DSO with PC by virtual COM port, we

click HAMEG HO730 USB with right button of mouse and select Content=>Advanced to check the Load VCP.



## Virtual Waveform Generator

The Virtual Waveform Generator (  ) can create a virtual waveform when (and must) there is no logic analyzer connected to your PC (Demo mode).

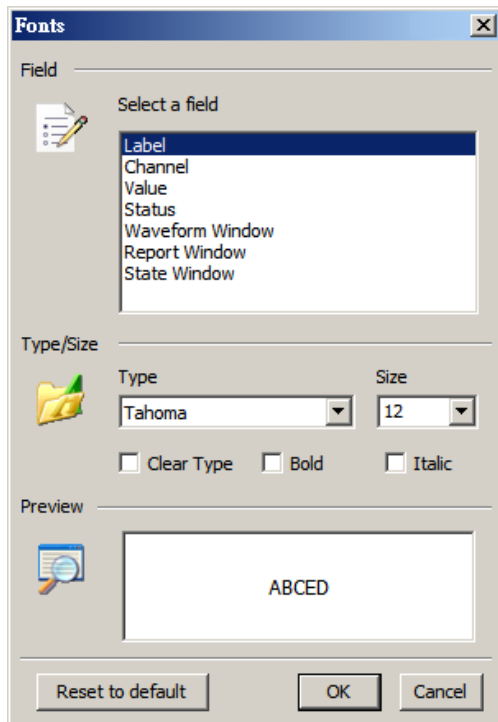




## Tools

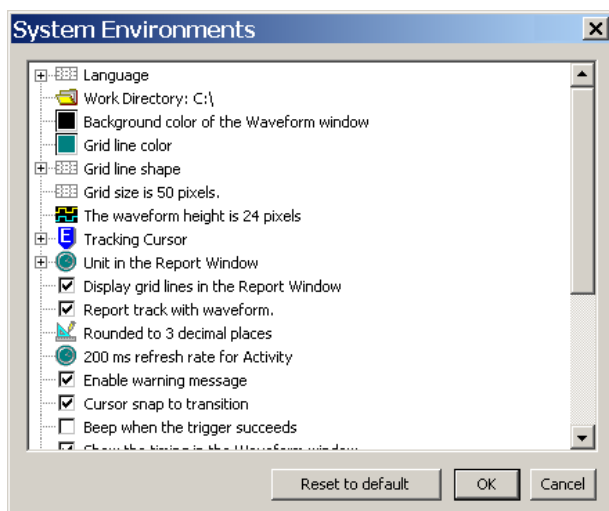
### Fonts

Set font type and size for the Label field, Channel field, Value field, Status field, Waveform Window, Report Window, or State Window in the dialog box below.



### System Environments

Customize the working environments in the System Environments dialog box below.



### Language

The LA Viewer supports English, Traditional Chinese and Simplified Chinese.

**Work Directory**

Set the file directory.

**Background color of the Waveform Window**

Set the background color of the Waveform Window.

**Grid line color**

Set the color of the grid lines in the Waveform Window.

**Grid line shape**

Set the shape of the grid lines in the Waveform Window.

**Grid size**

Set the size (in pixels) of the grid lines.

**The waveform height**

Set the waveform height (16~100 pixels).

**Tracking Cursor**

Change the tracking cursor default is Cursor E.

**Unit in the Report Window**

Display the waveform values in Sample or Timestamp in the Report Window.

Sample	CH-00	CH-01
3	0	0
5	1	0
7	1	1
11	1	0
13	1	0

Timestamp	CH-00	CH-01
0.0003 ms	0	0
0.0005 ms	1	0
0.0007 ms	1	1
0.0011 ms	1	0
0.0013 ms	1	0

**Display grid lines in the Report Window**

Display grid lines in the Report Window.

**Report track with waveform.**

**Rounded to X decimal places**

Round the waveform values to X (0-9) decimal places.

**X ms refresh rate for Activity**

Set the refresh rate (100~1000 mini-second) for the Activity field (state and frequency). (This feature is only available in TravelLogic Series.).

### **Enable warning message**

A warning message will show if any system error occurs.

### **Cursor snap to transition**

The cursor will snap (if close) to a transitional edge.

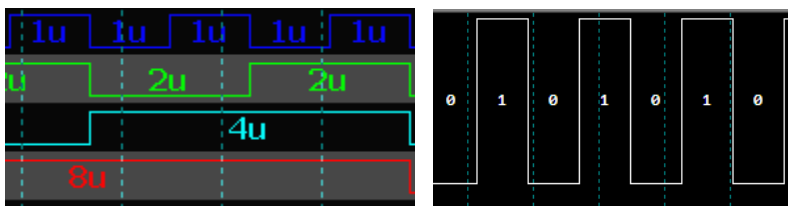
### **Beep when trigger succeeds**

Beep when a trigger occurs.

### **Show the timing / frequency in the Waveform Window**

Show the timing of the waveforms' logic levels on the Waveform Window but not available for the group channels (bus).

Show the logic state of the waveform when off the timing information.



### **Beep when the memory buffer is full**

Beep when the memory buffer is full.

### **Shade Alternate Channels**

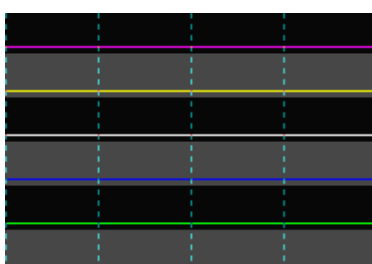
Use two different colors for alternate rows to better differentiate the waveforms.

### **Flick the waveforms**

Flick the waveforms.

### **Load Last Project**

Load the last working environments (project).



**Save waveform after each acquisition**

Save waveforms after each acquisition.

**Ask before exit the LA Viewer**

Ask before exit the LA Viewer.

**Check software update when starts the LA Viewer**

Check if there is a new version software each time when start the LA Viewer.

**Automatically enable bus decode report window**

Always show bus decode report window.

**Stop repeat capturing to show the last captured waveform**

Show the last complete waveform when stop repeat capturing.

**Scroll the mouse wheel to pan the waveform**

Pan the waveform by the mouse wheel. Zoom in/out the waveform by “Ctrl + mouse wheel”.

**Don't show logic state of channel**

Do not show the logic state in the waveform.

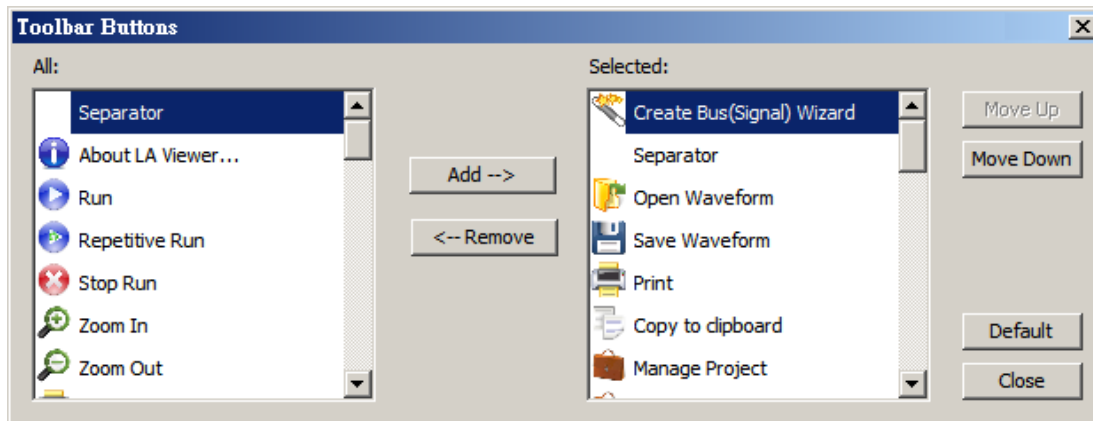
**Show the channel transitional period in report**

Show the pulse width in the waveform.

**Show the frequency in the Waveform window**

Show the pulse frequency in the low state.

## Toolbar Buttons



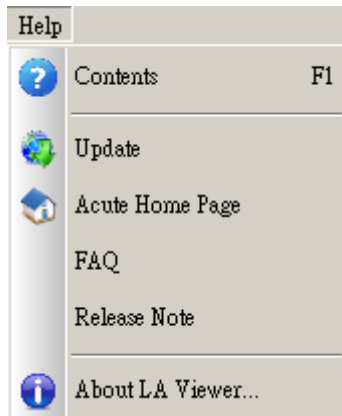
### Add/Remove

Add/remove toolbar buttons to/from Toolbar in the dialog box above.

### Move Up/Move Down

Move the selected buttons, shown on the Toolbar, up or down in the dialog box above.

## Help



### **Contents**

Open the software online manual.

### **Update**

Update the latest version LA Viewer.

### **Acute Home Page**

Link to our home page - [www.acute.com.tw](http://www.acute.com.tw).

### **FAQ**

Link to the frequently asked questions on our home page.

### **Release Note**

Link to the release note on our website.

### **About LA Viewer**

Show the current software version.

## **Chapter 4    Digital Data Logger**


## How to use Digital Data Logger?

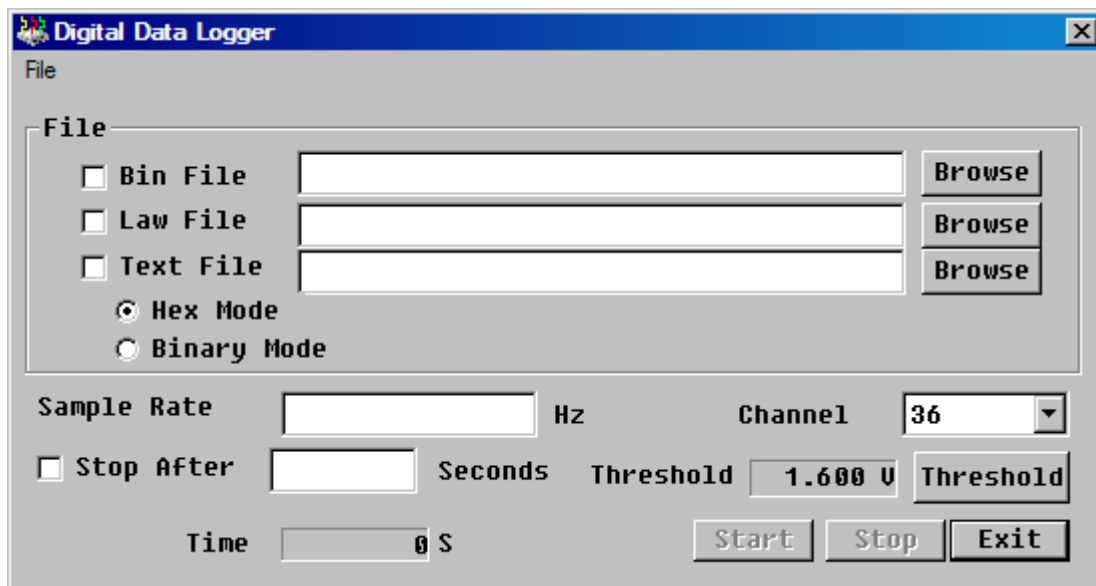
### Use time

This feature is only available in TravelLogic Series.

### Start the Digital Data Logger

It is able to record the acquired data for a long time as a log file xxx.log and independent of the LA Viewer. To use the record model only to record the transitional data (rising or falling edge), therefore, the overall amount of data transmitted will decrease because the data don't change.

You can find and click the Data Logger icon (  ) in the programs (Start\All Programs\Acute Logic Analyzer\Digital Data Logger) of your PC to show the dialog box below.



### File

Enter the file name.

### Sample Rate

In "Hz", can be an integer or decimal number. The maximum value is 50MHz.



## Channel

The number of channels recorded.

## Stop after

Stop Data Logger after the time (in seconds).

## Time

The time (in seconds) being running Data Logger.

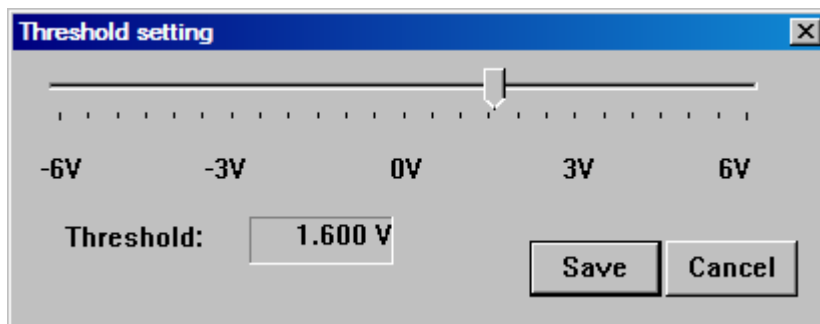
## Numerical Bases

Save the data in Hexadecimal or Binary data type.

**Note:** The logged file may lose some data if the sampling rate is high and will mark in the file.

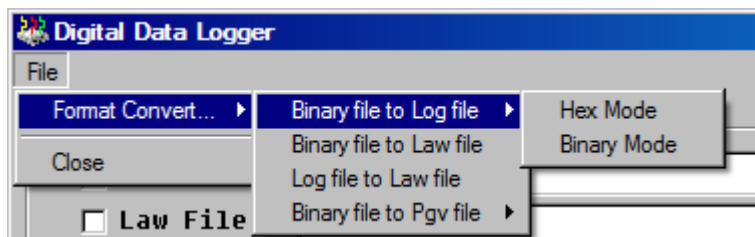
If this occurs, the program will place in the data leakage, marked “Lose data”.

## Threshold Setting



You may also set the threshold for the data logger.

## Format Convert



An example of the acquired data, consisting of Information (sampling rate and format in green box), Time (in decimal number when the edge changes in red box) and Data (in hexadecimal number in blue box), is shown below. The first data recording time is not necessarily 0, because the internal counter will start from power after the count. Therefore, it

is normal. If it is found much record time interval, because data did not change, so do not record data, this is normal.

The sampling rate is 1000Hz, 0000000000026 in the red box denotes the edge changes at 26/1000th second and 00003FFFF in the blue box denotes the data value for 36 channels at 26/1000th second. Bit 0 of data for the channel 0.

Sampling Rate = 5000000Hz Format: Sample Clocks(Dec), Data(Hex)		Sampling Rate = 5000000Hz Format: Sample Clocks(Dec), Data(Bin)	
00000000000000	00000001	00000000000000	111110110001011100010101000011111001
000000000000254	00000000	000000000000240	111110010001011100010101000011111001
000000000000500	00000000	000000000000371	111110000001011100010101000011111001
000000000000753	00000000	0000000000001252	111110100001011100010101000011111001
000000000001000	00000001	000000000001524	111110110001011100010101000011111001
000000000001253	00000000	000000000001791	111110100001011100010101000011111001
000000000001500	00000001	000000000002063	111110110001011100010101000011111001
000000000001753	00000000	000000000002330	111110100001011100010101000011111001
000000000002000	00000001	000000000002602	111110110001011100010101000011111001
000000000002253	00000000	000000000002610	111110100001011100010101000011111001
000000000002500	00000001	000000000002870	111110000001011100010101000011111001
000000000002753	00000000	000000000003141	111110010001011100010101000011111001
000000000003000	00000001	000000000003408	111110000001011100010101000011111001
000000000003253	00000000	000000000003681	111110010001011100010101000011111001
000000000003500	00000001	000000000003948	111110000001011100010101000011111001

## **Chapter 5 Miscellaneous**

## **Release Note**

[Release Note](#)

## Notes

### Hardware:

1. Make sure that you use the USB cable in the product package. The device may be not available with other USB cable due to the poor quality of transmission.
2. Always connect the logic analyzer's ground lines to the target system in order to improve the measurement quality.

### Software:

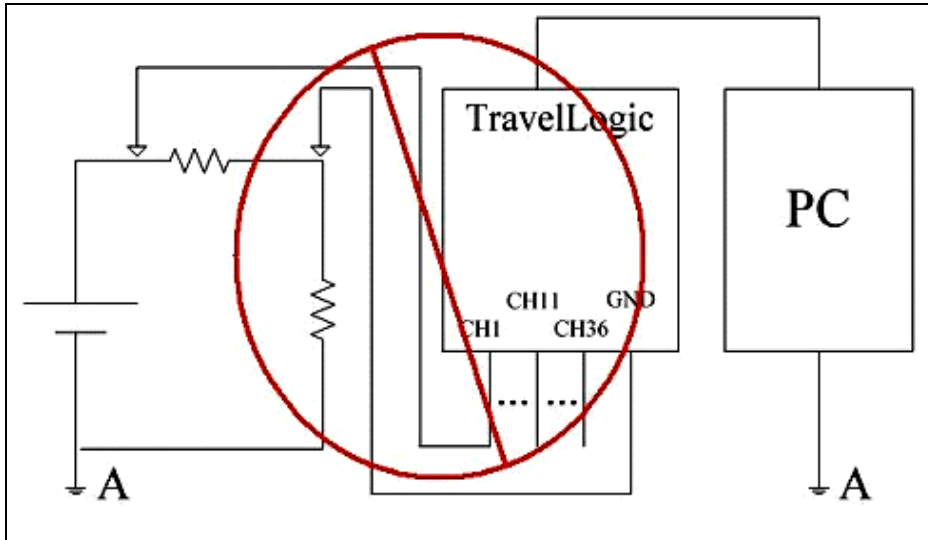
1. You can run several LA Viewer programs at the same time and if your PC has enough memory, but the second to open the LA Viewer will only demo mode.
2. You can add multiple labels with the same channel but all labels only have one trigger condition.

### LA2000P series

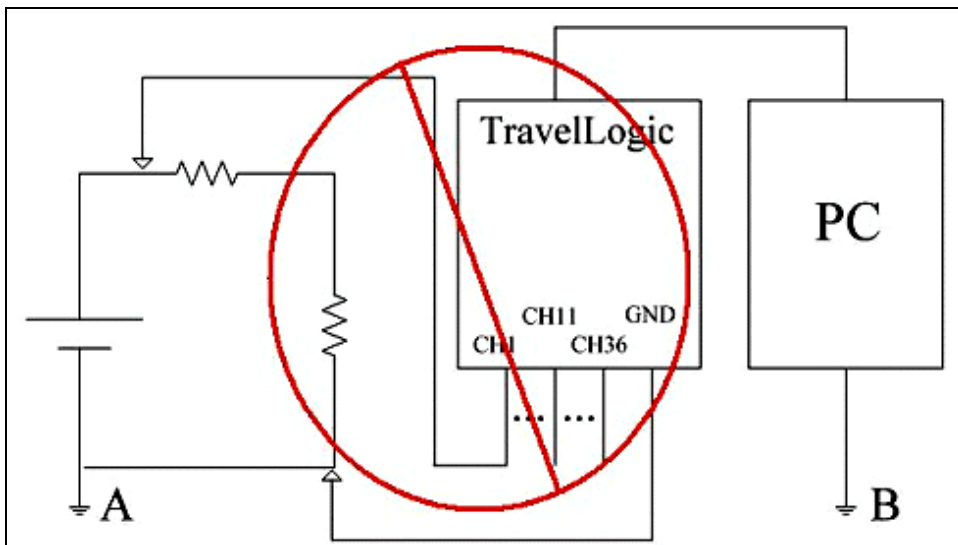
1. Do NOT connect the LA2164P's printer round cable to the LA 2000P and the printer at the same time.
2. If you use the PCI interface for the LA2164P, insert the LA mainframe into the PC's lowest disk slot, so the cables will not interfere with the PC's CD-ROM drive.
3. If you use the external trigger for the LA2164P, connect the RG-58A/U (50 Ohm) coaxial cable with a BNC connector to the LA.
4. The USB to Printer Port Adapter Cable in the product package can only be purchased from us if you have the demand. Other general adapter would not be available due to the special design of our adapter.
5. Connect the LA2164P's four pods (pod A, B, C and D) to its four ports (port A, B, C and D) in their respectively alphabetic order unless you want to check the function of each pod.

Connect the probe's ground to the earth ground ONLY, NOT an elevated voltage. Please refer to the two figures in the next page.

**Prohibition 1: Wrong connection of TravelLogic's ground.**



**Prohibition 2: Electric potential A and B are not equal.**



## Tips

Search Next Click **Search Pattern** on Toolbar, set search patterns and click Search, then move Cursor B to the trigger cursor position and click **Search Next Pattern** button.

Use **Create Bus (Signal)** to set parameters for group channels or bus.

The LA2164P model has 64 channels; but ONLY 32 channels (CH 0 ~ CH 31) support 200MHz sample rate, so connect these channels to those signals that are 200MHz from the target system.

Press A-Z key on the keyboard move the selected (key) cursor to the middle of the Waveform Window.

## Questions

Check the FAQ on our web site at [www.acute.com.tw](http://www.acute.com.tw). We also provide tutorial videos on

Youtube: [www.youtube.com/user/AcuteTechnologyInc](http://www.youtube.com/user/AcuteTechnologyInc).



## Troubleshooting

### Hardware

If the LA Viewer shows "Enter DEMO Mode" when the logic analyzer is connected to your PC, please check the following steps. Please contact your local dealer or us if the LA Viewer still does not work.

#### **USB interface (for the TravelLogic series, PkLA1616+ and LA2164P).**

Use the original USB cable.

Check the USB interface/power connection.

Check if there is an USB driver in the Device Manager and then download and install the latest version from [www.acute.com.tw](http://www.acute.com.tw).

Run the LA Viewer again.

#### **Printer port interface (for the LA2164P).**

Check the power connection.

Check the interface cable connection.

Check if the BIOS is in any EPP mode as the table below.

Run the LA Viewer again.

#### **PCI Interface (for the LA2164P).**

Check the power connection.

Check the PCI card seating.

Check the interface cable connection.

Check if there is a PCI driver in the Device Manager and then download and install the latest version (if any, uninstall the previous version first) of the LA Viewer from

[www.acute.com.tw](http://www.acute.com.tw).

Reboot the Windows OS. Run the LA Viewer again.

**Logic Analyzer Manual**

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