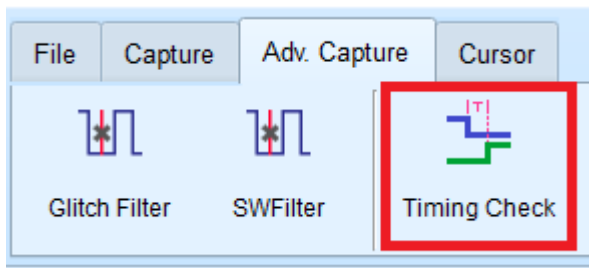


## Timing Check Documents

2022.10



This function can import a CSV file containing the parameters and measurement items. The logic analyzer will adjust the parameters, channel names and measurement types according to the settings in this file.

The CSV file compilation rules need to be based on the field names at the beginning, then separate the values in different fields with a comma. and it need to end with a semicolon (;).

The text after the double slash (//) will be regarded as a comment and ignored.

### Column Items:

[SampleRate]

**Only accept single line input.**

Input the sample rate value, Units: MHz, KHz, Hz.

The maximum sampling rate range that can be used will be affected by the number of channels and trigger types, and the minimum sampling rate cannot be lower than 100KHz.

**This item will affect both Analog and Digital Sample Rate settings, use [AnalogSampleRate] and [DigitalSampleRate] items to change the Sample Rate settings separately.**

Example	[SampleRate] 200MHz ;
---------	-----------------------------

[AnalogSampleRate]

**Only accept single line input. ONLY for MSO series.**

Input the analog sample rate value, Units: MHz, KHz, Hz.

The maximum analog sampling rate range that can be used will be affected by the number of channels and trigger types, and the minimum sampling rate cannot be lower than 100KHz.

Example	[AnalogSampleRate] 25MHz ;
---------	----------------------------------

## [DigitalSampleRate]

**Only accept single line input.**

Input the digital sample rate value, Units: MHz, KHz, Hz.

The maximum digital sampling rate range that can be used will be affected by the number of channels and trigger types, and the minimum sampling rate cannot be lower than 100KHz.

Example	[DigitalSampleRate] 25MHz ;
---------	-----------------------------------

## [ChannelNumber]

**Only accept single line input.**

**Only for TravelLogic series**

Input the channel counts, Units: None.

Available channel counts depend on the value of sample rate and transitional storage mode is enabled.

Sample Rate	LA Non-Transition	LA Transition
2G (TL3234B+ only)	0:3 (4 Channels)	0:2 (3 Channels)
1G	0:7 (8 Channels)	0:5 (6 Channels)
500M	0:15 (16 Channels)	0:11 (12 Channels)
250M, 200M	0:31 (32 Channels)	0:23 (24 Channels)

Example	[ChannelNumber] 24 ;
---------	----------------------------

## [RecordLength]

**Only accept single line input.**

Input the recording memory. Unit: MB, Mb.

The maximum of the recording memory depends on the different models. The minimum recording memory value be lower than 16Mb.

Example	[RecordLength] 100Mb ;
---------	------------------------------

## [TransitionalMode]

**Only accept single line input.**

Transitional Mode setup. Unit: None.

**For Acute MSO series, Transitional storage mode is not available when analog channel is on.**

Example	[TransitionalMode]
	1 //Transitional storage mode ON ;

[Threshold]

**Available to input multiple line for adjust different threshold for the channels.** Enter the threshold level in each row, Unit: mV, V.

For different model, it has different range of threshold level.

TL series threshold voltage range :  $\pm 5V$

MSO series threshold voltage range :  $\pm 20V$

**\*For TL series, when the Schmitt circuit function is enabled, Channel 16-31 will turn into the secondary Ref. threshold voltage. Acute MSO series are unaffected.**

Example	[Threshold]
	1.6V //Ch 00-07
	1.5V //Ch 08-15
	1.2V //Ch 16-23 or the secondary of input for Ch00-07
	2.5V //Channel 24-31 or the secondary of input for Ch08-15 ;

[UseSchmittCircuit]

**Only accept single line input.**

TL series

Control whether to enable Schmitt circuit function. This will affect the significance of the parameters of the voltage level, **and the maximum number of available channels will drop to 16 channels.**

MSO series

Enter whether to enable the hardware Schmitt circuit hysteresis function to reduce the received digital signal noise, and the number of available channels will not be affected.

Example	[UseSchmittCircuit]
	1 //Input 1 to enable Schmitt circuit ;

[Hysteresis]

**Only accept single line input. ONLY for MSO series**

Enter whether to enable the hardware Schmitt circuit hysteresis function to reduce the received digital signal noise.

Example	[Hysteresis] 1 //Input 1 to enable extra Hysteresis feature. ;
---------	--

#### [Channel]

**Available to enter multiple lines of settings to add different channels, each line is entered in sequence:**

1. Select Channel. CH0 -> Digital CH0, CH(A)0 -> Analog CH0
2. Label for Channel. It is available to enter less than 31 alphabets or numbers.
3. (Option) Select TimingCheck or HwStrap (TimingCheck+HwStrap means enable both)
4. (Option) Enter the expect maximum voltage for auto calculate the voltage division for analog channel.
5. (Option) Enter the expect minimum voltage for auto calculate the voltage division for analog channel.

**The available channels will vary according to different models and the selected sampling rate.**

Example	[Channel] CH20, MyData0, HwStrap CH22, MyData1, TimingCheck CH24, MyData2, TimingCheck+HwStrap // (Analog Channel settings. ONLY for MSO series) CH(A)1, VCC (1.8V) //Analog CH1, Using the default voltage division and offset CH(A)2, VDD (1.5V) //Analog CH2, Using the default voltage division and offset CH(A)3, AAA, TimingCheck, 1.5V // Analog CH3, Set up the max voltage division CH(A)4, BBB,, 1.0V // Analog CH4, Set up the max voltage division CH(A)5, CCC,, 2.0V, 1.0V // Analog CH5, Set up the max & min voltage division ;
---------	--

Check Mode	Description
HwStrap	CH is only for H/W Strap. It will be hidden while in Timing Check.
TimingCheck	CH is only for Timing Check. It will be hidden while in H/W Strap.
TimingCheck+HwStrap	For both mode.

#### [AnalogChannel]

**Available to enter multiple lines of settings to add different channels, ONLY for MSO series, each line is entered in sequence:**

1. Select Channel. For MSO3K series, input DSO CH1 to select Analog CH1; For MSO2K series, input CH(A)0 to select Analog CH0
2. Label for Channel. It is available to enter less than 31 alphabets or numbers.

3. Enter the voltage division setting. For MSO3K series, the input will effect both display and acquisition settings; For MSO2K series, the input will only effect display settings.
4. Enter the voltage offset setting. For MSO3K series, the input will effect both display and acquisition settings; For MSO2K series, the input will only effect display settings.
5. (Option) Enter the probe attenuation setting, **ONLY for MSO3K series**, MSO2K series will ignore this setting.
6. (Option) Enter the bandwidth limitation setting, 20MHz, 100MHz or FULL, **ONLY for MSO3K series**, MSO2K series will ignore this setting.
7. (Option) Enter the channel coupling setting, DC or AC, **ONLY for MSO3K series**, MSO2K series will ignore this setting.

**The available channels will vary according to different models and the selected sampling rate.**

Example	<p>[AnalogChannel] //MSO3K settings sample DSO CH1, MyVolt1, 1V, 1.0, 10, FULL, DC //Analog CH1, display name is MyVolt1, voltage division 1V, voltage offset +1.0 division, x10 probe attenuation, FULL bandwidth, DC coupling DSO CH4, MyVolt2, 500mV, -3.0, 1, 20MHz, AC //Analog CH4, display name is MyVolt2, voltage division 500mV, voltage offset -3.0 division, x1 probe attenuation, bandwidth limited to 20MHz, AC coupling</p> <p>[AnalogChannel] //MSO2K settings sample CH(A)3, MyVolt5, 1V, 1.0 //Analog CH3, display name is MyVolt5, voltage division 1V, voltage offset +1.0 division;</p>
---------	--

[Trigger]

**Only accept single line input.** Enter in order:

1. Trigger Channel Label: Reference to the Label in [Channel] settings for trigger settings.
2. Trigger Type:

Trigger Type
CHANNEL_LOW
CHANNEL_HIGH
CHANNEL_ANY
CHANNEL_RISING
CHANNEL_FALLING
CHANNEL_CHANGING
ANALOG_CH_RISING (ONLY for MSO series)
ANALOG_CH_FALLING (ONLY for MSO series)

3. (Optional) Select TimingCheck or HwStrap (TimingCheck+HwStrap for both)
4. (Optional) Analog Trigger Voltage, Unit: mV 、V. (Only when selecting analog CH in MSO

series.

Example	<pre>[Trigger] // For H/W Strap, selecting MyData1 (Triggered when Ch22 Rise) MyData1, CHANNEL_RISING, HwStrap //For Timing Check, selecting MyData2 (Triggered when Ch24 Rise) MyData2, CHANNEL_RISING, TimingCheck ;  [Trigger] //Analog Trigger (Only for MSO series) //For Example: Timing Check VCC (1.8V) (Triggered when Analog Ch1 rising equal or more than 1.5V) VCC (1.8V), ANALOG_CH_RISING, TimingCheck, 1.5V ;</pre>
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[TriggerPosition]

**Only accept single line input.**

Entering the trigger position in percentage. Input Range: 1% to 99%

Example	<pre>[TriggerPosition] 20% //Set the trigger position to 20% ;</pre>
---------	--

[RangeStart]

**Only accept single line input.**

Set measurement start position, available input from CursorA to CursorZ.

Example	<pre>[RangeStart] CursorS //Set measurement starts from Cursor S ;</pre>
---------	--

[RangeEnd]

**Only accept single line input.**

Set measurement end position, available input from CursorA to CursorZ.

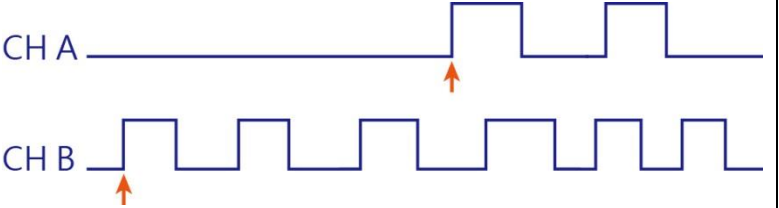
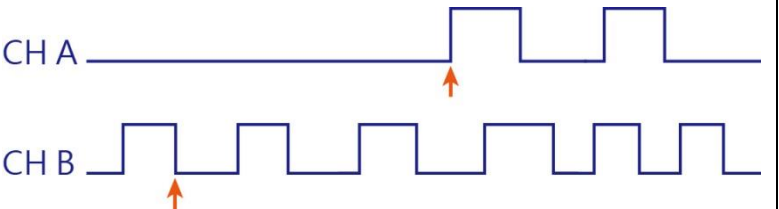
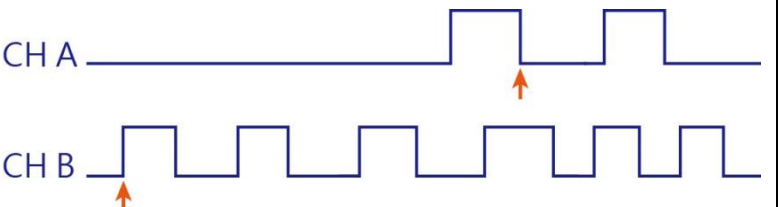
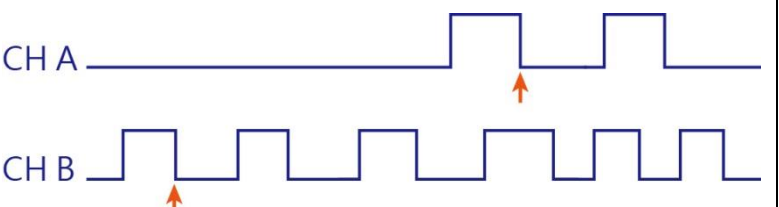
Example	<pre>[RangeStart] CursorE //Set measurement ends at Cursor E ;</pre>
---------	--

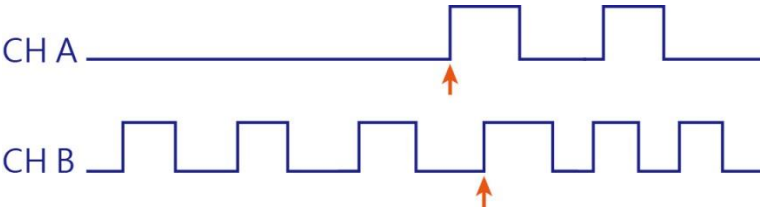
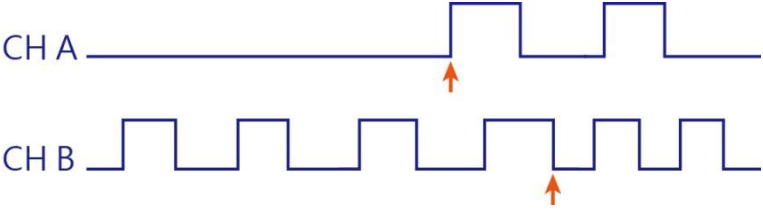
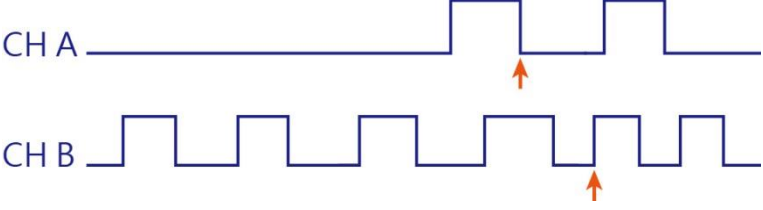
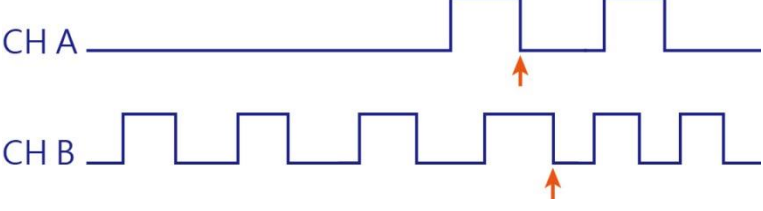
[TimingCheck]

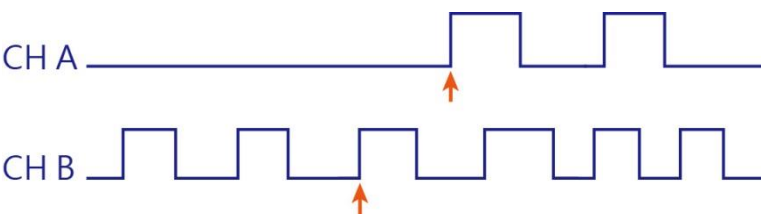
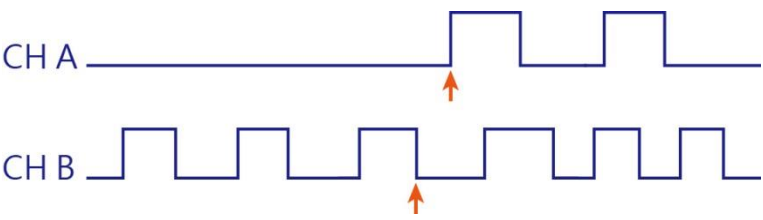
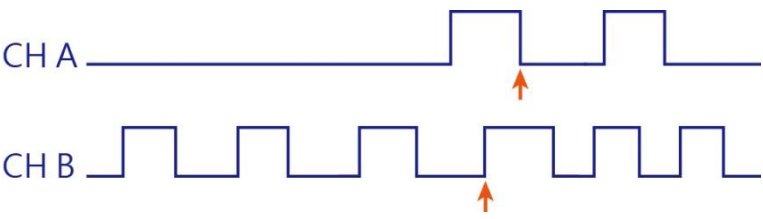
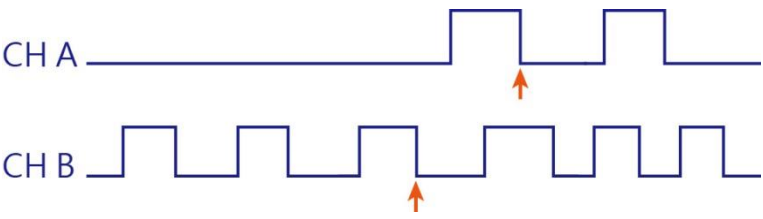
**Available to enter multiple lines of settings to add different settings, Enter in order:**

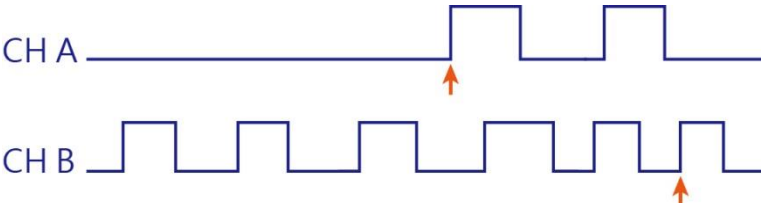
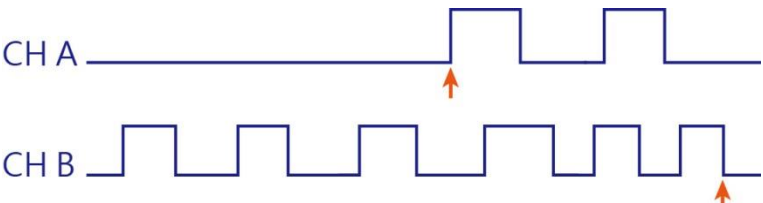
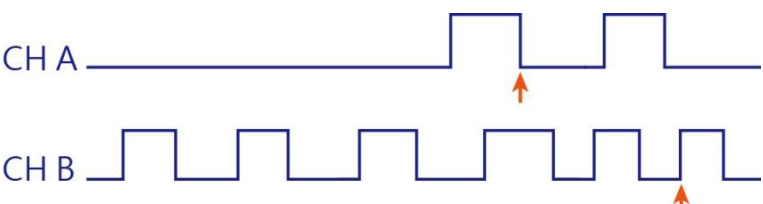
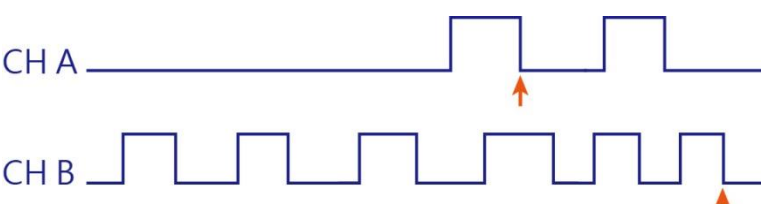
1. Timing Check Spec, Only for display.
2. Timing Check Description, Only for display.

3. Target CH A: Need reference [Channel] label name.
4. Target CH B: Need reference [Channel] label name.
5. Timing Check Type, **items marked in orange are for MSO series only.**

Item	Remark
CHA_RISE_TO_CHB_RISE	<p>Time difference from:</p> <p>First CH A Rising Edge TO First CH B Rising Edge.</p> 
CHA_RISE_TO_CHB_FALL	<p>Time difference from:</p> <p>First CH A Rising Edge TO First CH B Falling Edge.</p> 
CHA_FALL_TO_CHB_RISE	<p>Time difference from:</p> <p>First CH A Falling Edge TO First CH B Rising Edge.</p> 
CHA_FALL_TO_CHB_FALL	<p>Time difference from:</p> <p>First CH A Falling Edge TO First CH B Falling Edge.</p> 

CHA_RISE_TO_NEXT_CHB_RISE	<p>Time difference from: First CH A Rising Edge TO Next CH B Rising Edge.</p> 
CHA_RISE_TO_NEXT_CHB_FALL	<p>Time difference from: First CH A Rising Edge TO Next CH B Falling Edge.</p> 
CHA_FALL_TO_NEXT_CHB_RISE	<p>Time difference from: First CH A Falling Edge TO Next CH B Rising Edge.</p> 
CHA_FALL_TO_NEXT_CHB_FALL	<p>Time difference from: First CH A Falling Edge TO Next CH B Falling Edge.</p> 

CHA_RISE_TO_PREV_CHB_RISE	<p>Time difference from: First CH A Rising Edge TO Previous CH B Rising Edge.</p> 
CHA_RISE_TO_PREV_CHB_FALL	<p>Time difference from: First CH A Rising Edge TO Previous CH B Falling Edge.</p> 
CHA_FALL_TO_PREV_CHB_RISE	<p>Time difference from: First CH A Falling Edge TO Previous CH B Rising Edge.</p> 
CHA_FALL_TO_PREV_CHB_FALL	<p>Time difference from: First CH A Falling Edge TO Previous CH B Falling Edge.</p> 

CHA_RISE_TO_FAREST_CHB_RISE	<p>Time difference from: First CH A Rising Edge TO Farest CH B Rising Edge.</p> 
CHA_RISE_TO_FAREST_CHB_FALL	<p>Time difference from: First CH A Falling Edge TO Farest CH B Rising Edge.</p> 
CHA_FALL_TO_FAREST_CHB_RISE	<p>Time difference from: First CH A Falling Edge TO Farest CH B Rising Edge.</p> 
CHA_FALL_TO_FAREST_CHB_FALL	<p>Time difference from: First CH A Falling Edge TO Farest CH B Falling Edge.</p> 
CHA_HIGH_TIME	
CHA_LOW_TIME	
CHA_HIGH_PULSE_COUNT	
CHA_LOW_PULSE_COUNT	
CHA_RISE_EDGE_COUNT	
CHA_FALL_EDGE_COUNT	
CHA_EDGE_COUNT	

CHA_SLEW_RATE <sup>*1</sup>	
CHA_V_MAX	
CHA_V_MIN	
CHA_V_PP	
CHA_V_HIGH	
CHA_V_LOW	
CHA_V_AMPLITUDE	
CHA_V_MEAN	
CHA_RISE_TIME	
CHA_FALL_TIME	

6. Min. Limit:

- I. For Timing Measurement, Unit: ns, us, ms, s.
- II. For Voltage Measurement, Unit: mV, V.
- III. For SLEW\_RATE, available units: mV/us, mV/ms, V/us, V/ms.  
mV/us or V/us will be the default units.

Input X stands for don't care.

7. Max. Limit:

- I. For Timing Measurement, Unit: ns, us, ms, s.
- II. For Voltage Measurement, Unit: mV, V.
- III. For SLEW\_RATE, available units: mV/us, mV/ms, V/us, V/ms.  
mV/us or V/us will be the default units.

Input X stands for don't care.

8. (Option) CH A Ref. Voltage: (MSO Series Only)

- I. The percentage of the amplitude.  
Ex: Entered "90%" for the position of amplitude;
- II. The voltage value for reference point  
Ex: Entered "1.25V" for the 1.25V position.
- III.

9. (Option) CH B Ref. Voltage: (MSO Series Only)

- I. The percentage of the amplitude.  
Ex: Entered "90%" for the position of amplitude;
- II. The voltage value for reference point  
Ex: Entered "1.25V" for the 1.25V position.

10. (Option) CHA pass counts: Available to ignore N times when the condition matches. (MSO Series Only)

11. (Option) CHB pass counts: Available to ignore N times when the condition matches.  
(MSO Series Only)

\*1: Slew Rate will decide whether it is rise or fall edge by Ref. voltage.

Example	[TimingCheck]									
	Spec_00, Desc_00, MyData0, MyData1, CHA_RISE_TO_CHB_RISE, 1ns, 10ms									
	Spec_01, Desc_01, MyData1, MyData2, CHA_FALL_TO_CHB_RISE, X, 100ms									
	Spec_02, Desc_02, MyData2, MyData3, CHA_FALL_TO_CHB_FALL, 100us, X									
	;									
	[TimingCheck] //Analog Channel (MSO series ONLY)									
	Spec_00, Desc_00, VDD (1.5V), VCC (1.8V),CHA_RISE_TO_CHB_RISE,10ms,20ms,90%,90%,0,0									
	Spec_01, Desc_01, VDD (1.5V), VCC (1.8V),CHA_RISE_TO_CHB_RISE,1ms,5ms,80%,80%,0,0									
	Spec_02, Desc_02, CH0 (3.3V), CH0 (3.3V), CHA_SLEW_RATE, 20mV/ms, 50mV/us //Rising									
	Spec_03, Desc_03, CH0 (3.3V), CH0 (3.3V), CHA_SLEW_RATE, 50mV/ms, 20mV/us //Falling									

Spec\_04, Desc\_04, CH0 (3.3V), , CHA\_V\_HIGH, 500mV, 600mV //V High

Spec\_05, Desc\_05, CH0 (3.3V), , CHA\_RISE\_TIME, 50ms, 100ms //Rise Time

;

## Timing check report area:

Timing Spec.	Description	Label Name A	Label Name B	Type	Min. Limit	Max. Limit	Value	Pass/Fail	Label A Rule	Label B Rule	Label A Pass Count	Label B Pass Count
PowerDelay01	XXXX	CH1 (1.8V)	CH0 (3.3V)	CH A Rise to CH B Rise	10ms	20ms	9us	Pass	90.0% (1.502V)	90.0% (2.75V)	----	----
PowerDelay02	XXXX	CH2 (1.3V)	CH1 (1.8V)	CH A Rise to CH B Rise	1ms	5ms	3.006ms	Pass	90.0% (986.024mV)	80.0% (1.323V)	----	----
PowerDelay01	XXXX	CH2 (1.3V)	CH0 (3.3V)	CH A Rise to CH B Rise	10ms	20ms	2.596ms	Fail	1.2V	1.25V	----	----
PowerDelay01	XXXX	CH1 (1.8V)	CH0 (3.3V)	CH A Rise to CH B Rise	10ms	20ms	---	---	90.0% (1.502V)	90.0% (2.75V)	1 time(s)	----
PowerDelay01	XXXX	CH1 (1.8V)	CH0 (3.3V)	CH A Rise to CH B Rise	10ms	20ms	---	---	90.0% (1.502V)	90.0% (2.75V)	1 time(s)	1 time(s)

While the waveform finished capture, the software will do the result(Pass/Fail) analysis and display it.

Double click the report data for positioning the CHA & the CHB referenced location in waveform area.

[HWStrap]

Available to enter multiple lines of settings to add different settings, Enter in order:

1. Timing Check Target Channel: Enter "CH0" for Digital CH0. Only for display.
2. Target Channel Label: Need reference [Channel] label name.
3. Ref. Channel Label: Need reference [Channel] label name.
4. Ref. Channel Type

Ref. Channel Type
CHANNEL_RISING
CHANNEL_FALLING

**CHANNEL\_CHANGING (Only for Digital Measurement)**

5. Spec Value: Enter 0 or 1 for expect value. If the actual value doesn't equal to the spec value, then the result will show "Fail".
6. (Option) CH A Ref. Voltage: (MSO Series Only)
  - A. The percentage of the amplitude.  
Ex: Entered "90%" for the position of amplitude;
  - B. The voltage value for reference point  
Ex: Entered "1.25V" for the 1.25V position.
7. (Option) CH B Ref. Voltage: (MSO Series Only)
  - A. The percentage of the amplitude.  
Ex: Entered "90%" for the position of amplitude;
  - B. The voltage value for reference point  
Ex: Entered "1.25V" for the 1.25V position.
8. (Option) CH A pass counts: Available to ignore N times when the condition matches. (MSO Series Only)
9. (Option) CH B pass counts: Available to ignore N times when the condition matches. (MSO Series Only)

範例	[HwStrap]									
	CH0,MyData0,MyData1,CHANNEL_RISING,1 CH1,MyData1,MyData2,CHANNEL_RISING,1 CH2,MyData2,MyData3,CHANNEL_FALLING,0 ;  [HwStrap] //Analog Channel (MSO series ONLY) CH(A)1, VCC (1.8V), VDD (1.5V),CHANNEL_RISING,1,90%,90%,0,0 ;									

## H/W Strap Report Area

Channel	Signal	Sample	Sample Edge	Design Value	Value	Result	Label A Rule	Label B Rule	Label A Pass Count	Label B Pass Count
CH0	CH0 (3.3V)	CH2 (1.3V)	Channel Rising	1	0	Fail	90.0% (2.75V)	90.0% (1.122...	---	---
CH2	CH2 (1.3V)	CH1 (1.8V)	Channel Rising	1	1	Pass	1.2V	80.0% (1.323...	---	---