

User Manual

TravelBus

2-in-1 Analyzer (Protocol & Logic)



Publish: 2024/12

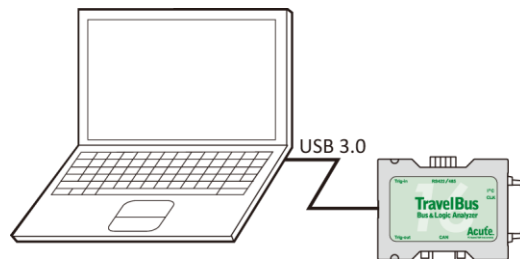
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Chapter 1 Installation

Hardware


Connect the TravelBus to the PC with the USB 3.0 cable in the TravelBus kit.

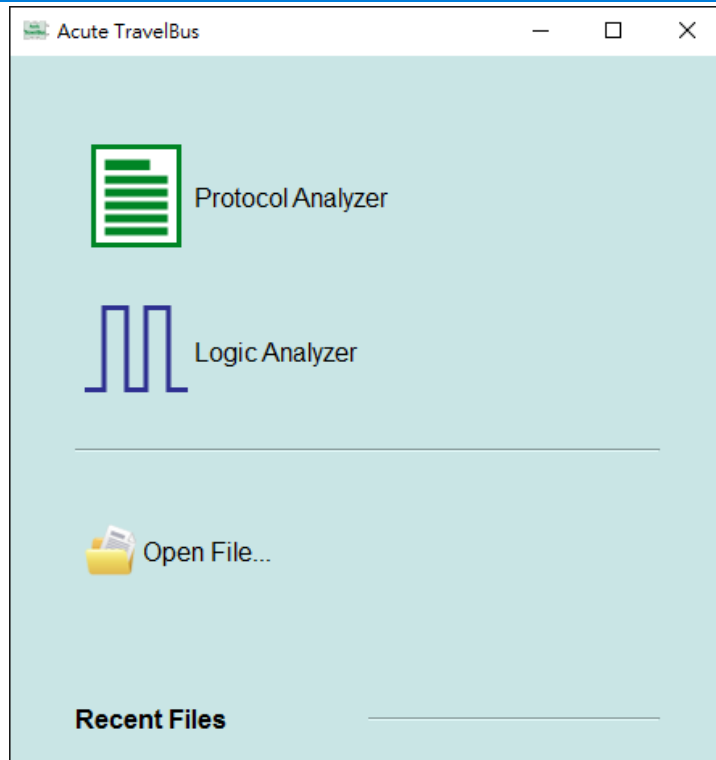


Software

NOTE: Since 2024, we will not provide x86(32 bit) software, only x64(64 bit) software. Whoever needs x86 software, please contact us.

Please visit the official website of Acute Technology Inc., go to the Download page->Software, and then select **[Logic Analyzer] TravelBus series** to download the TBA series. After completion of installation, the “start icon” of TBA series will appear on the desktop and the program set. User can select either one to start TBA

(). After starting the software, the main menu screen will show up. User can choose to enter logic Analyzer or protocol Analyzer.



Open File... will open the old file (.TBW).

SDK

We provide SDK for user to control the software and hardware behavior.

- **Software behavior (need to keep the software executing)** : User can monitor the software behavior by AqLAVISA Manager. Please check our official GitHub website: <https://github.com/acute-technology-inc/aqvisa-grpc>. Or find the label: **Download**→**SDK(DLL)**→**[Logic Analyzer]AqLAVISA SDK**, in our official website. Or contact us with e-mail.

- **Hardware behavior(DO NOT need to keep the software executing):** Please find the label, [Download->SDK\(DLL\)-> \[Logic Analyzer\] TravelBus SDK](#) ; Or contact us with e-mail. Please note it, there has no any decode processing, only capture data and save.

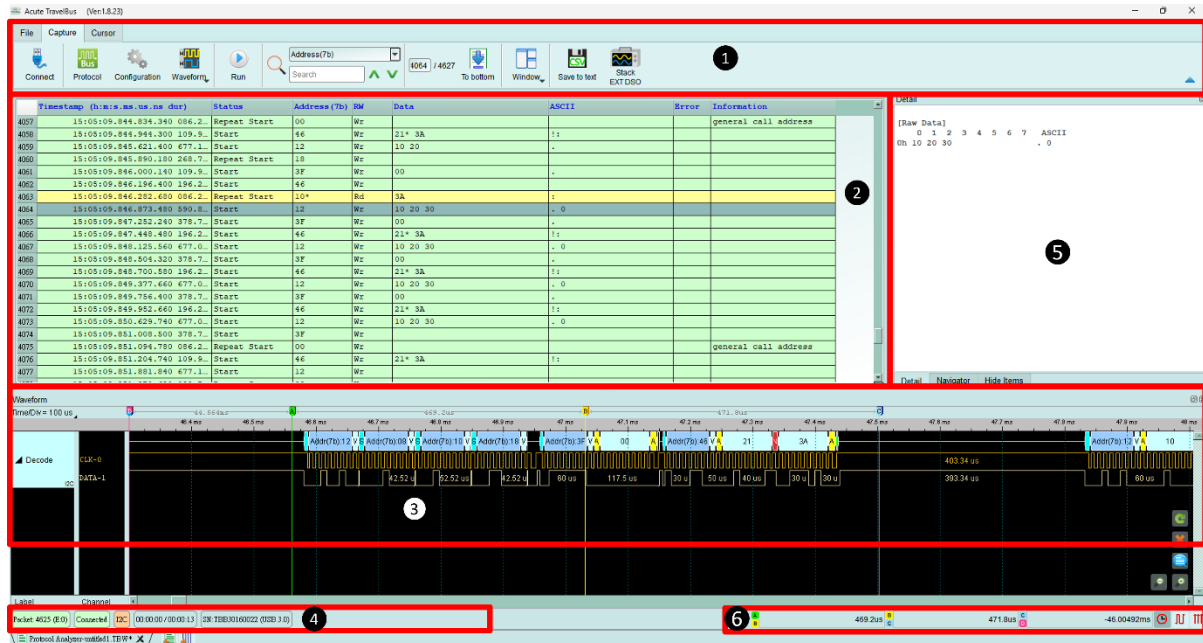
gRPC

We provide gRPC for user to remote control our device. Please check our official GitHub website: <https://github.com/acute-technology-inc/aqvisa-grpc>. Or search: “aqvisa-grpc”. Or contact us with e-mail.

Chapter 2 Operations

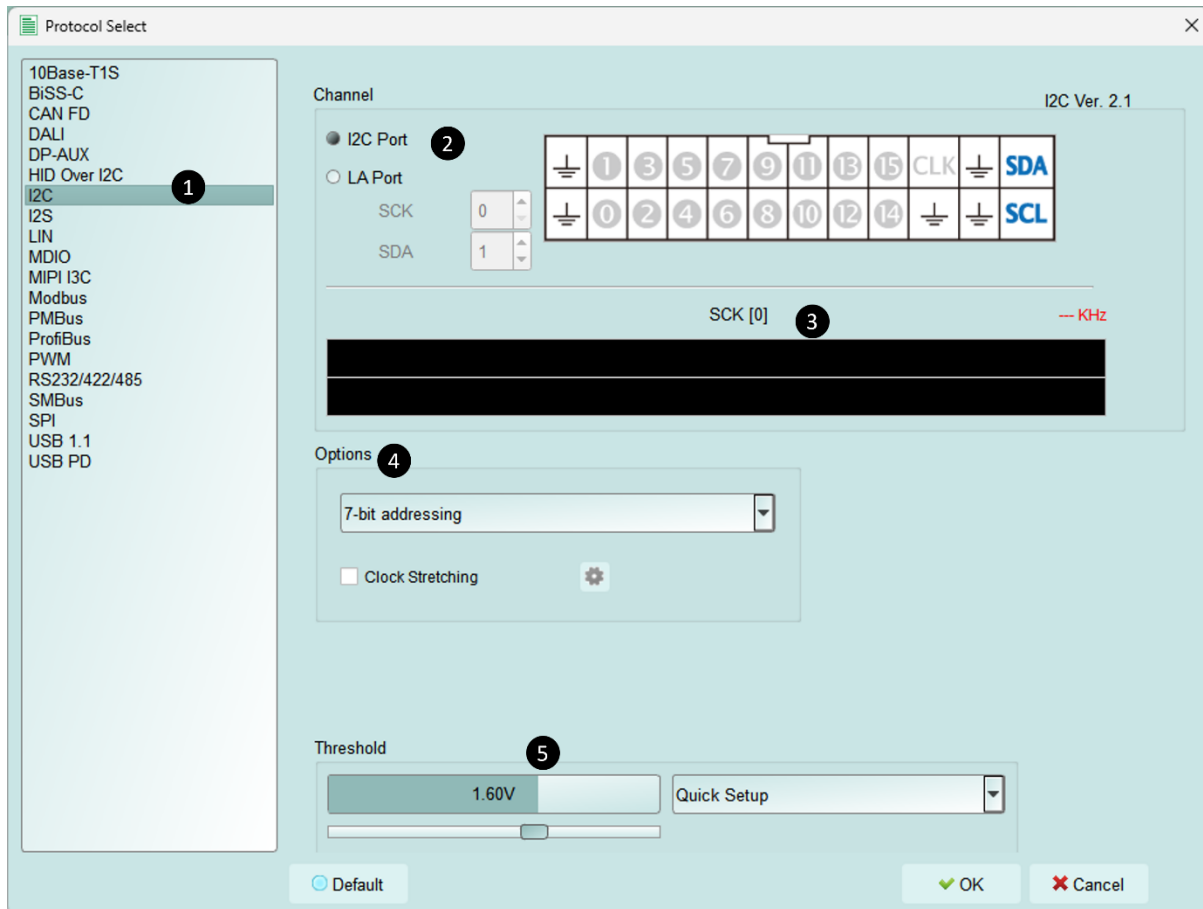
Protocol Analyzer

Main Window



1. **Toolbar** includes Protocol, Waveform, Run, Search and Save to text which format is .csv or .txt.
2. **Report Window** displays real-time protocol data.
3. **Waveform** displays the waveforms only when the Waveform option is checked.
4. **Status Bar** shows if the TravelBus is connected to the PC, what protocol, time captured/available time to capture,
5. **Detail/Navigator/Filter** shows the protocol data detail and is able to filter those data.
6. **Cursors** display the time/frequency difference between cursors.

Protocol Select ()



1. **Select different protocol.**

2. **Channel:**

Choose either LA ports or Dedicated ports. LA ports (channel 0~15) are used for normal LA usage; for more dedicated ports information, please check **Dedicated Channel Description**.

3. **Waveform :**

The TravelBus auto-detects the signal frequency and displays the real-time waveform.

4. **Options :** Choose the address mode.

5. **Threshold :** The threshold is provided by default for each protocol or can be set manually.

Memory Usage (⚙️)

The screenshot shows a 'Configuration' dialog box with the following settings:

- Repetitive Times:** Checked, set to 2. (0 is Infinite)
- Stop Conditions:**
 - Maximum PC RAM limit:** Checked, set to 1%.
 - Available Memory:** 130 MB.
 - Number of Data Lines:** Unchecked. Options: Maximum 17,000,000, Minimum 10,000, Customize (selected, set to 10000).

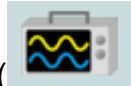
Buttons at the bottom: Default, OK, Cancel.

1. Repetitive Times: If it was checked, user can set the number of times to capture; after the number of times is completed, all the retrieved data would be saved.
2. RAM limit: User can set the limitation of memory usage. When the memory is full, stop capturing.
3. Number of Data Lines: If it was checked, user can set the number of data lines. When the number of lines reach the user setting, stop capturing.

Stack with the DSO

The TravelBus can be stacked with Acute DSO as MSO, but only in Logical Analysis mode.

In Protocol Analysis Mode, user must turn on the Show Waveforms and capture data before convert Trigger and Decode settings to Logical Analysis Mode for stacking with the oscilloscope. After extracting data, select Convert to Logical Analysis and

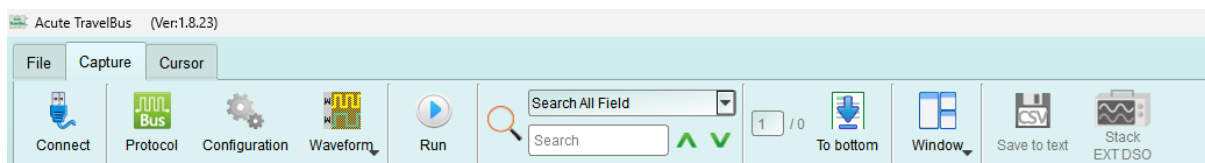


Stack Oscilloscope () in the File field of the toolbar to convert all settings to Logical Analysis mode, see Stacking Oscilloscopes in Logical Analysis Mode for details. Alternatively, you can keep only the settings and data and convert them to

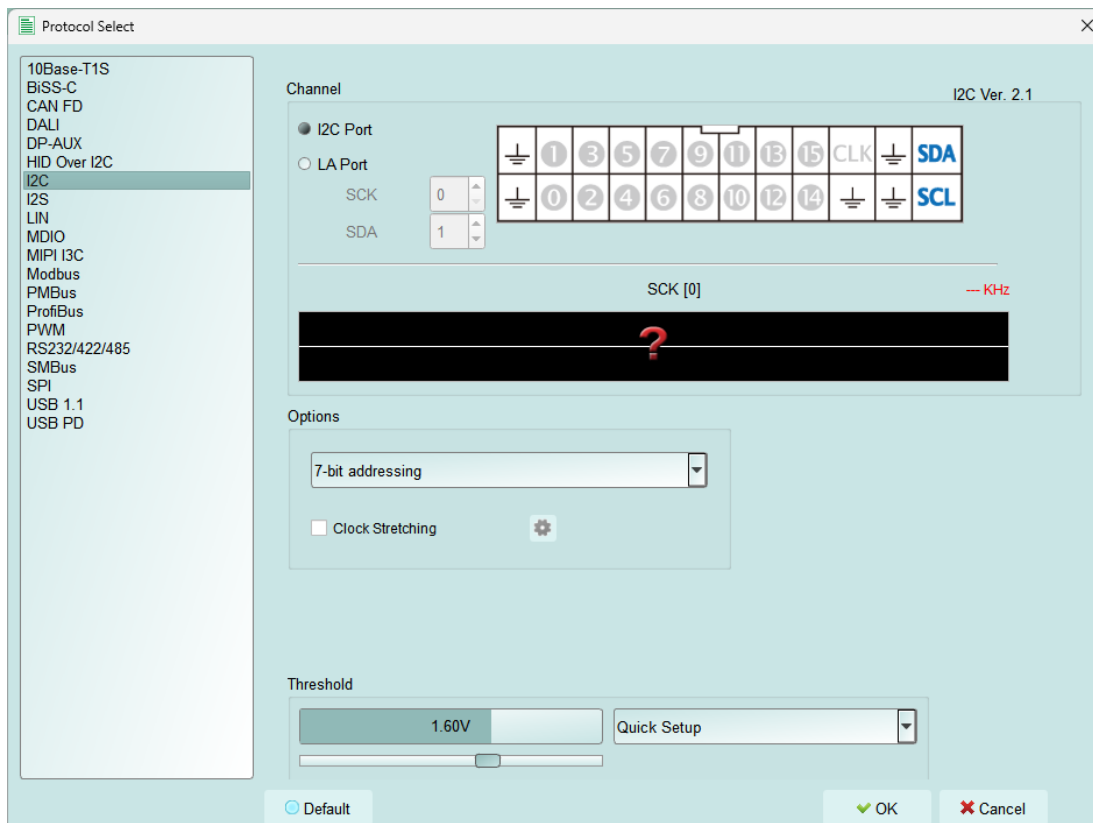
Logical Analysis mode by clicking Convert to Logical Analysis ().

Example:

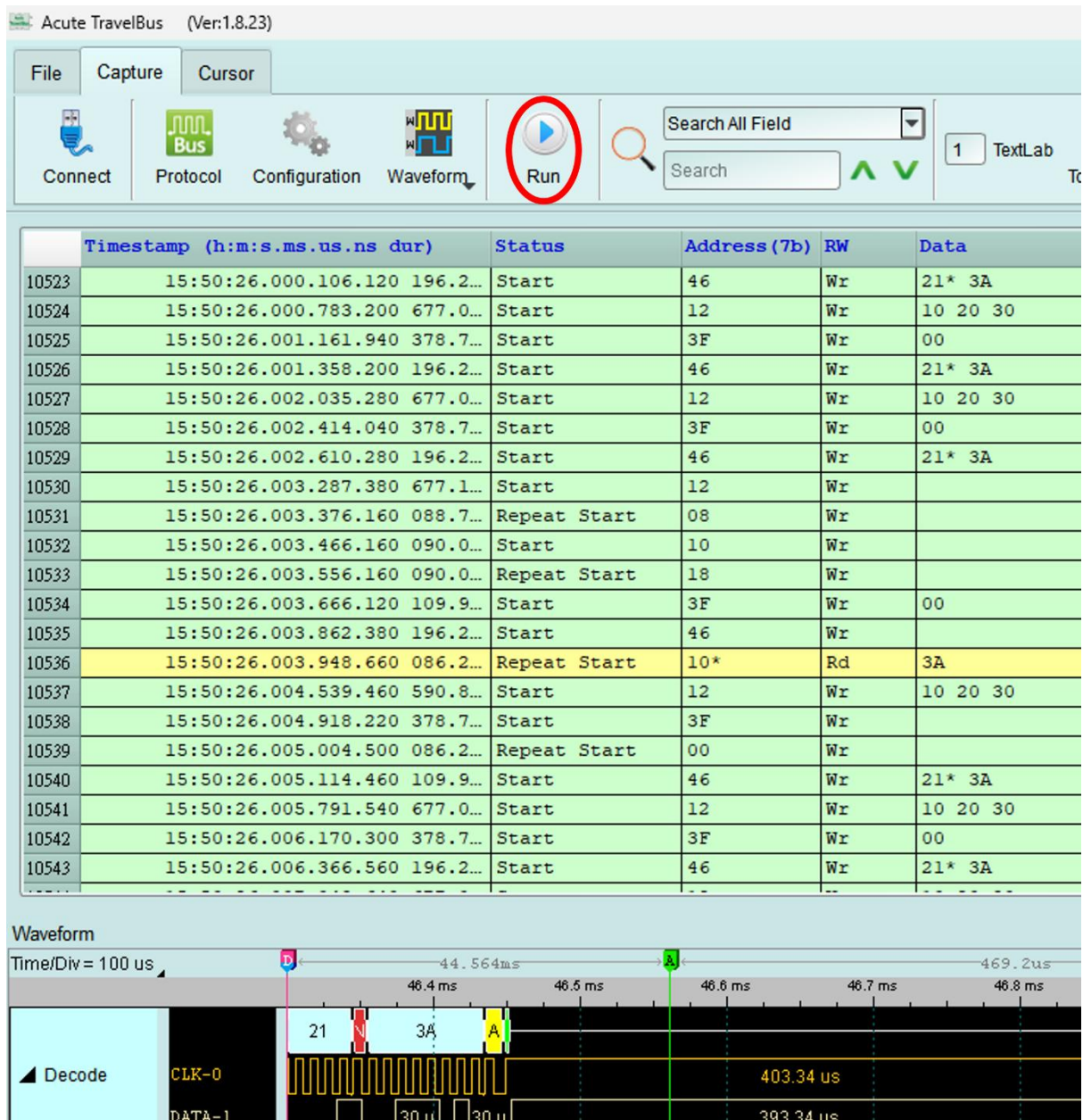
Click **Waveform** to store the protocol data with waveform.

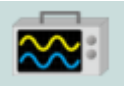


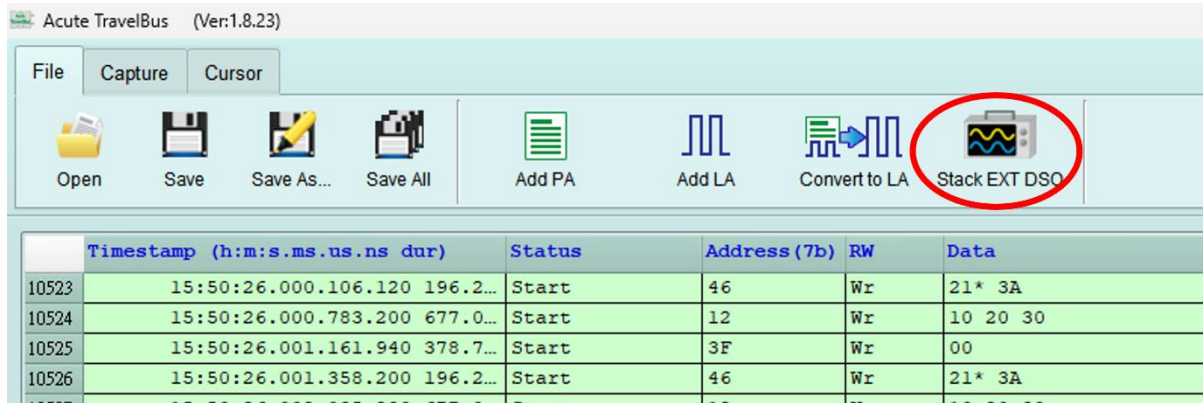
Choose **I²C** for protocol settings, click **OK** by default settings or reset manually.



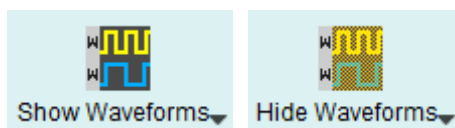
Click **Run** () to capture the data.



User can stack Oscilloscopes () in the File field of the Toolbar to convert all settings to Logical Analysis mode, see Stacking Oscilloscopes in Logical Analysis Mode for instructions.







Show Waveforms / Hide Waveforms

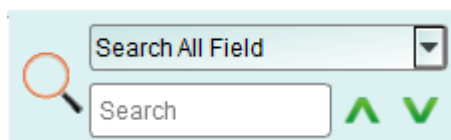


If User select “Show Waveforms”, the device will capture the waveform data. It requires more device memory. Please decide show or hide waveform before capture.

When “Show Waveforms” is enabled, the waveform area will provide the following functions:

1. Bus Decode 
Press this button to refresh the bus decode.
2. Stop the bus decode 
This button can stop the bus decode right away.
3. Add User Notes 
4. Waveform zoom in/out 
User can use these buttons or mouse wheel to zoom in or out the waveforms.

Search



Search function can search data in the report window.

1. Enter search criteria in the text field.

A mark will appear in front of each row meeting the search criteria.



2. Search the previous / next piece of data.
3. Specify all fields or target fields to search.

Specify fields to narrow the search range, to search faster.

It will show the total number of packets found with green

'CMD' 5556 Packets found

background. If no data is found, it will show an orange background.

Search text 'CMD99' not found!

orange background.

To bottom

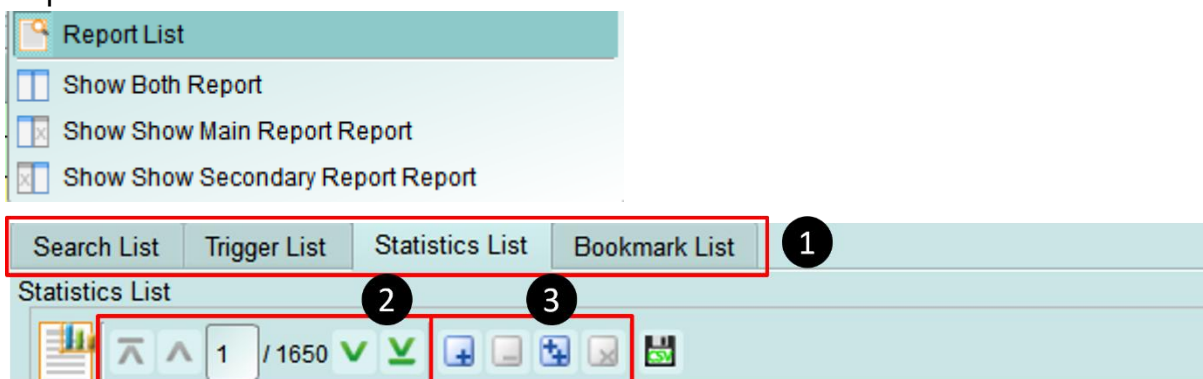


When viewing data, user press this button to move directly to the last end of data if user press this button while the device is capturing data, the most up to data will be displayed.

Window



Select to enable/disable multiple display report, such as: Report List, Show Both Report...etc.



1. Select different display list.
2. Use the control buttons to move the current position, or input row number to jump to specified row.

3. Use the control buttons to add /remove selected row to Bookmark List.
For detailed usage steps, please refer to Appendix 1: Report List Advanced Instructions.

Saved as text file



Contents of the report may be saved as .TXT or .CSV.

Save to TXT/CSV

Total number of lines: 1399

☒ Save all in one file

☐ Save each file within 32000 lines

☐ Save selected range

☐ Select Row Number

From 1

To 1399

☐ Select Column Number

From 1

To 6

☐ Advance report

☐ Use nanosecond(ns) as duration unit

☐ Splitting timestamp into separate timestamp and duration columns

☐ Maximum saving byte per column 64 byte(s)

Save Location

.CSV

Save Cancel

Save options:

1. You can select to save the data as a file or according to the number of rows.
2. Advanced reports: If it was checked, the detailed data would be saved.
3. Splitting timestamp into separate timestamp and duration columns: If it was checked, the timestamp column would be separated into two columns, timestamp and duration time. (It was combined together by default).
4. Maximum saving byte per column: Set the limitation of byte numbers in one column.

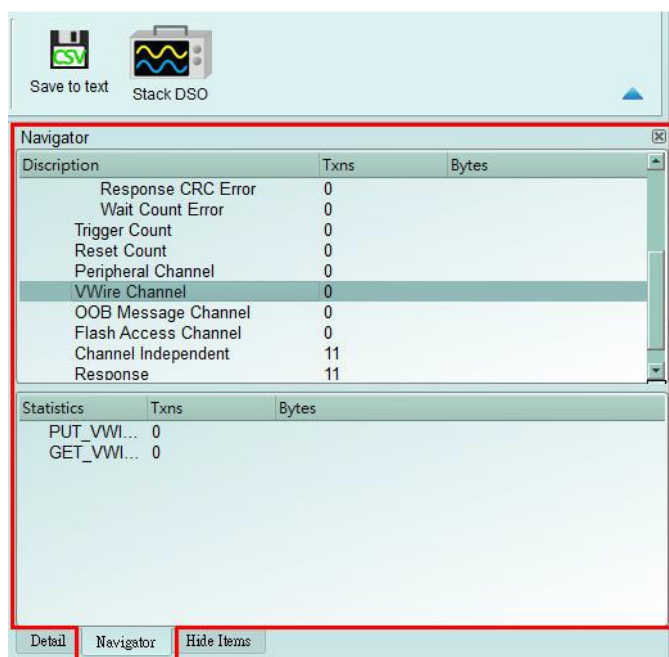
Detail window

Many protocols contain a large number of numerical data, it is not suitable to display in the report window at one time, so User can click the Data column of the report window with the mouse first, and the data will be displayed in the detail window.



Statistics window

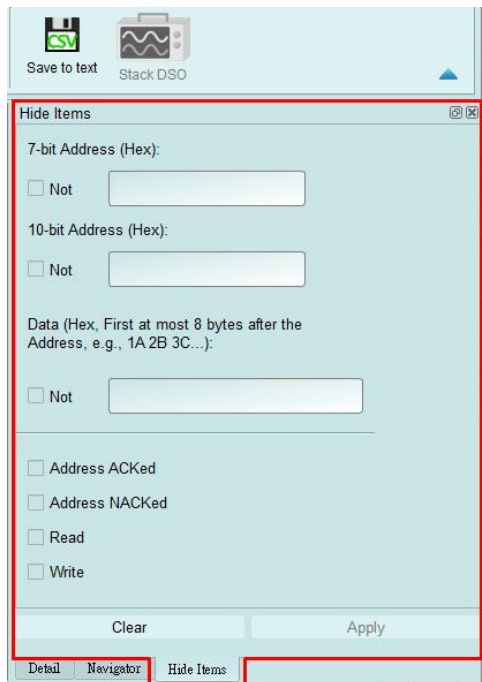
According to protocols' different characteristics, statistics are made to understand the entire transmission situation, User may also click on the statistic trace to summarize all records of the selected trace into the statistic list window.



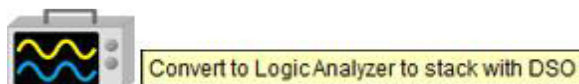
For detailed usage steps, please refer to Appendix 1: Report List Advanced Instructions.

Hide Data window

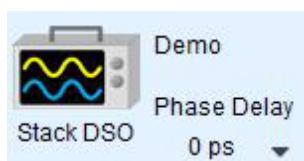
Select item to hide certain data, click “Clear” to restore.



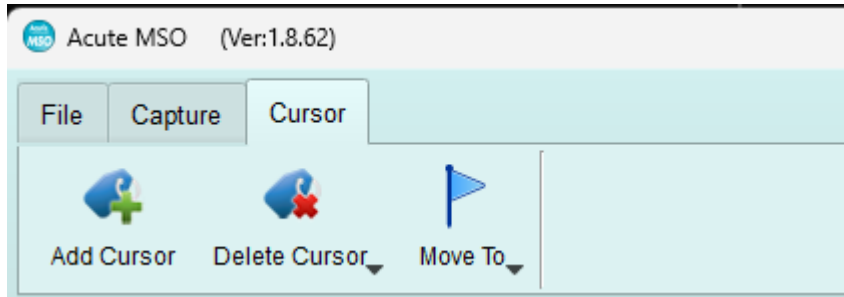
Stack external oscilloscope



The stack oscilloscope can only be enabled in the Logic Analyzer mode. If you want to enable the stack oscilloscope in the protocol Analyzer mode, you must first press the "Convert to Logic Analyzer and Stack Oscilloscope" button to switch to the Logic Analyzer mode to enable this function. It should be noted that you must open Show Waveforms in the Protocol Analyzer mode and capture the data/waveform to switch.



Cursor

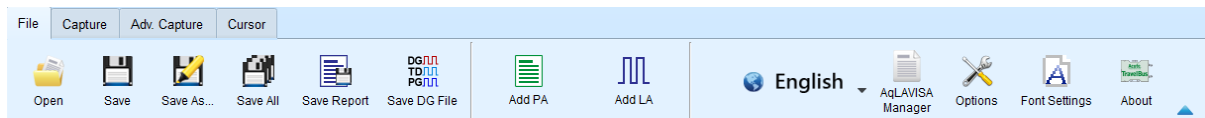


This function includes the cursor setting and the waveform search function matching the cursor.

But it can only be operated while the 'Show Waveform' function was turned on. Otherwise, user will see these buttons turn gray and disabled.

Logic Analyzer

File



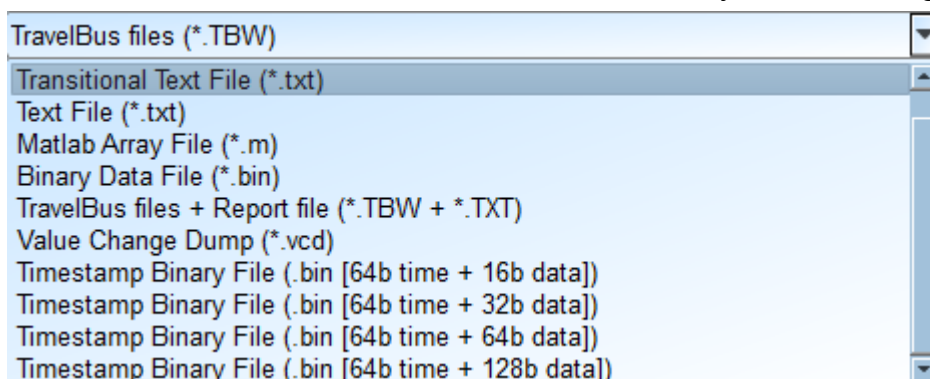
Open file: Load the file



Save file: Save the current file



Save as: Save with a new file name and may set the storage range

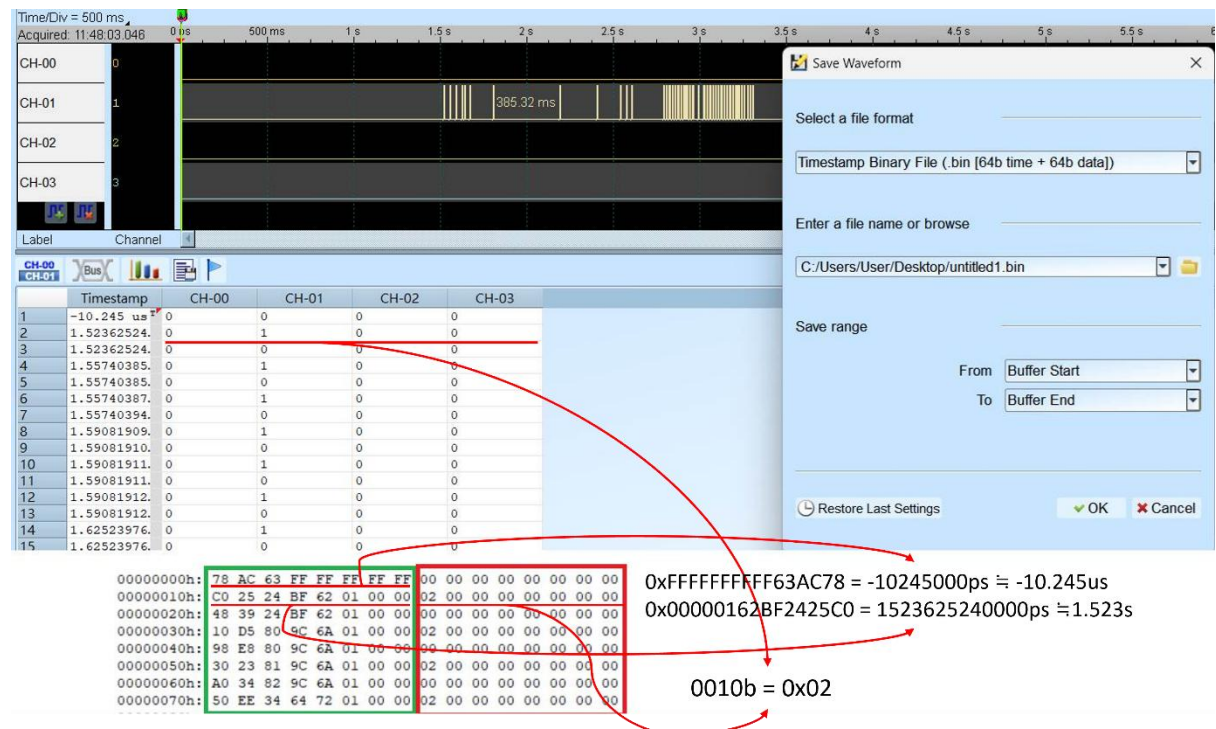


User can save file as:

1. TravelBus files (*.TBW)
2. Transitional Text File (*.txt)
3. Text File (*.txt)

4. Matlab Array File (*.m)
5. Binary Data File (*.bin)
6. TravelBus files + Report file (*.TBW + *.TXT)
7. Value Change Dump (*.vcd)
8. Timestamp Binary File (*.bin)
 - i. 64b time + 16b data
 - ii. 64b time + 32b data
 - iii. 64b time + 64b data
 - iv. 64b time + 128b data

The format of Timestamp Binary File is, the first 64 bits represented time, the rest bits used to present data.



In this figure, the green block represents time, the red block means data. Take the values shown in this figure as an example, the data from left to right represents the direction from lsb to msb, so for the second line of data, the archive value is 0010b = 0x02. Note that if you choose a data bit archive format that is less than the number of channels, the extra bits will be discarded.



Save all: Save all files at once

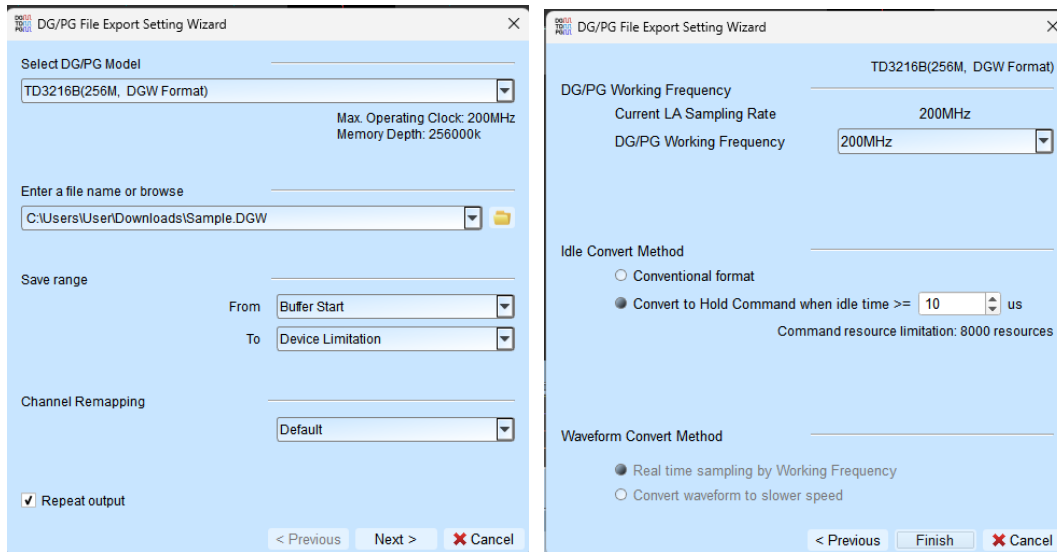


Save report: Save the bus decode report



Saved as a DGW file:

Convert captured waveform to DGW format for the Acute Digital Data Generator(PKPG、PG2000、DG Series、TD Series), which can be used to resend the digital signals.



1. Select DG/TD/PG Model: The software will check the maximum working frequency and memory depth according to the selected DG/TD/PG model.
2. Enter a file name or browse
Enter a file name and directory to save the converted DGW/PGV file.
3. Save range:
Select the waveform range to convert to DGW/PGV file, you may select either waveform within cursor range, or select maximum available range according to DG/TD/PG's maximum memory. (Exported file size larger than DG/PG's maximum memory may not be opened by the DG/TD/PG's software.)
4. Repeat output:
Check to add "Jump to start" command at the end of DGW/PGV file.
5. Idle Convert Method
Select to replace signal pulse width greater than specified time to a short block of waveform with Loop instructions to save the DG/TD/PG's memory. (The waveform will become more complicated and not easy to read/edit after enable this option)
6. DG/TD/PG Working Frequency:
Specify the DG/TD/PG working frequency.
7. Waveform Convert Method
When the LA's sampling frequency is faster than the DG/TD/PG's working

frequency, the software provides two different ways to convert the DGW/PGV wave form, one is the real time sampling mode with DG/TD/PG's maximum working frequency (Small signal might be lost during the conversion), the other is convert the original high speed waveform to slower DGW/PGV waveform (Slower signal speed might introduce some signal timing issue since the setup/hold time will also be changed)



Add Protocol Analyzer: Add a protocol Analyzer window



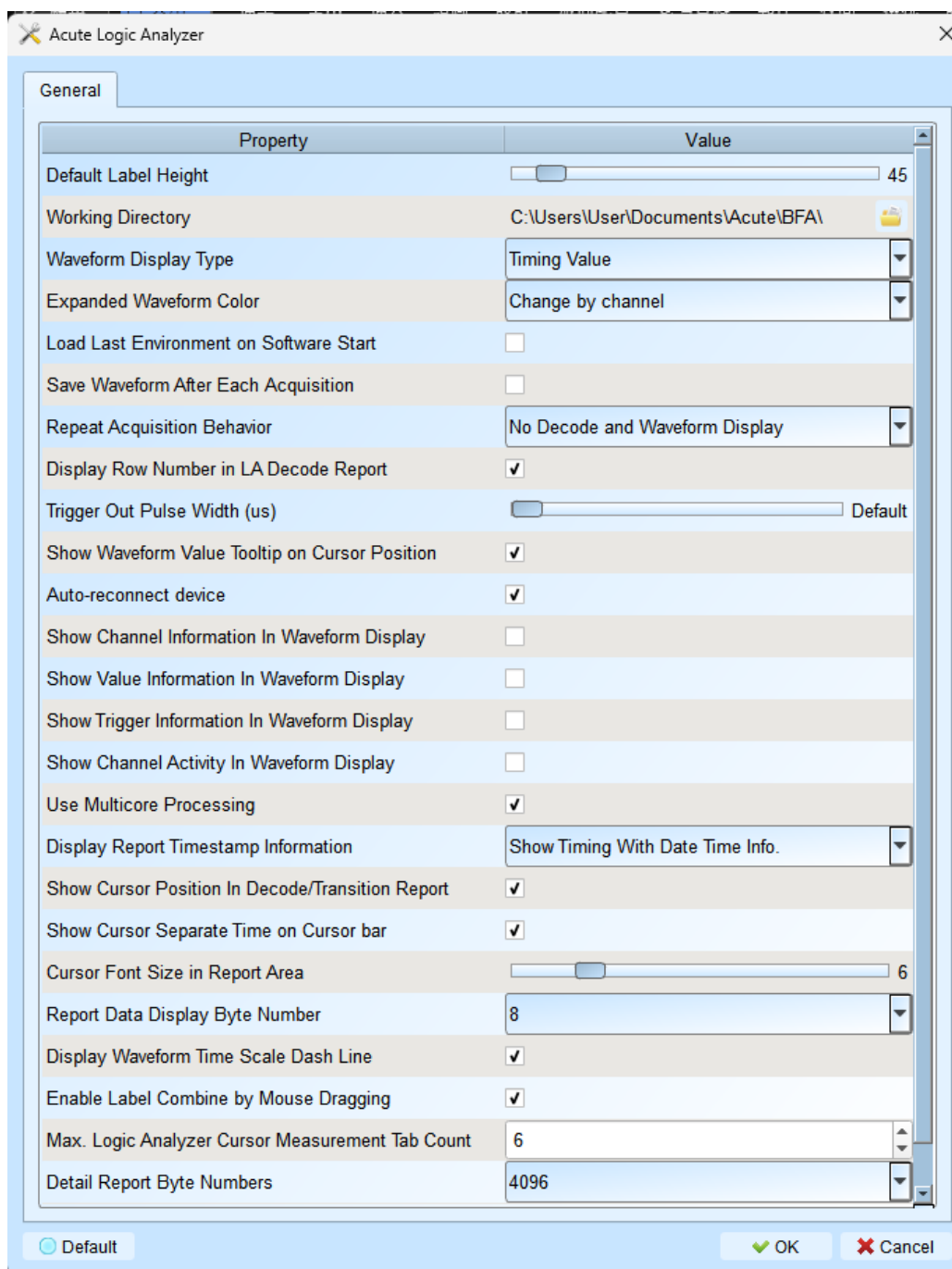
Add Logic Analyzer: Add a logic Analyzer window



Language: Display language. You can select English, Traditional Chinese, or Simplified Chinese



System environment settings: Here you can set the working directory, the label height, whether to load the last setting, the waveform display mode and its color.



1. Default Label Height: Modify the channel height of the waveform area.
2. Working Directory: The directory where the temporary files and waveforms are stored when the software is in operation.
3. Waveform Display Type: Select which information to display between waveform edges. You can select either display time value, logic value or not to display.
4. Expanded waveform color: You can choose whether the colors are different between channels.
5. Load Last Environment on Software Start: When the software starts, load the

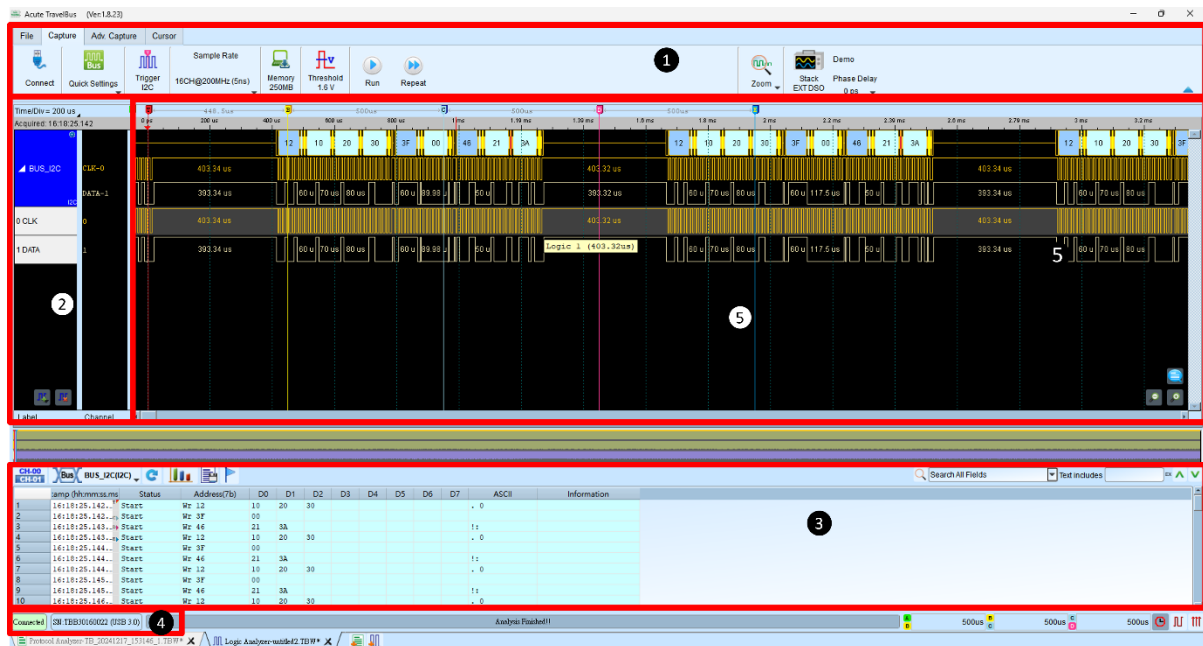
- settings as the file that was previously closed, waveforms will not be loaded.
6. Save Waveform After Each Acquisition: This file is stored in the working directory.
 7. Repeat Acquisition Behavior: Whether to display waveform decoding, to display, choose display time (1/2/5 s).
 8. Display row number in LA Decode Report: Show row number on the left to the reporting area.
 9. Trigger Out Pulse Width (us): The default length is from trigger point to the end of capture. The following 2 items will be controlled by the cursor, which will display the contents of the "Select Cursor", which can be set in the waveform area shift and A-Z, and moved to the cursor position by pressing A-Z (T is the trigger point mark, not available).
 10. Show Waveform Value Tooltip on Cursor Position : Show numbers of used channels, show additional names for bus decode.
 11. Auto-reconnect device: Reconnect the device while re-plug the USB after device offline.
 12. Show Channel Information In Waveform Display: Display the channel number in waveform area.
 13. Show Value Information in Waveform Display: Digital channels display 0/1, analog channels display the voltage value.
 14. Show Trigger Information in Waveform Display: Display trigger setting values.
 15. Show Channel Activity In Waveform Display: Sum up the change types of the edge channel of the captured waveform.
 16. Use Multicore Processing: Use multi-core to speed up data processing.
 17. Display Report Timestamp Information: Display the timestamp column with timing info format / timing info with date time format (trigger point is at 0 s) / sample count format.
 18. Show Cursor Position in Decode/Transition Report: Show cursor position in the report area time field.
 19. Show Cursor Separate Time on Cursor bar: Add additional time between cursors on the horizontal timeline of the waveform area.






20. Cursor Font Size in Report Area: Cursor font size for cursor position in decode/transition report (refer to item 18).
21. Report Data Display Byte Number: This is an item set for protocol analyzer mode, and you can modify the report field to show the number of Bytes.
22. Display Waveform Time Scale Dash Line: Add dash lines on the waveform area to correspond time line to report area.
23. Enable Label Combine by Mouse Dragging: Use the left mouse button to drag a channel label onto another channel label to combine channels.
24. Max. Logic Analyzer Cursor Measurement Tab Count: Displays the number of groups of cursor measurement values in the lower right corner. Minimum of 3 groups, maximum of 10 groups.
25. Detail Report Byte Numbers: Set the limitation of displaying byte number of each detail report.



Font Settings: User can set the font type and font size that used in display the text in waveform area, note and label.

Main Window



- 1. Toolbar** includes Trigger, Sample Rate, Threshold and Run.
Operating Steps: Quick Setting→Trigger→Sample Rate→Memory→Threshold
- 2. Label Field** is to add or to delete the channel(s) by pressing the icons (, ).
You may modify the channel settings by clicking its label.
- 3. Report Window** displays either the data () or decode () which can be exported text file in .csv or .txt ().
- 4. Status Bar** shows if the TravelBus is connected to the PC.
- 5. Waveform Window :**
You may roll the mouse wheel to zoom in/out the waveforms and see the time difference between cursors.

Trigger ()

Manual Trigger

After setting up, Click “Stop” button to position trigger point.

Single Level Trigger Settings

Single Level Trigger Settings

Char **1**

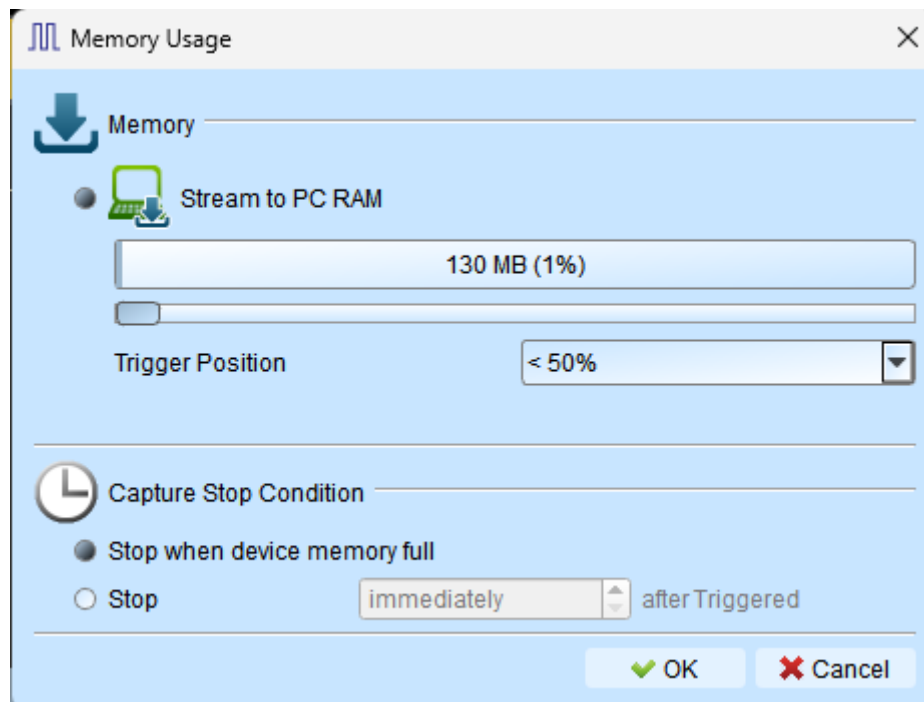
7	x	6	x	5	x	4	x	3	x	2	x	1	x	0	↑
15	x	14	x	13	x	12	x	11	x	10	x	9	x	8	x

Pass Count **2** 0

☐ Default

1. **Channel** is to choose the trigger event as any (x), rising (↑),
2. **Pass Count** is to pass the trigger event(s) for the number of times you input.

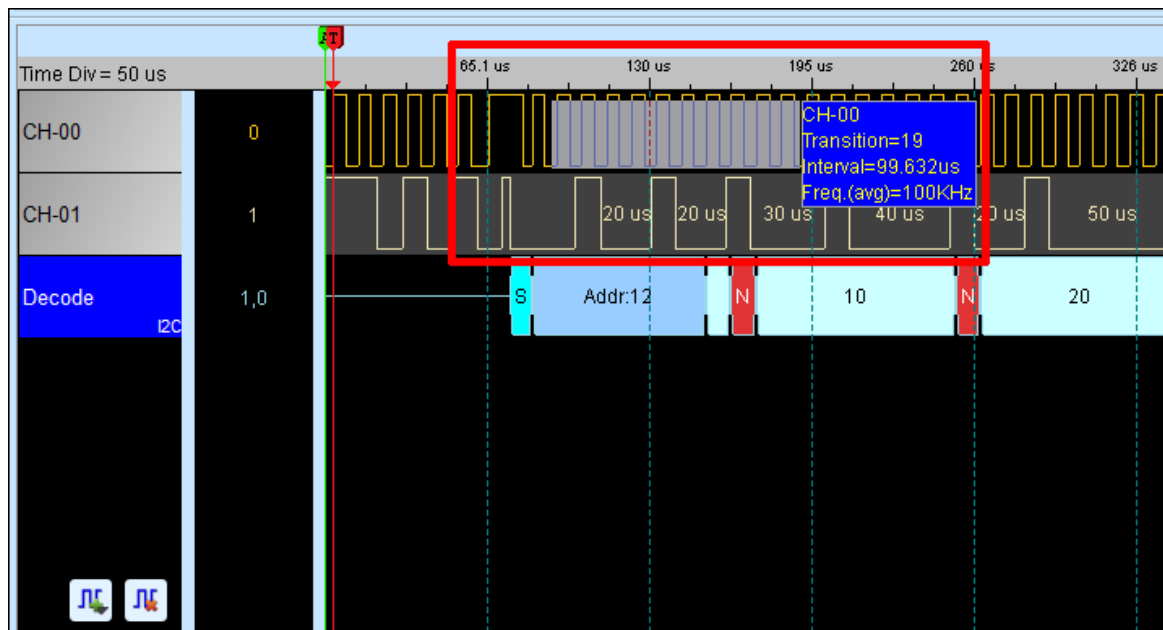
Memory Usage ()



1. **Available Memory** is to set the percentage of the available PC RAM for use.
2. **Trigger Position** is to set the trigger position at the percentage of the memory used.

Waveform Window

In the Waveform Window, right-click and drag the mouse on the waveform to show the number of transitions, the interval and average frequency of the waveform. The Protocol Analyzer supports this function too.



Stack with DSO

Using TravelBus and the Oscilloscope Stack functions, you need to install the special software provided by each oscilloscope brand. The software names are shown in the following table.

DSO brand	Software
Acute	Acute DSO software
Gwinstek	Please download the GW USB driver from the Gwinstek website
Tektronix	Please download the TEKVISA CONNECTIVITY SOFTWARE from the Tektronix website.
Agilent Keysight	Please download the KEYSIGHT IO LIBRARIES SUITE from the Keysight website.
LeCroy	Please download the NI-VISA and Drivers from the NI website.
HAMEG	Please download the NI-VISA and Drivers from the NI website.
Rohde & Schwarz	Please download the NI-VISA and Drivers from the NI website.

Oscilloscope-supportive models:

DSO brand	Model	USB	TCP/IP
Acute	<ul style="list-style-type: none"> DS-1000 MSO3000 TravelScope2000/3000 	√	
Gwinstek	<ul style="list-style-type: none"> GDS-1000A/2000/2000E/3000 	√	
Tektronix	<ul style="list-style-type: none"> TDS1000B/1000C/2000B/2000C/3000/3000B/ 3000C/5000/5000B/7000 DPO2000/3000/4000/4000B/5000/7000 7000C/70000/70000B DSA70000/70000B MSO2000/3000/4000/4000B/5000 MDO3000/4000/4000B/4000C MDO32, MDO34, MSO54, MSO56, MSO58, MSO64 MDO4014B-3, MDO4034B-3, MDO4054B-3, MDO4054B-6, MDO4104B-3, MDO4104B-6, MDO4024C, MDO4034C, MDO4054C, MDO4104C 	√	√
Keysight(Agilent)	<ul style="list-style-type: none"> DSO1000A/5000A/6000A/6000L 	√	√

	<ul style="list-style-type: none"> 7000A/7000B/9000A MSO6000A/7000A/7000B/9000A DSO-X 2000A/3000T/3000G/4000A/6000A/9000A DSA 9000A DSA-X 9000A/9000Q MSO-X 2000A/3000T/3000G/4000A/6000A EXR 100A/400A DSAZ634A, DSOZ634A, DSAZ632A, DSOZ632A, DSAZ594A, DSOZ594A, DSAZ592A, DSOZ592A, DSAZ504A, DSOZ504A, DSAZ334A, DSOZ334A, DSAZ254A, DSOZ254A, DSAZ204A, DSOZ204A, DSOS054A, DSOS104A, DSOS204A, DSOS254A, DSOS404A, DSOS604A, DSOS804A, MSOS054A, MSOS104A, MSOS204A, MSOS254A, MSOS404A, MSOS604A, MSOS804A 		
LeCroy	<ul style="list-style-type: none"> WaveRunner / WaveSurfer / HDO4000 / HDO6000 / SDA 8 Zi-A / DDA 8 Zi-A 		√
HAMEG	<ul style="list-style-type: none"> HMO3000/2000/1000 	√	√
R & S	<ul style="list-style-type: none"> RTO1000 / 2000 / 3000 RTE1000 RTM3000 RTP164 MXO44, MXO54, MXO58 		√

There are two methods for hardware wiring:

TravelBus is the Master, while the oscilloscope is the Slave.

Wiring direction is from TravelBus's Trig-Out ➔ the oscilloscope's Trig-In (see Figure 1)

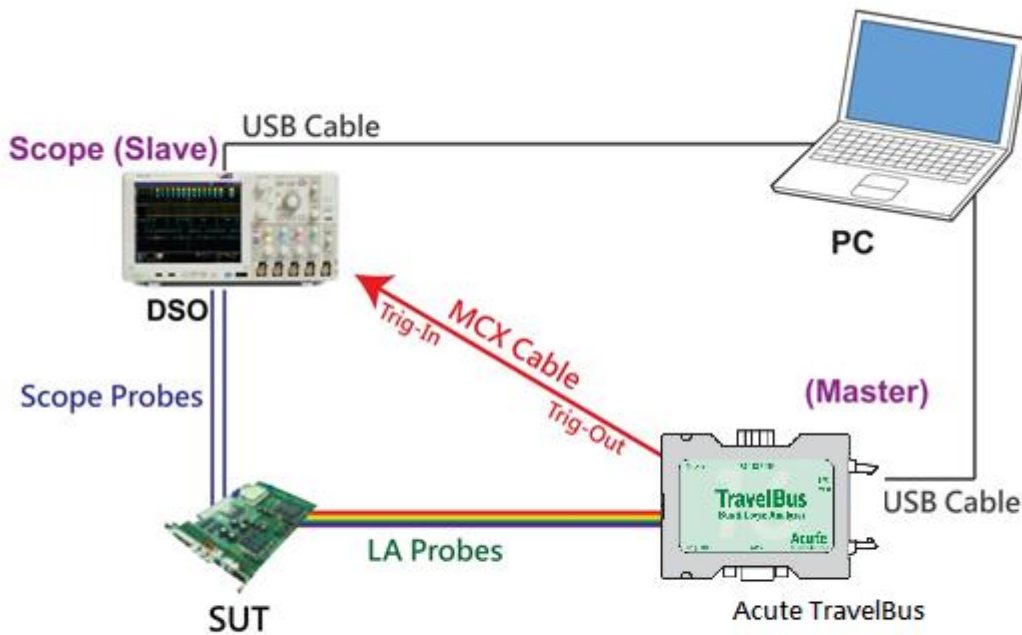


Figure 1

In Figure 1, the USB or Ethernet (TCP / IP) interface is connected to the computer, and then connect the BNC-MCX cable to the TravelBus Trig-Out and the trigger input interface (Ext-Trig, Aux In or Trig-In) of the oscilloscope. MDO4000 series is fixed in the analog channel CH4.

The oscilloscope is the Master, while the TravelBus is the Slave.

Wiring direction is from the oscilloscope's Trig-Out → TravelBus's Trig-In (see Figure 2).

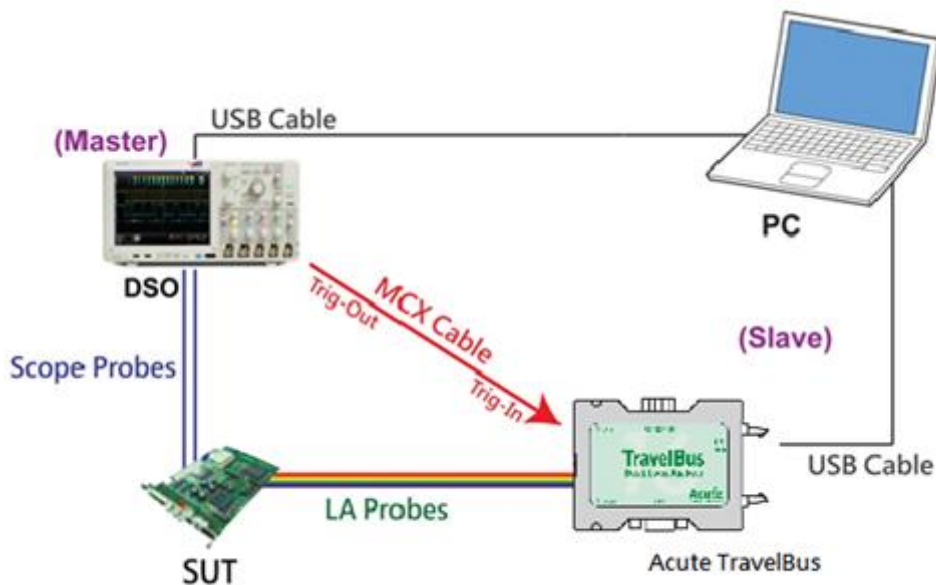
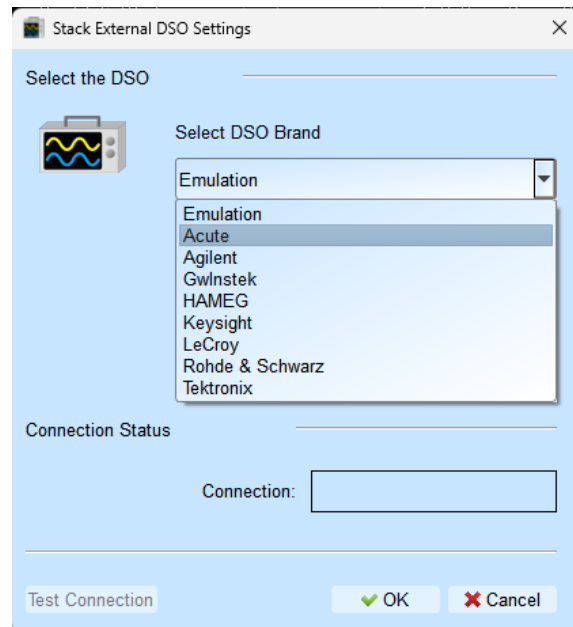
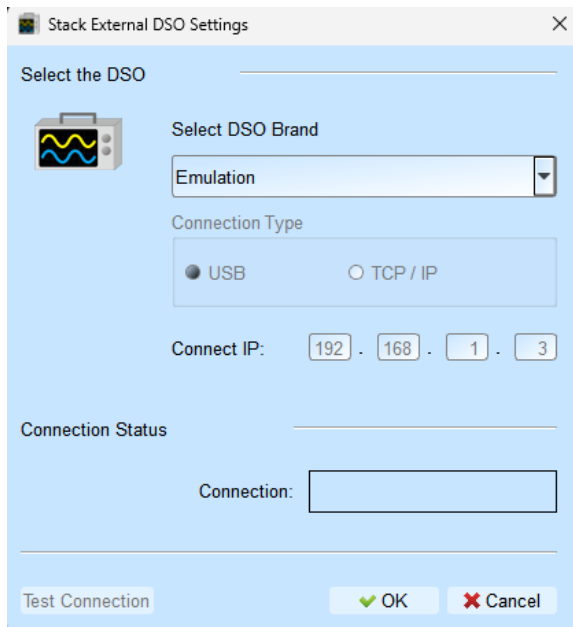


Figure2

In Figure 2, the BNC-MCX cable is connected to the TravelBus Trig-In and the trigger output interface (Trig-Out) of the oscilloscope. After completing the above actions,

press the "Stack Oscilloscope" button, as shown below:



Select the DSO

Select the brand that needs to be stacked on the oscilloscope. When there is no DSO hardware available for stacking, emulation is the mode used to read back the storage files of DSO stack.

Connection Type

It can be used to select USB, TCP / IP, according to the connection interface provided by the oscilloscope brands.

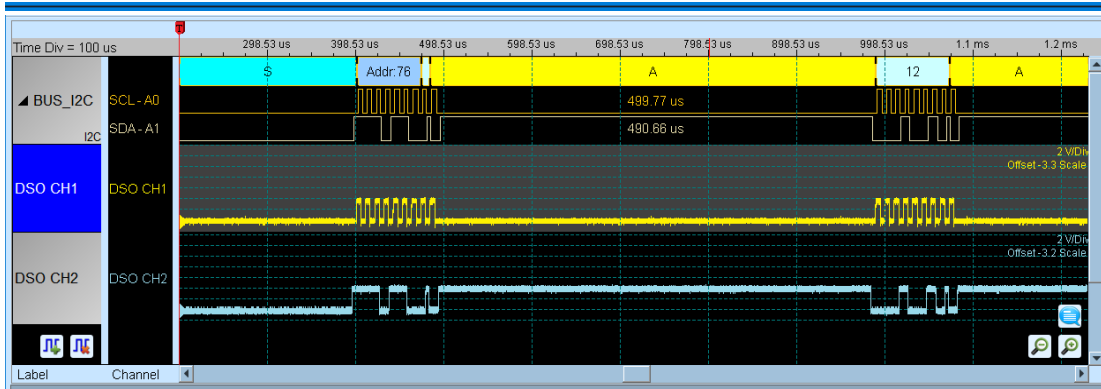
Connect IP

It can be used to select TCP / IP for the connection mode and enter IP address. When the Ethernet crossover cable is used, it is recommended that the IP settings of the two machines be 192.168.1.2 and 192.168.1.3 respectively. Gateway is the same, set to 192.168.1.1, and DHCP is set to OFF. If the IP setting does not take effect, please disable and then enable the network, or reboot to make the network settings effective.

Test Connection / Connection Status

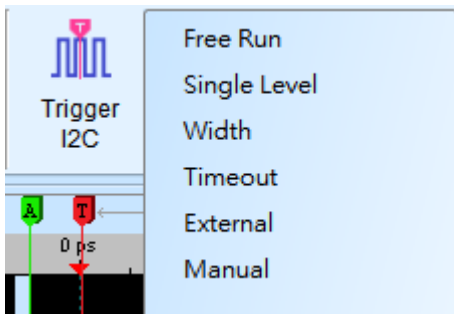
It can be used to connect the oscilloscope / display the current stack oscilloscope model and automatically add the oscilloscope channel to the waveform window.

Screen of oscilloscope stack



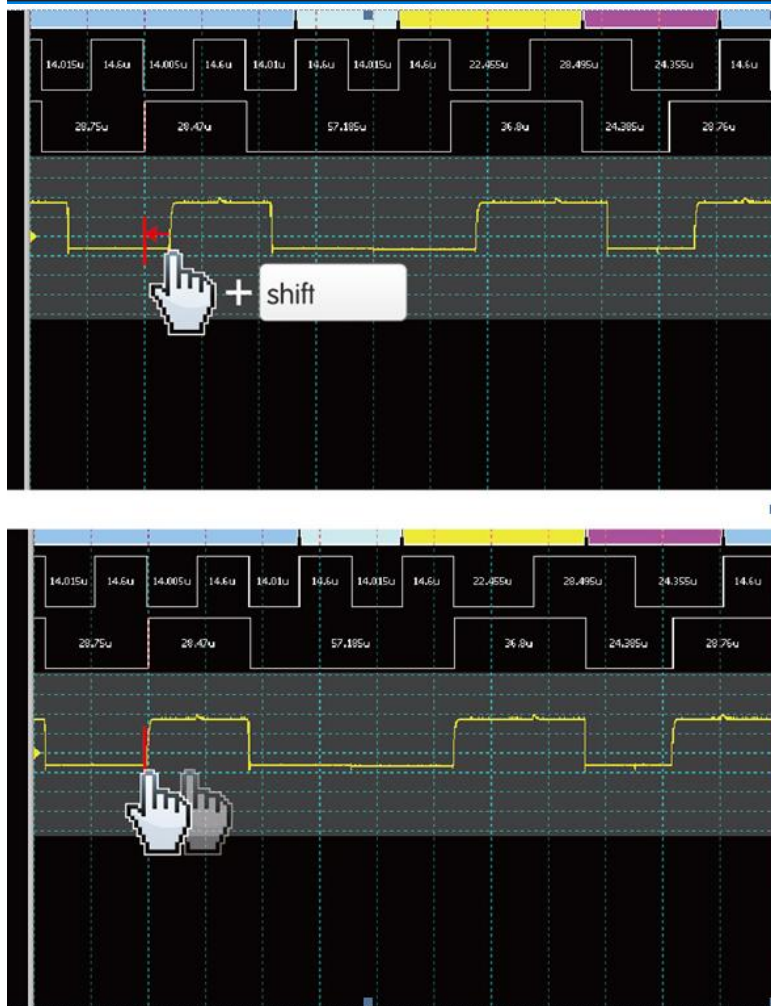
Oscilloscope is set as the master, while the TravelBus is set as the slave

If the stack is composed of the oscilloscope as the master and TravelBus as the slave, you must not only complete the above-mentioned basic settings but also set the external trigger signal. For the hardware wiring, please refer to Figure 2. Press "Trigger Condition" → "External Trigger", as shown below.



Stack Delay

When TravelBus is triggered successfully, the Trig-Out signal is transmitted through Cable to the DSO with a time delay, resulting in a deviation between the logic and the analog signal time displayed by the waveforms. Therefore, the stack delay time must be set to compensate the delay. In the waveform display screen, you can put the mouse on the top of the DSO waveforms, hold down the Shift key, and then use the mouse's left button to drag the DSO waveforms to the appropriate location to complete the stack delay correction.

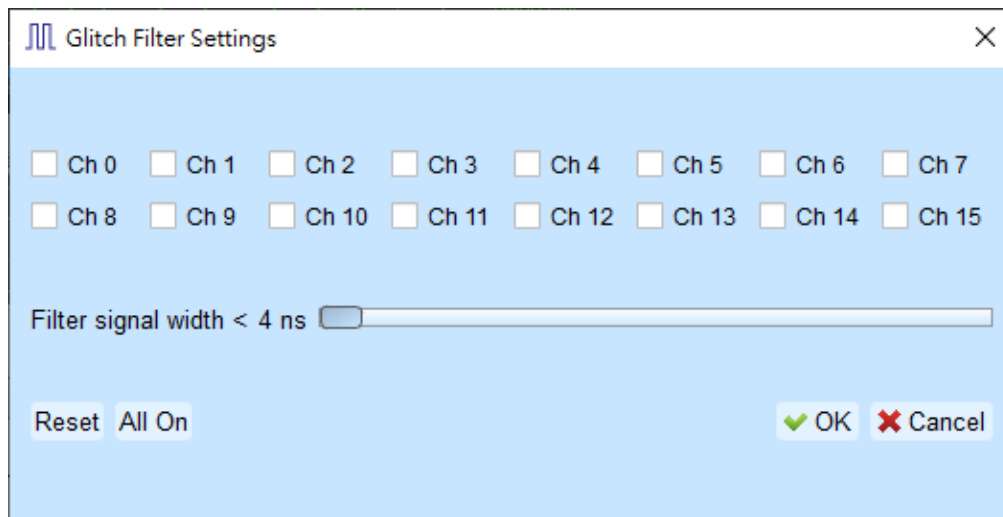


Advanced Capture Settings

Glitch filter settings



The hardware glitch filter function is used to filter out unwanted glitches and logical misjudgment caused by slow transitions. It can be regarded as a low pass filter. Notice that the glitches may sometimes lead to poor quality of data transmission. User can stack a logic analyzer and an oscilloscope to check the signal integrity and whether there are unexpected glitches.



This filter can filter the signals of less than 5 ns - 35 ns wide. If this filter function is enabled, it will filter before the hardware is triggered. Channels that use the glitch filter function are marked with a red dot on the channel label for identification.

Software Glitch filter settings



SWFilter

☐ Ch 0 ☐ Ch 1 ☐ Ch 2 ☐ Ch 3 ☐ Ch 4 ☐ Ch 5 ☐ Ch 6 ☐ Ch 7

☐ Ch 8 ☐ Ch 9 ☐ Ch 10 ☐ Ch 11 ☐ Ch 12 ☐ Ch 13 ☐ Ch 14 ☐ Ch 15

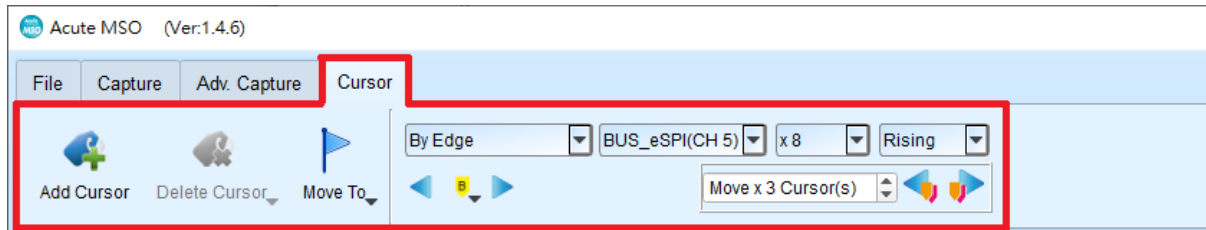
Filter signal width < 1 sample

Reset All On OK Cancel

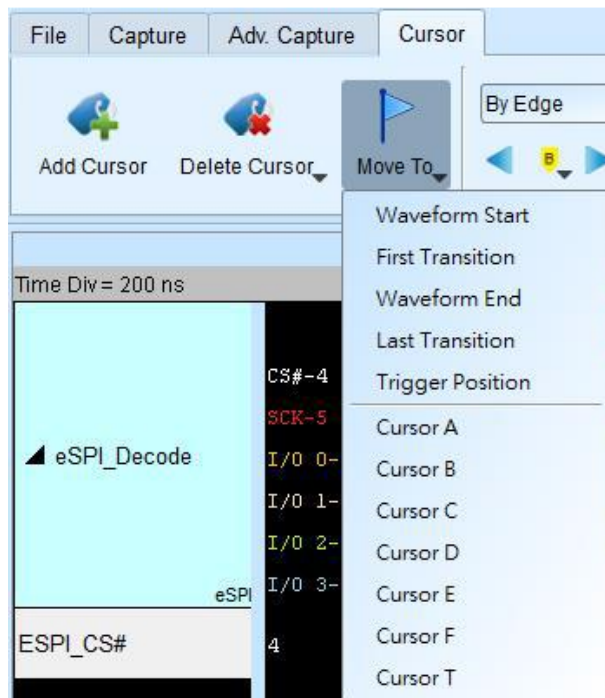
This filter function can be set to filter the signals with pulse width range from 1 ps to 1ms. Enable this filter function will only change the display and decode contents, the trigger and recordable time will remain not effected. Disable this filter function will restore all waveform contents back to the original unfiltered waveform.

Cursor

This function includes the cursor setting and the waveform search function matching the cursor.



Move To: Move the focused timestamp position in the waveform area according to the selection.



Waveform Start: Move to the beginning of waveform.

First Transition: Move to first waveform transition.

Waveform End: Move to the end of waveform.

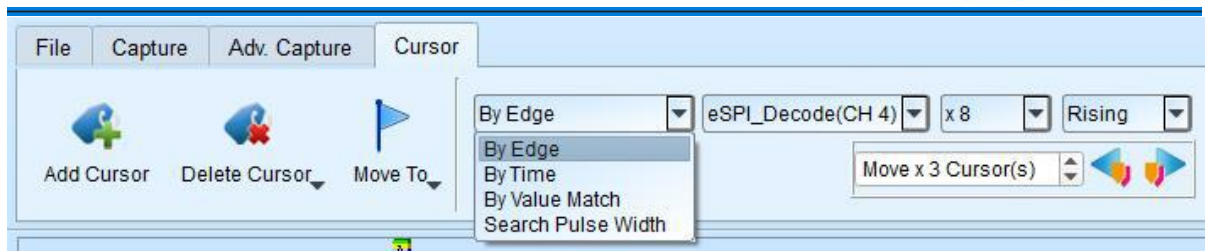
Last Transition: Move to last waveform transition.

Last Transition on selected channel: Move to the last waveform transition of selected label.

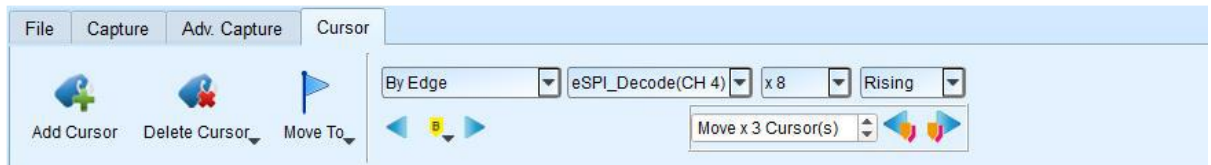
Trigger Position: Move to the trigger position.

Cursor A-Z: Move to the Cursor position.

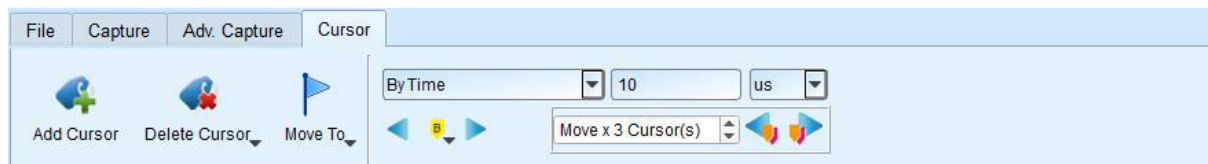
Waveform search is divided into four modes:



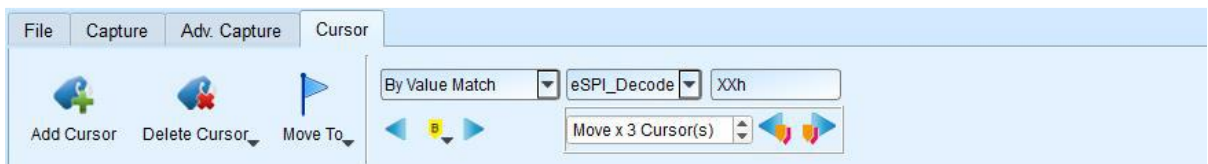
1. By Edge: Move the specified cursor according to the number of Rising/Falling/Either edges (x1 ~ x4096) of the specified channel.



2. By Time: Move the specified cursor forward or backward to a certain amount of time.



3. By Value Match: In search of displayed value content of the specified channel, if the specified channel is a protocol, the text comparison will be used for the search; if the specified channel is the bus or channel, the numerical comparison will be used for the search.




4. Search Pulse Width: The waveform pulse widths meeting the conditions can be searched on the specified channels. The single-cursor movement function on the left side or the multiple-cursor movement function on the right side can be used on any operation meeting or exceeding the conditions.
All of the above operations can be used to move a single cursor on the left or multiple cursors on the right.




The starting point of the search is set to the current position of the selected cursor.

Cursor usage:

The cursor system has two special purpose cursors: the triggering cursor T and the search specific cursor B, respectively. To add a new cursor, User can click the “Add

Cursor Button” () on the top or press the Shift+ letter key. To delete a cursor,

User can click the “Delete Cursor Button” () on the top.

Cursor movement method:

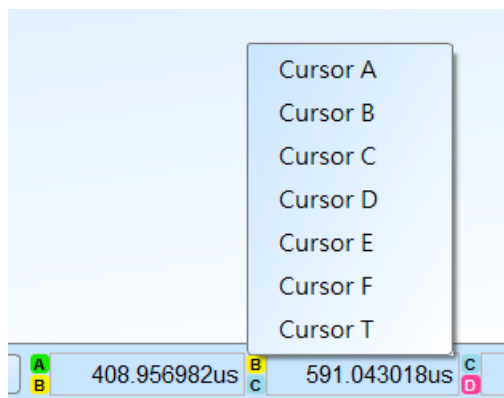
1. Drag the cursor sign or cursor line to move the cursor.
2. Use the keyboard A-Z to quickly navigate to the cursor’s location.
3. Use the keyboard Shift + A-Z to move the cursor to the place where the mouse cursor is. If the cursor does not exist, it will add the cursor to the mouse cursor’s location; this could save User time dragging the cursor.

At the bottom right of the screen shows the frequency / time, the value will change as the cursor moves.





From left to right are the interval time, frequency calculation, the number of sampling statistics, respectively.

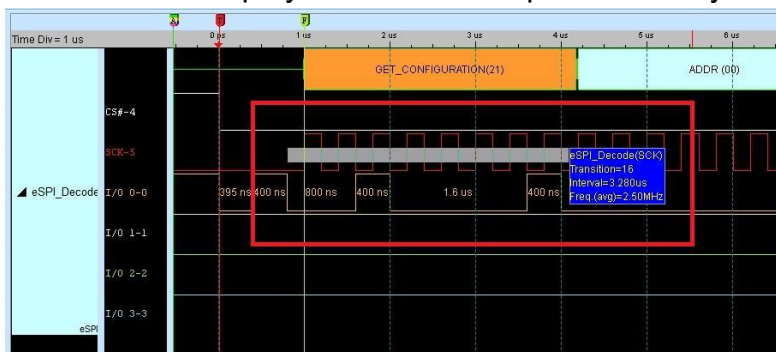
Clicking the cursor name, User can switch the cursor.



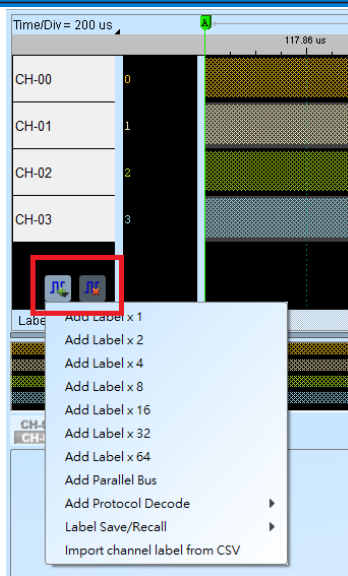
Waveform and Report

Waveform

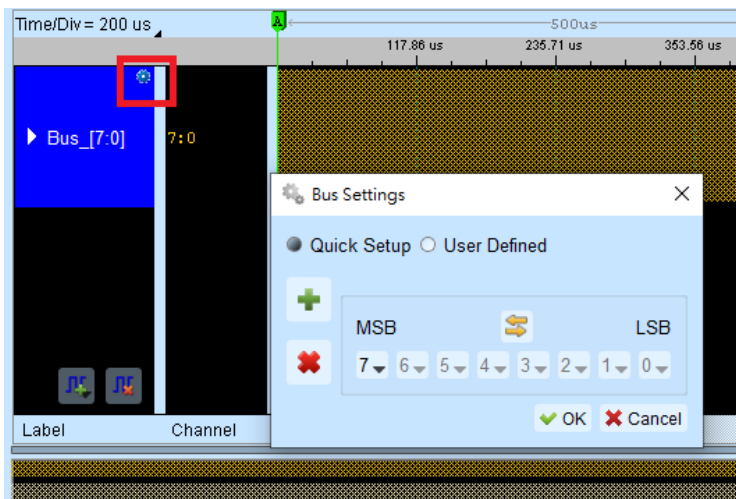
1. Use the left mouse button to drag the waveform in the wave form display area.
2. User can use the mouse wheel or click the zoom in button on the screen  to zoom in/out the waveform.
3. To add text/graphic annotation , User can add text or graphic annotation data in the waveform area.
4. Quick calculation function
Use the right mouse button to box out an area in the waveform display area, it will show the number of signal transitions in the observation interval, the length of time and the average frequency information. This function can also be used in the waveform display area under the protocol analyzer mode.



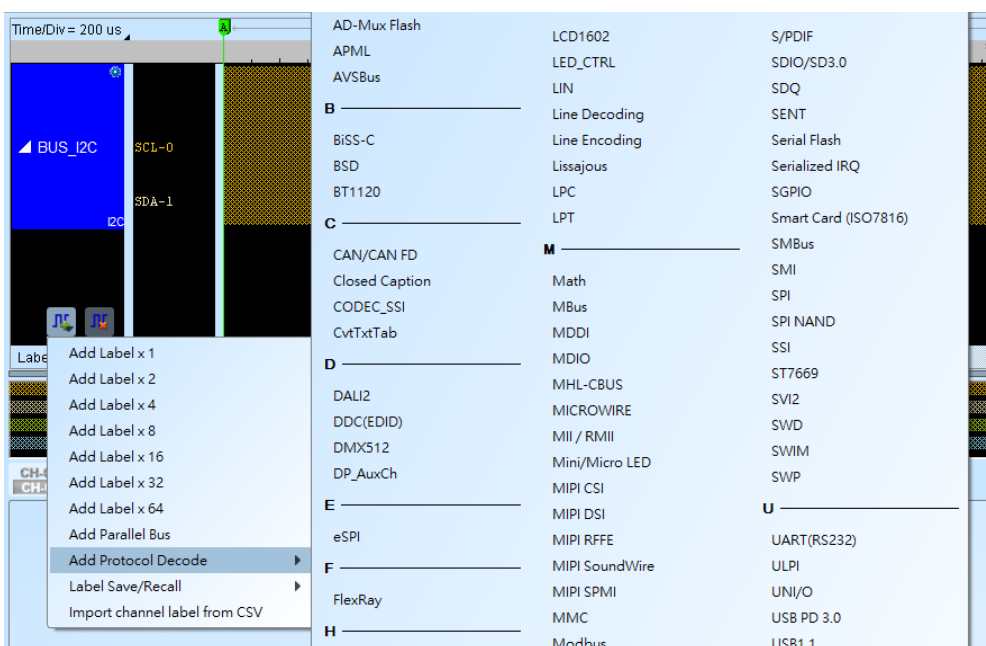
5. Add/Delete the waveform label.
 - Add labels



● Add parallel bus



● Add protocol decode

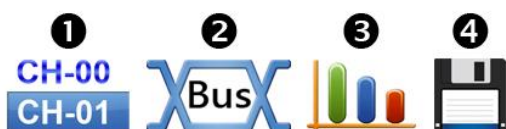


- Label Save/Recall: Save the current channel settings or load the saved channel label.
- Import channel label from CSV file. The file format is as follows,

	A	B	
1	name1	1	
2	name2	2	
3	name3	3	
4	name4	4	
5			

Notice: The feature can only import channel name and number. It cannot import parallel bus or protocol decode.

Report Area



1. Display the channel status.
2. Display the results of the bus decode, or create customize report from multiple decodes.

3. Waveform data statistics

Select measurement type and channels. The default measurement range is the entire waveform area, User can specify a certain range between two cursors.

Digital Measurement:

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

Analog Measurement:

Type	Channels
Frequency	1
Period	1
V Max.	1
V Min.	1
V High	1
V Low	1
V Peak to Peak	1
V Amplitude	1
V RMS.	1
V Mean	1
V Mid	1
High Duty	1
Low Duty	1
High Period	1
Low Period	1
Rise Time	1
Fall Time	1
V Pos. Overshoot	1
V Neg. Overshoot	1
V Rising Pre-shoot	1
V Falling Pre-shoot	1
Ch to Ch Rising Delay	2
Ch to Ch Falling Delay	2
Ch Rising to Ch Falling Delay	2
Ch Falling to Ch Rising Delay	2
Phase Delay	2
Rising Edge Count	1
Falling Edge Count	1
Edge Count	1

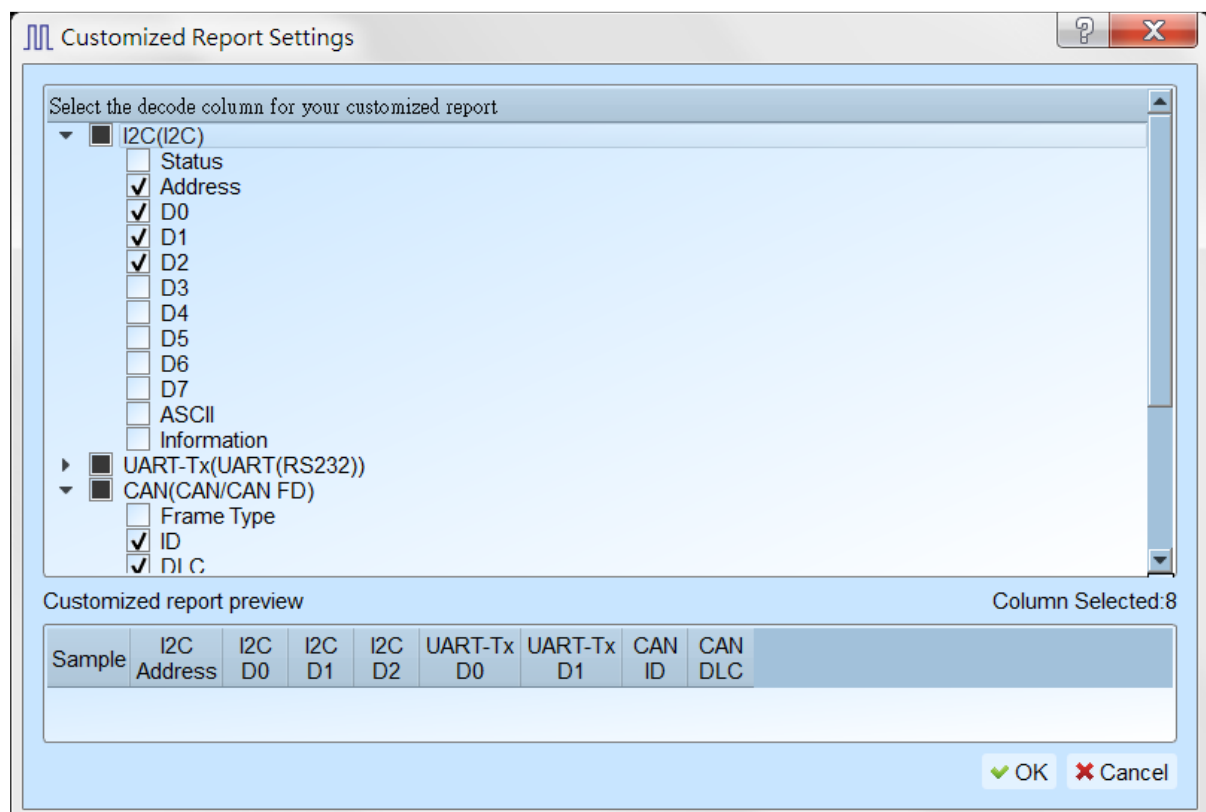
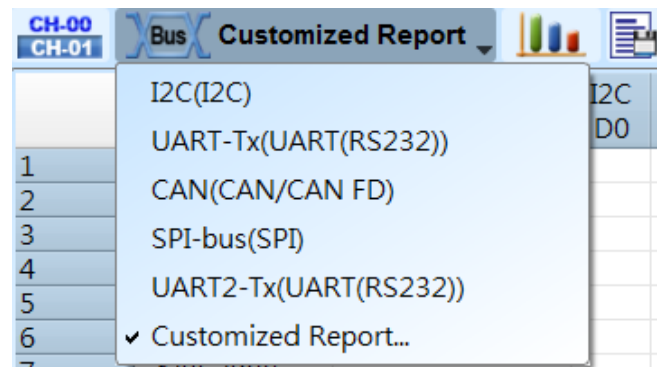
4. Save report area

Save the report area as text files.

Bus Decode Settings

Please refer to the bus trigger and Analyzer manual.

Customized Report Settings

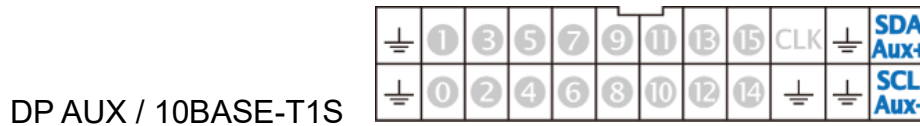
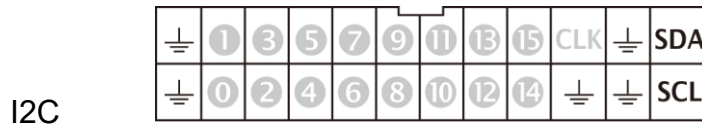


All bus decodes enabled in waveform area will be listed in the settings window, select columns wanted from each reports, the preview window will show selected column and combine them to create User customized report.

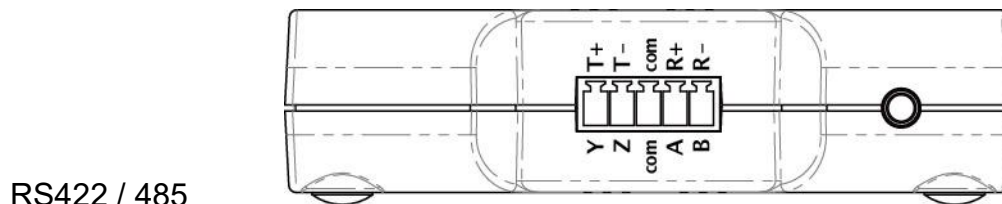
Note: The Bus Decoders must be setup correctly in order to fetch the correct column names for the customized report.

Chapter 3 Dedicated Channel Description

I2C 、 DP AUX, 10 BASE-T1S port are supported on the TB2000/TB3000 series



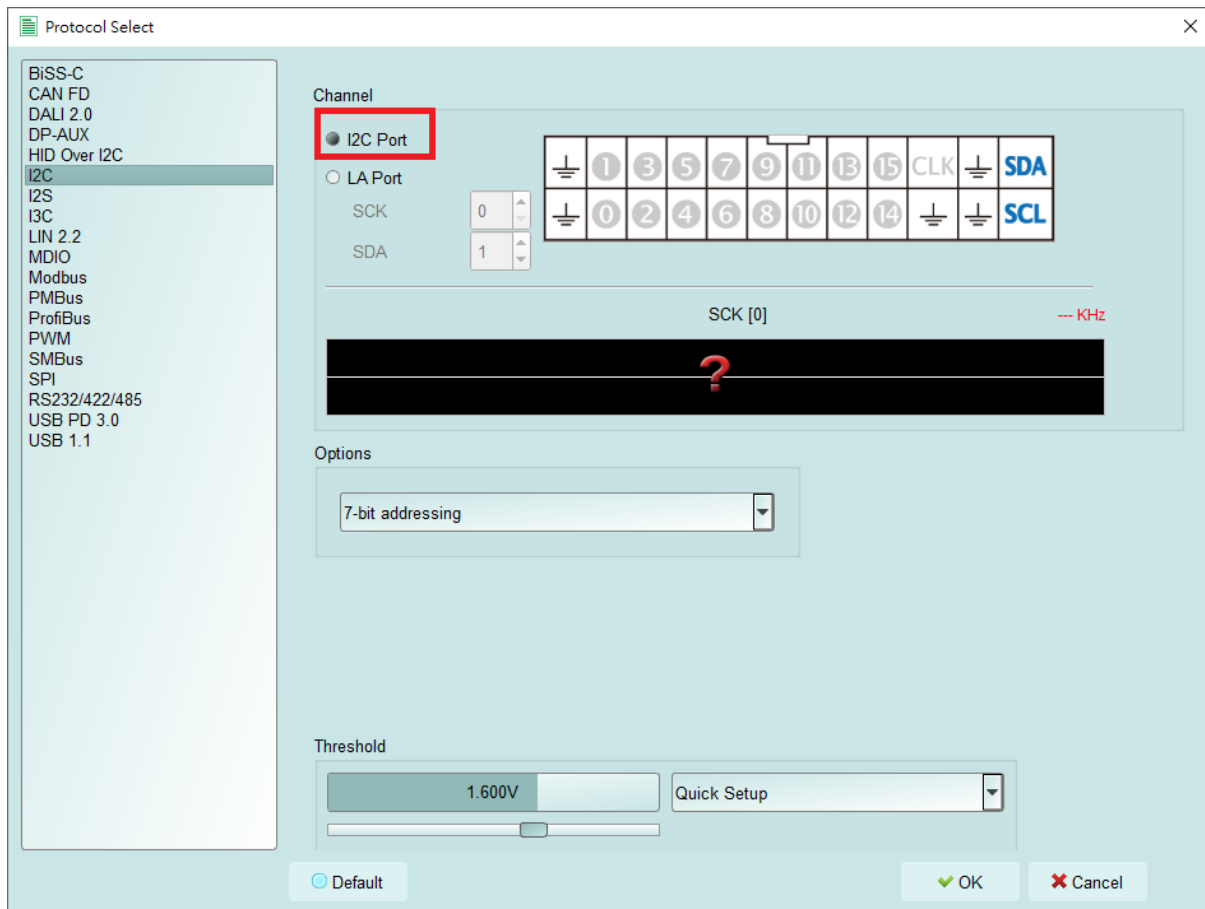
There are additional RS422 / 485 、 CAN / CAN-FD port supported on the TB2016B/TB3016B,



(DP AUX, 10BASE-T1S, RS485, CAN / CAN-FD are differential signal. Since TB2000/TB3000 series have the converter inside, there is no need to set the threshold before measure)

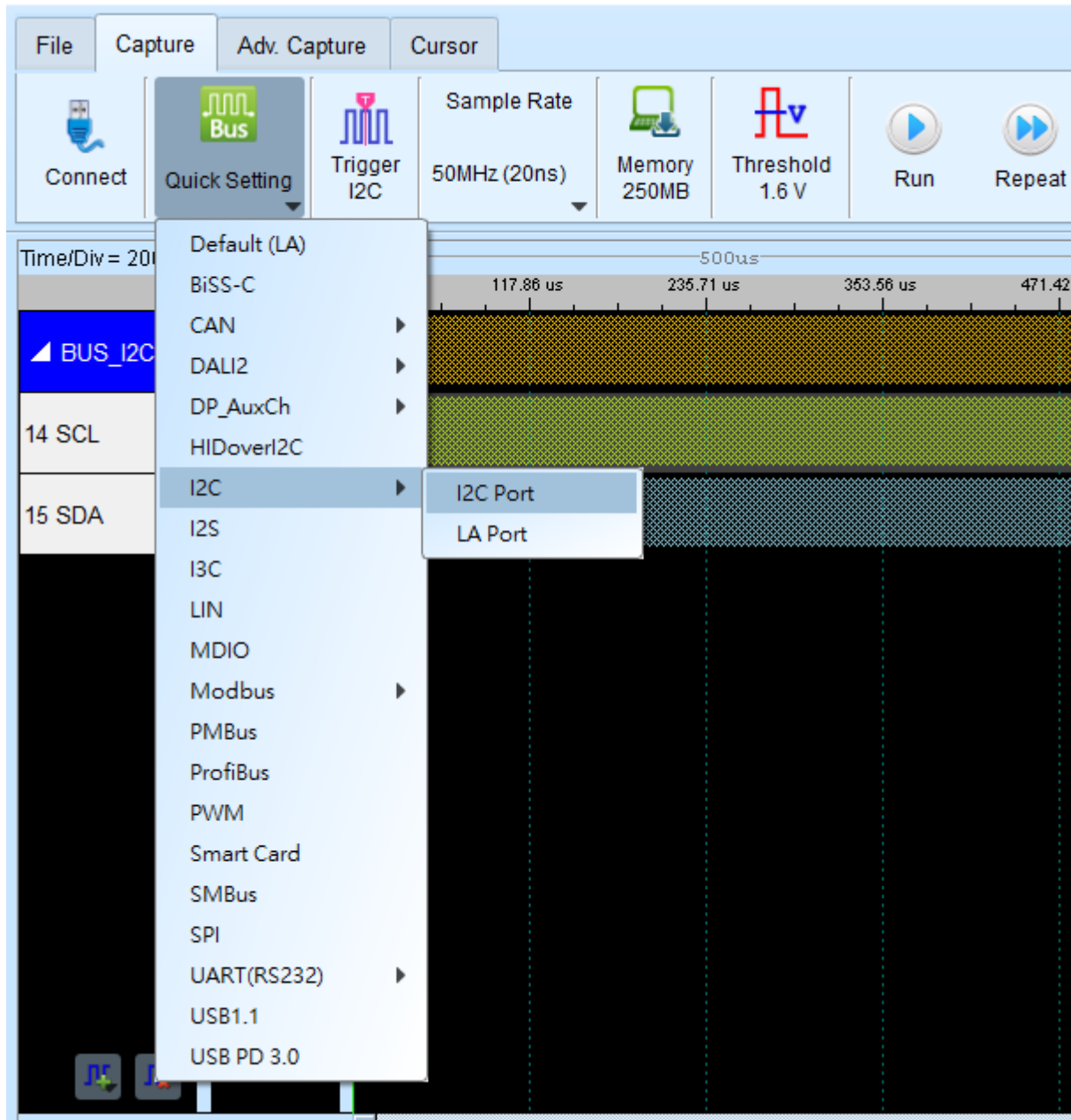
Protocol Analyzer mode

Please modify the channel settings in the Protocol Setting.



Logic Analyzer mode

Use Quick Setting to change channel settings. Warning: Don't change the trigger type after quick setting, or the dedicated channel can't not use.



(If the I2C port is on, only the I2C Clause Trigger can use. If change to the other trigger mode, the I2C port can't use. Unless re-Quick Setting.)

Chapter 4 Specifications

Model		TB3016 F	TB3016 E	TB3016B
Power	Power Source	USB bus-power (+5V)		
	Static Power Dissipation	0.75W		
	Max Power Dissipation	< 2.5W		
Hardware Interface		USB 3.0		
Timing Analysis (Asynchronous, Max. Sample Rate)		800MHz*		
State Clock Rate (Synchronous, External Clock)		200MHz*		
Channels (Data / CLK / I ² C / DP_Aux / CAN / RS485)		16 / 1 / 2 / - / -	16 / 1 / 2 / 2 / 4	
Timing Vs Channels	Timing Analysis	Available channels		
	800 MHz	8		
	400 MHz	16		
	200 MHz	16		
Threshold	Group	2 (ch0~7, ch8~15 & clk0)		
	Range	±6V		
	Resolution	50mV		
	Accuracy	±100mV + 5%*Vth		
Trigger	Time resolution	5 ns		
	Channels	16 (Max.)		
	Pre/Post Trigger Setting	Yes		
	Pass Counter	Yes (0~65536 times)		
	Event Types	Channel, Pattern, Single, Width, Time-out, External		
	Module I	I ² C, MIPI I3C 1.1, SPI, UART (RS232)		
	Module II	---	HID over I ² C , I ² S , LIN2.2, MDIO, PMBus, SMBus, USB1.1	
	Module III	---		BiSS-C, CAN2.0B, CAN-FD, DALI2.0, DP_AUX, SENT, Modbus, ProfiBus, RS422, RS485, USB PD 3
	Input port (for Stack)	---		TTL 3.3V
	Output port (for Stack)	---		TTL 3.3V

Input Voltage	Maximum	±40V DC, 15Vpp AC		
	Sensitivity	0.5Vpp @150MHz		
Impedance		200KΩ // < 5pF		
Maximum target signal speed		Data Port: 14 MHz, CAN Port: 10 Mbps, I²C Port: 400 KHz 3.3V, RS485 Port: Baud rate 20 Mbps		
Temperature	Operating / Storage	5°C ~ 45°C (41°F ~ 113°F) / -10°C ~ 65°C (-14°F ~ 149°F)		
Protocol Analyzer	Module I	I²C, MIPI I3C 1.1, SPI, UART (RS232)		
	Module II	---	HID over I²C, I²S, LIN2.2, MDIO, PMBus, SMBus, USB1.1	
	Module III	---	---	BiSS-C, CAN2.0B, CAN-FD, DALI2.0, DP_Aux, Modbus, Profibus, PWM, RS422, RS485, USB PD 3
Software features	Bus decode	1-Wire, 3-Wire, 7-Segment, AccMeter, ADC, APM, BiSS-C, BSD, CAN2.0, CAN FD, Close Caption, CODEC_SSI, DALI2.0, Digital LED, DMX512, DP_Aux, EDID, FlexRay, HDLC, HDQ, HID over I²C, I²C, I²C EEPROM, I²S, ITU656, IrDA, JTAG, JVC IR, LCD1602, LIN2.2, Line Decoding, Line Encoding, LPT, M-Bus, Math, MDIO, MHL Cbus, Microwire, Mini/Micro LED, MIPI CSI LP, MIPI DSI LP, MIPI I3C 1.1, MIPI SoundWire, Modbus, NEC IR, PECL, PMBus, Profibus, PS/2, PWM, QEI, QI, RC-5, RC-6, RT_SWI, SDQ, SENT, SGPIO, Smart Card (ISO7816), SMBus, SMI, SPI, SSI, ST7669, SWD, SWIM, SWP, UART, UNI/O, USB1.1, USB PD 3, Wiegand		

* Measure signal under 14 MHz ONLY due to data transmission limitation.

Model		TB2016F	TB2016E	TB2016B	
Power	Power Source	USB bus-power (+5V)			
	Static Power Dissipation	0.75W			
	Max Power Dissipation	< 2.5W			
Hardware Interface		USB 3.0			
Timing Analysis (Asynchronous, Max. Sample Rate)		200MHz*			
State Clock Rate (Synchronous, External Clock)		200MHz*			
Channels (Data / CLK / I ² C / CAN / RS485)		16 / 1 / 2 / - / -		16 / 1 / 2 / 2 / 4	
Trigger	Time resolution	5 ns			
	Channels	16 (Max.)			
	Conditions	Yes (4)			
	Pre/Post Trigger Setting	Yes			
	Pass Counter	0~65536 times			
	Event Types	Channel, Pattern, Single, Width, Time-out, External			
	Module I	I ² C, RS232, SPI			
	Module II	---	HID over I ² C , I ² S , LIN2.2, MDIO, PMbus, SMBus, USB1.1		
	Module III	---	BiSS-C, CAN2.0B, CAN-FD, DALI2.0, DP_AUX, SENT, Modbus, ProfiBus, RS422, RS485, USB PD3.0		
	Input port (for Stack)	---	TTL 3.3V		
	Output port (for Stack)	---	TTL 3.3V		
	Range	-6V ~ +6V			
	Voltage resolution	50mV			
Threshold	Accuracy	±100mV + 5%*Vth			
Input Voltage	Maximum	±40V DC, 15Vpp AC			
	Sensitivity	0.5Vpp @150MHz			
Impedance		Impedance			
Temperature	Operating	5°C ~ 45°C (41°F ~ 113°F)			

	Temperature			
	Storage Temperature	-10°C ~ 65°C (14°F ~ 149°F)		
Bus Decode	Module I	DALI, HID over I ² C, I ² C, I ² S, LIN, MDIO, PMBus, RS232, SMBus, SPI, USB1.1		
	Module II	---	CAN, Modbus, ProfiBus, RS422, RS485	
	Module III	---	---	BiSS-C, PWM

*Measure signal under 14MHz ONLY due to data transmission limitation

Model		TB1016E	TB1016B	TB1016B+
Power	Power Source	USB bus-power (+5V)		
	Static Power Dissipation	0.75W		
	Max Power Dissipation	< 2.5W		
Hardware Interface		USB 3.0 (USB 2.0 Compatible)		
Timing Analysis (Asynchronous, Max. Sample Rate)		200MHz*		
State Clock Rate (Synchronous, External Clock)		200MHz*		
Channels (Data / CLK / I ² C / CAN / RS485)		16 / 1 / 2 / - / -	16 / 1 / 2 / 2 / 4	
Trigger	Time resolution	5 ns		
	Channels	16 (Max.)		
	Conditions	Yes (4)		
	Pre/Post Trigger Setting	Yes		
	Pass Counter	0~65536 times		
	Event Types	Pattern, Channel, Transition, Width		
	Module I	DALI, HID over I ² C, I ² C, I ² S, LIN, MDIO, PMBus, RS232, SMBus, SPI, USB1.1		
	Module II	---	CAN, Modbus, ProfiBus, RS422, RS485	
	Module III	---	---	BiSS-C
	Input port (for Stack)	---	TTL 3.3V	
	Output port (for Stack)	---	TTL 3.3V	
	Range	-6V ~ +6V		
	Voltage resolution	50mV		
Threshold	Accuracy	±100mV + 5%*Vth		
Input Voltage	Maximum	±40V DC, 15Vpp AC		
	Sensitivity	0.5Vpp @150MHz		
Impedance		200KΩ // < 5pF		

Temperature	Operating Temperature	5°C ~ 45°C (41°F ~ 113°F)		
	Storage Temperature	-10°C ~ 65°C (14°F ~ 149°F)		
Bus Decode	Module I	DALI, HID over I ² C, I ² C, I ² S, LIN, MDIO, PMBus, RS232, SMBus, SPI, USB1.1		
	Module II	---	CAN, Modbus, ProfiBus, RS422, RS485	
	Module III	---	---	BiSS-C, PWM

*Measure signal under 14MHz ONLY due to data transmission limitation

Chapter 5 Service

Contact information:

Website: <http://www.acute.com.tw>

E-Mail: service@acute.com.tw

Phone: +886-2-2999 3275

Fax: +886-2-2999 3276

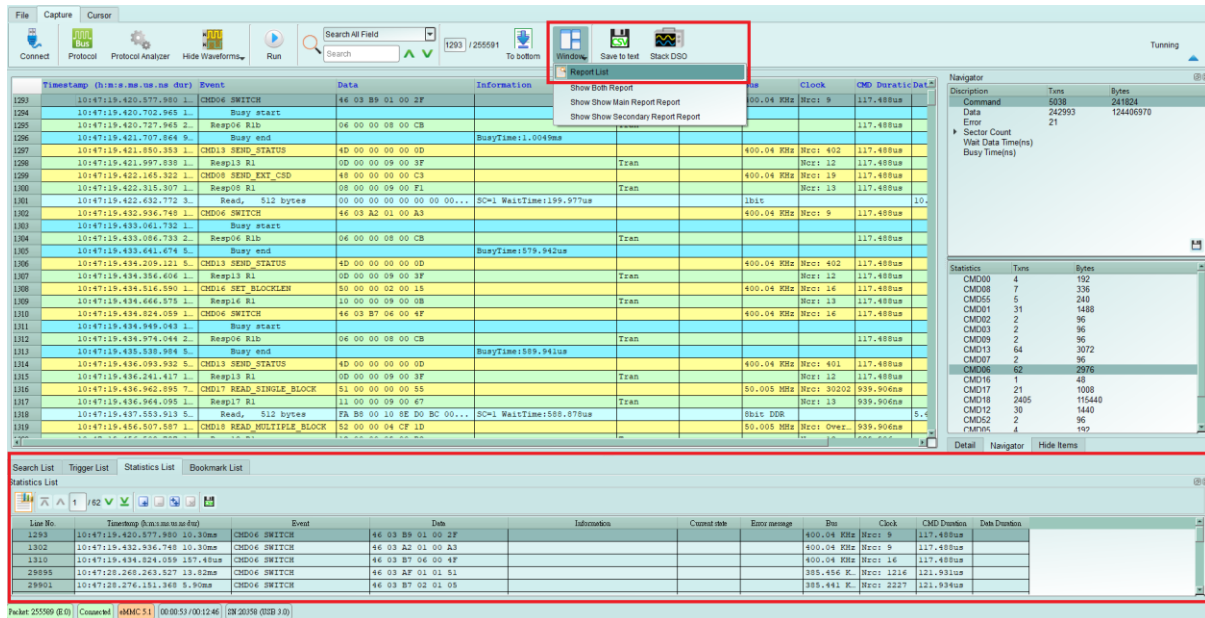
Troubleshooting:

If the TravelBus is in "Demo mode", please follow the steps below:

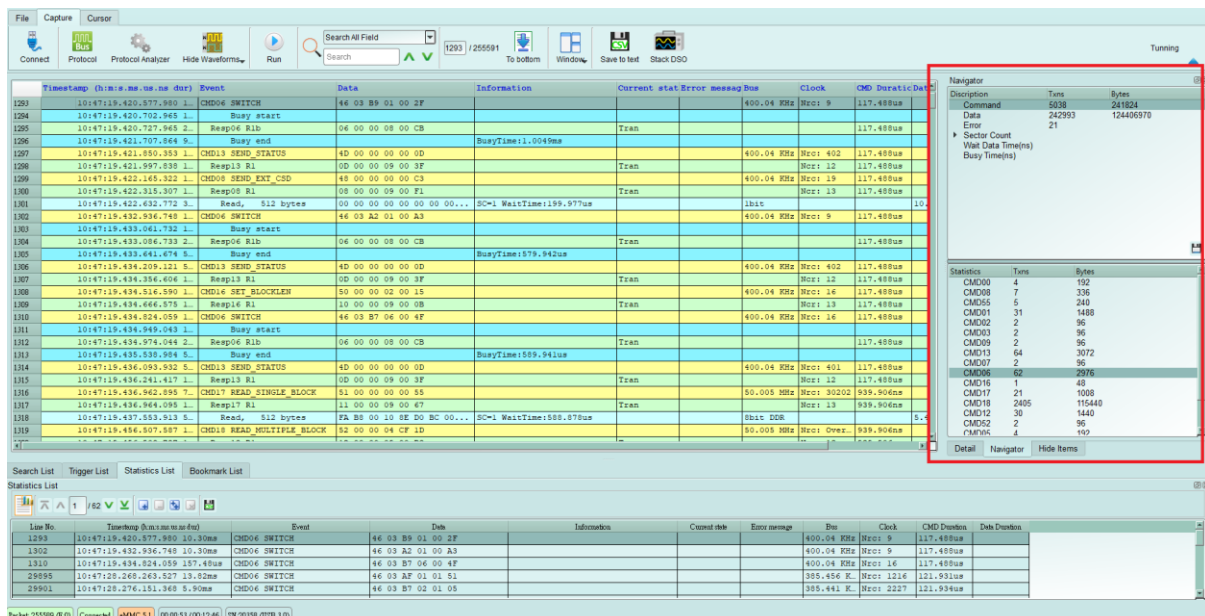
- (1) Use the USB3.0 cable (only) in the product package.
- (2) Check if the USB driver is in the Device Manager.
- (3) Install the latest version software from the official website of Acute Technology Inc., go to the Download page->Software, and then select **[Logic Analyzer] TravelBus series** to download the TBA series.
- (4) Re-plug the USB3.0 cable or reboot the OS to check if the USB driver exists.
- (5) Contact us for further help if above procedures do not work.

Appendix 1 Report List Advanced Instructions

1. Select the Window button-> Report list on the toolbar, the software will open the report list function and present it at the bottom of the main window. It can be adjusted the most suitable viewing size.



2. This function can be combined with the statistics function, please click the Navigator tab on the right side of the main window.



3. Click the items of the statistical function in sequence, the statistical results will be presented in the Statistic List in the report list, and can be clicked on this table to track the position of this data in the main report area.

The screenshot shows the main report area with a table of data. The table has columns: TimeStamp, Data, Information, Current state, Error message, Bus, Clock, CMD Duration, and Data Duration. The data is organized into rows, with some rows highlighted in yellow. A red box highlights the Navigator panel on the right, which contains a table of Command, Tms, and Bytes. The Navigator panel also includes a search field and a list of commands. A red arrow points from the Navigator panel to the main report area, indicating the relationship between the two.

TimeStamp	Data	Information	Current state	Error message	Bus	Clock	CMD Duration	Data Duration
1295	10:47:19.420.727.945 2	Resp06 Rlb	06 00 00 08 00 CB		400.04 KHz	Rrcr: 9	117.488us	
1296	10:47:19.421.707.644 9	Busy end						
1297	10:47:19.421.850.353 1	CHD13 SEND_STATUS	4D 00 00 00 00 00		400.04 KHz	Rrcr: 402	117.488us	
1298	10:47:19.421.997.838 1	Resp13 Rl	0D 00 00 09 00 3F		400.04 KHz	Rrcr: 12	117.488us	
1299	10:47:19.422.145.322 1	CHD08 SEND_EXT_CSD	48 00 00 00 00 C3		400.04 KHz	Rrcr: 19	117.488us	
1300	10:47:19.422.315.307 1	Resp06 Rl	08 00 00 09 00 F1		400.04 KHz	Rrcr: 13	117.488us	
1301	10:47:19.422.432.772 3	Read, 512 bytes	00 00 00 00 00 00 00...	SC=1 WaitTime:199.977us	1bit			10...
1302	10:47:19.422.936.749 1	CHD06 SWITCH	46 03 A2 01 00 A3		400.04 KHz	Rrcr: 9	117.488us	
1303	10:47:19.433.061.732 1	Busy start						
1304	10:47:19.433.066.733 2	Resp06 Rlb	06 00 00 08 00 CB		400.04 KHz	Rrcr: 9	117.488us	
1305	10:47:19.433.641.674 5	Busy end						
1306	10:47:19.434.209.121 5	CHD13 SEND_STATUS	4D 00 00 00 00 00		400.04 KHz	Rrcr: 402	117.488us	
1307	10:47:19.434.356.404 1	Resp13 Rl	0D 00 00 09 00 3F		400.04 KHz	Rrcr: 12	117.488us	
1308	10:47:19.434.516.590 1	CHD16 SET_BLOCKLEN	10 00 00 02 00 15		400.04 KHz	Rrcr: 16	117.488us	
1309	10:47:19.434.666.575 1	Resp16 Rl	10 00 00 09 00 0B		400.04 KHz	Rrcr: 13	117.488us	
1310	10:47:19.434.824.059 1	CHD06 SWITCH	46 03 B7 04 00 4F		400.04 KHz	Rrcr: 16	117.488us	
1311	10:47:19.434.949.043 1	Busy start						
1312	10:47:19.434.974.044 2	Resp06 Rlb	06 00 00 08 00 CB		400.04 KHz	Rrcr: 9	117.488us	
1313	10:47:19.435.538.984 5	Busy end						
1314	10:47:19.436.093.932 5	CHD13 SEND_STATUS	4D 00 00 00 00 00		400.04 KHz	Rrcr: 401	117.488us	
1315	10:47:19.436.241.417 1	Resp13 Rl	0D 00 00 09 00 3F		400.04 KHz	Rrcr: 12	117.488us	
1316	10:47:19.436.366.404 1	CHD17 READ_SINGLE_BLOCK	51 00 00 02 00 15		50.005 MHz	Rrcr: 30202	939.906us	
1317	10:47:19.436.964.095 1	Resp17 Rl	11 00 00 09 00 67		50.005 MHz	Rrcr: 13	939.906us	
1318	10:47:19.437.553.913 5	Read, 512 bytes	FA B8 00 10 E8 D0 BC 00...	SC=1 WaitTime:558.078us	8bit DDB			5...
1319	10:47:19.456.507.587 1	CHD18 READ_MULTIPLE_BLOCK	52 00 00 04 CF 1D		50.005 MHz	Rrcr: Over	939.906us	
1320	10:47:19.456.508.787 1	Resp18 Rl	12 00 00 09 00 03		50.005 MHz	Rrcr: 13	939.906us	
1321	10:47:19.456.755.802 2	Read, 512 bytes	00 00 00 00 00 00 00...	SC=1 WaitTime:2.24608ms	8bit DDB			5...

4. This function also provides Search, Trigger and Bookmark List can be used, (1). Search List

The screenshot shows the Search List panel, which is a table of data. The table has columns: Line No., TimeStamp, Data, Information, Current state, Error message, Bus, Clock, CMD Duration, and Data Duration. The data is organized into rows, with some rows highlighted in yellow. A red box highlights the Search List panel, which is located at the bottom of the interface. The Search List panel also includes a search field and a list of commands.

Line No.	TimeStamp	Data	Information	Current state	Error message	Bus	Clock	CMD Duration	Data Duration
1295	10:47:19.420.727.945 2	Resp06 Rlb	06 00 00 08 00 CB			400.04 KHz	Rrcr: 9	117.488us	
1304	10:47:19.433.066.733 25.00us	Resp06 Rlb	06 00 00 08 00 CB			400.04 KHz	Rrcr: 9	117.488us	
1312	10:47:19.434.974.044 25.00us	Resp06 Rlb	06 00 00 08 00 CB			400.04 KHz	Rrcr: 9	117.488us	
29597	10:47:19.456.507.587 1	CHD18 READ_MULTIPLE_BLOCK	52 00 00 04 CF 1D			50.005 MHz	Rrcr: Over	939.906us	
29903	10:47:19.456.755.802 2	Read, 512 bytes	00 00 00 00 00 00 00...			50.005 MHz	Rrcr: 13	939.906us	

(2). Trigger List

Protocol Settings

Sample Rate: 2.4 GHz

Filter: Data Length > 512 bytes, Number of blocks > 1 (SC > 1)

Trigger on

- ☒ CMD/DATA
 - ☒ CMD
 - ☐ CRC16 error
 - ☐ CRC16 error
 - ☐ End bit error
 - ☐ VCC Drop
 - ☐ VDD Drop
 - ☐ DATA
- ☐ General
- ☐ Additional
 - ☐ Timeout
 - ☐ Setting
 - ☐ CRC Status Pattern
 - ☐ Positive

Option

BUS mode settings at BOOT

- ☐ HS400
- ☐ DDR mode
- BUS width: 4 bit
- ☐ 3 Pin mode (CMD, CLK, D0)
- ☐ No BOOTACK sent
- ☐ CLK Delay: 24ns
- ☐ Retain BUS mode settings after BOOT
- ☐ Volt. detect channel
- ☐ VDD(A0)
- ☐ VDD(A1)

Tuning settings

OK Cancel

Main Report Area

Search Field: 1287 / 31332

Running

TimeStamp	Event	Data	Information	Current state	Error message	Bus	Clock	CMD Duration
1270	11:13:13.920.465.741 L	Resp01 R3	3F 40 FF 80 80 FF			400.023 K	117.488us	
1271	11:13:13.921.608.132 L	CMD01 SEND_OP_COND	41 40 30 00 00 B7			400.04 KHz	117.488us	
1272	11:13:13.921.740.422 L	Resp01 R3	3F 40 FF 80 80 FF			400.04 KHz	117.488us	
1273	11:13:13.922.063.013 L	CMD01 SEND_OP_COND	41 40 30 00 00 B7			400.04 KHz	117.488us	
1274	11:13:13.922.995.500 L	Resp01 R3	3F 40 FF 80 80 FF			400.04 KHz	117.488us	
1275	11:13:13.924.115.391 L	CMD01 SEND_OP_COND	41 40 30 00 00 B7			400.04 KHz	117.488us	
1276	11:13:13.924.247.878 L	Resp01 R3	3F 40 FF 80 80 FF			400.04 KHz	117.488us	
1277	11:13:13.925.370.272 L	CMD02 ALL_SEND_CID	42 00 00 00 00 4D			400.04 KHz	117.488us	
1278	11:13:13.925.502.759 L	Resp02 R2	3F 45 01 00 53 44 57 31...			400.04 KHz	117.488us	
1279	11:13:13.925.635.221 L	CMD03 SEND_RELATIVE_ADDR	43 00 00 00 00 21			400.04 KHz	117.488us	
1280	11:13:13.926.038.206 L	Resp03 R1	03 00 00 08 00 FB	Ident		400.04 KHz	117.488us	
1281	11:13:13.926.182.493 L	CMD09 SEND_CSD	49 00 00 00 00 AF			400.04 KHz	117.488us	
1282	11:13:13.926.335.179 L	Resp09 R2	3F 50 0F 00 32 0F 59 03...			400.04 KHz	117.488us	
1283	11:13:13.926.712.441 L	CMD13 SEND_STATUS	4D 00 00 00 00 0D			400.04 KHz	117.488us	
1284	11:13:13.926.845.128 L	Resp13 R1	0D 00 00 07 00 FB	Stby		400.04 KHz	117.488us	
1285	11:13:13.927.005.112 L	CMD07 SELECT/DESELECT_CARD	47 00 00 00 00 83			400.04 KHz	117.488us	
1286	11:13:13.927.155.101 L	Resp07 R1	07 00 00 07 00 75	Stby		400.04 KHz	117.488us	
1287	11:13:13.927.320.084 L	CMD05 SEND_EXT_CSD	45 00 00 00 00 C3			400.04 KHz	117.488us	
1288	11:13:13.927.470.049 L	Resp05 R1	05 00 00 00 00 00 00 00...	SC=1 WaitTime:4.2495ms		400.04 KHz	117.488us	
1289	11:13:13.932.837.146 L	Read, 512 bytes	00 00 00 00 00 00 00 00...	SC=1 WaitTime:1.9497ms		400.023 K	117.488us	
1290	11:13:13.942.153.454 L	CMD08 SEND_EXT_CSD	48 00 00 00 00 C3			400.023 K	117.488us	
1291	11:13:13.942.303.442 L	Resp08 R1	08 00 00 09 00 F1	Tran		400.04 KHz	117.488us	
1292	11:13:13.942.416.108 L	Read, 512 bytes	00 00 00 00 00 00 00 00...	SC=1 WaitTime:1.9497ms		400.04 KHz	117.488us	
1293	11:13:13.952.920.117 L	CMD06 SWITCH	46 03 59 01 00 2F			400.04 KHz	117.488us	
1294	11:13:13.953.045.101 L	Busy start						
1295	11:13:13.953.070.105 L	Resp06 R1b	06 00 00 06 00 CB	Tran		400.04 KHz	117.488us	
1296	11:13:13.954.050.007 L	Busy end						

Packet 31330 (80) Command: CMD05 (00:00:00:00:01:18) IN 20359 (00B:30)

Trigger List

Line No.	TimeStamp	Event	Data	Information	Current state	Error message	Bus	Clock	CMD Duration	Data Duration
1276	11:13:13.924.247.878	CMD01 SEND_OP_COND	41 40 30 00 00 B7				400.04 KHz	117.488us		
1277	11:13:13.925.370.272	CMD02 ALL_SEND_CID	42 00 00 00 00 4D				400.04 KHz	117.488us		
1278	11:13:13.925.502.759	Resp02 R2	3F 45 01 00 53 44 57 31...				400.04 KHz	117.488us		
1279	11:13:13.925.635.221	CMD03 SEND_RELATIVE_ADDR	43 00 00 00 00 21				400.04 KHz	117.488us		
1280	11:13:13.926.038.206	Resp03 R1	03 00 00 08 00 FB	Ident			400.04 KHz	117.488us		
1281	11:13:13.926.182.493	CMD09 SEND_CSD	49 00 00 00 00 AF				400.04 KHz	117.488us		
1282	11:13:13.926.335.179	Resp09 R2	3F 50 0F 00 32 0F 59 03...				400.04 KHz	117.488us		
1283	11:13:13.926.712.441	CMD13 SEND_STATUS	4D 00 00 00 00 0D				400.04 KHz	117.488us		
1284	11:13:13.926.845.128	Resp13 R1	0D 00 00 07 00 FB	Stby			400.04 KHz	117.488us		
1285	11:13:13.927.005.112	CMD07 SELECT/DESELECT_CARD	47 00 00 00 00 83				400.04 KHz	117.488us		
1286	11:13:13.927.155.101	Resp07 R1	07 00 00 07 00 75	Stby			400.04 KHz	117.488us		
1287	11:13:13.927.320.084	CMD05 SEND_EXT_CSD	45 00 00 00 00 C3				400.04 KHz	117.488us		
1288	11:13:13.927.470.049	Resp05 R1	05 00 00 00 00 00 00 00...	SC=1 WaitTime:4.2495ms			400.04 KHz	117.488us		
1289	11:13:13.942.153.454	CMD08 SEND_EXT_CSD	48 00 00 00 00 C3				400.023 K	117.488us		
1290	11:13:13.942.303.442	Resp08 R1	08 00 00 09 00 F1	Tran			400.04 KHz	117.488us		
1291	11:13:13.942.416.108	Read, 512 bytes	00 00 00 00 00 00 00 00...	SC=1 WaitTime:1.9497ms			400.04 KHz	117.488us		
1292	11:13:13.952.920.117	CMD06 SWITCH	46 03 59 01 00 2F				400.04 KHz	117.488us		
1293	11:13:13.953.045.101	Busy start								
1294	11:13:13.953.070.105	Resp06 R1b	06 00 00 06 00 CB	Tran			400.04 KHz	117.488us		
1295	11:13:13.954.050.007	Busy end								

Packet 31330 (80) Command: CMD05 (00:00:00:00:01:18) IN 20359 (00B:30)

(3). Bookmark List (right click in the main report area to add)

Main Report Area

Search Field: 1287 / 31332

Running

TimeStamp	Event	Data	Information	Current state	Error message	Bus	Clock	CMD Duration
1270	11:13:13.920.465.741 L	Resp01 R3	3F 40 FF 80 80 FF			400.023 K	117.488us	
1271	11:13:13.921.608.132 L	CMD01 SEND_OP_COND	41 40 30 00 00 B7			400.04 KHz	117.488us	
1272	11:13:13.921.740.422 L	Resp01 R3	3F 40 FF 80 80 FF			400.04 KHz	117.488us	
1273	11:13:13.922.063.013 L	CMD01 SEND_OP_COND	41 40 30 00 00 B7			400.04 KHz	117.488us	
1274	11:13:13.922.995.500 L	Resp01 R3	3F 40 FF 80 80 FF			400.04 KHz	117.488us	
1275	11:13:13.924.115.391 L	CMD01 SEND_OP_COND	41 40 30 00 00 B7			400.04 KHz	117.488us	
1276	11:13:13.924.247.878 L	Resp01 R3	3F 40 FF 80 80 FF			400.04 KHz	117.488us	
1277	11:13:13.925.370.272 L	CMD02 ALL_SEND_CID	42 00 00 00 00 4D			400.04 KHz	117.488us	
1278	11:13:13.925.502.759 L	Resp02 R2	3F 45 01 00 53 44 57 31...			400.04 KHz	117.488us	
1279	11:13:13.925.635.221 L	CMD03 SEND_RELATIVE_ADDR	43 00 00 00 00 21			400.04 KHz	117.488us	
1280	11:13:13.926.038.206 L	Resp03 R1	03 00 00 08 00 FB	Ident		400.04 KHz	117.488us	
1281	11:13:13.926.182.493 L	CMD09 SEND_CSD	49 00 00 00 00 AF			400.04 KHz	117.488us	
1282	11:13:13.926.335.179 L	Resp09 R2	3F 50 0F 00 32 0F 59 03...			400.04 KHz	117.488us	
1283	11:13:13.926.712.441 L	CMD13 SEND_STATUS	4D 00 00 00 00 0D			400.04 KHz	117.488us	
1284	11:13:13.926.845.128 L	Resp13 R1	0D 00 00 07 00 FB	Stby		400.04 KHz	117.488us	
1285	11:13:13.927.005.112 L	CMD07 SELECT/DESELECT_CARD	47 00 00 00 00 83			400.04 KHz	117.488us	
1286	11:13:13.927.155.101 L	Resp07 R1	07 00 00 07 00 75	Stby		400.04 KHz	117.488us	
1287	11:13:13.927.320.084 L	CMD05 SEND_EXT_CSD	45 00 00 00 00 C3			400.04 KHz	117.488us	
1288	11:13:13.927.470.049 L	Resp05 R1	05 00 00 00 00 00 00 00...	SC=1 WaitTime:4.2495ms		400.04 KHz	117.488us	
1289	11:13:13.942.153.454 L	CMD08 SEND_EXT_CSD	48 00 00 00 00 C3			400.023 K	117.488us	
1290	11:13:13.942.303.442 L	Resp08 R1	08 00 00 09 00 F1	Tran		400.04 KHz	117.488us	
1291	11:13:13.942.416.108 L	Read, 512 bytes	00 00 00 00 00 00 00 00...	SC=1 WaitTime:1.9497ms		400.04 KHz	117.488us	
1292	11:13:13.952.920.117 L	CMD06 SWITCH	46 03 59 01 00 2F			400.04 KHz	117.488us	
1293	11:13:13.953.045.101 L	Busy start						
1294	11:13:13.953.070.105 L	Resp06 R1b	06 00 00 06 00 CB	Tran		400.04 KHz	117.488us	
1295	11:13:13.954.050.007 L	Busy end						

Packet 31330 (80) Command: CMD05 (00:00:00:00:01:18) IN 20359 (00B:30)

Bookmark List

Line No.	TimeStamp	Event	Data	Information	Current state	Error message	Bus	Clock	CMD Duration	Data Duration
1276	11:13:13.924.247.878	CMD01 SEND_OP_COND	41 40 30 00 00 B7				400.04 KHz	117.488us		
1277	11:13:13.925.370.272	CMD02 ALL_SEND_CID	42 00 00 00 00 4D				400.04 KHz	117.488us		
1278	11:13:13.925.502.759	Resp02 R2	3F 45 01 00 53 44 57 31...				400.04 KHz	117.488us		
1279	11:13:13.925.635.221	CMD03 SEND_RELATIVE_ADDR	43 00 00 00 00 21				400.04 KHz	117.488us		
1280	11:13:13.926.038.206	Resp03 R1	03 00 00 08 00 FB	Ident			400.04 KHz	117.488us		
1281	11:13:13.926.182.493	CMD09 SEND_CSD	49 00 00 00 00 AF				400.04 KHz	117.488us		
1282	11:13:13.926.335.179	Resp09 R2	3F 50 0F 00 32 0F 59 03...				400.04 KHz	117.488us		
1283	11:13:13.926.712.441	CMD13 SEND_STATUS	4D 00 00 00 00 0D				400.04 KHz	117.488us		
1284	11:13:13.926.845.128	Resp13 R1	0D 00 00 07 00 FB	Stby			400.04 KHz	117.488us		
1285	11:13:13.927.005.112	CMD07 SELECT/DESELECT_CARD	47 00 00 00 00 83				400.04 KHz	117.488us		
1286	11:13:13.927.155.101	Resp07 R1	07 00 00 07 00 75	Stby			400.04 KHz	117.488us		
1287	11:13:13.927.320.084	CMD05 SEND_EXT_CSD	45 00 00 00 00 C3				400.04 KHz	117.488us		
1288	11:13:13.927.470.049	Resp05 R1	05 00 00 00 00 00 00 00...	SC=1 WaitTime:4.2495ms			400.04 KHz	117.488us		
1289	11:13:13.942.153.454	CMD08 SEND_EXT_CSD	48 00 00 00 00 C3				400.023 K	117.488us		
1290	11:13:13.942.303.442	Resp08 R1	08 00 00 09 00 F1	Tran						