User’s Guide

Hantek4032L

PC USB Logic Analyzer

www.hantek.com

Content

General safety summary

Understand the following safety precautions to avoid injuries and to prevent damage to the product or the product of any product link. To avoid possible dangers, be sure to use the product in accordance with the regulations.

- **Only qualified personnel to perform maintenance procedures**.
- **Prevent fire and personal injury.**
- **Use the right power cord.** Only the country in which the authorized use of this product for the power line.
- **Correctly inserted.** Probe or test voltage wire connected to the source, please do not plug.
- **Products will be grounded.** This product through the power of the grounding wire grounding. To avoid electric shocks, grounding conductor must be connected to. In this connection the import or export of products before the end, be sure to correct grounding for this product.
- **Properly connected probe.** Probe the ground with the same potential. Do not connect high-voltage ground.
- **See all the terminals rating.** To avoid excessive current fire and the impact, see the product of all the ratings and tags; please connect products in the product manual inspection prior to understand the detailed ratings information.
- **Do not run the product if you open the cover or panel.**
- **Avoid the exposed circuit.** Do not connect power after contact with the exposed joints and components.
- **Suspected products to failure do not operate.** If you suspect that this product has been a failure, can be qualified maintenance personnel to be checked.
- **Maintain proper ventilation.**
- **Do not operate in the humid environment.**
- **Do not flammable and explosive environment operation.**
- **Please keep the product clean and dry surface.**

Introduction

The Hantek4032L is a sophisticated 32-channel logic analyzer used for testing, analysis, and troubleshooting of digital circuits. It is equipped with features found only in more expensive bench type instruments. The use of advanced large-scale integrated circuits, integrated USB 2.0, CPLD, FPGA, high-frequency digital circuitry, and other advanced technology, make the Hantek4032L to be portable, and easy-to-use. The Hantek4032L is very suitable for electronic measurement engineers, college students in scientific research and development and teaching assistants.

The User's Manual describes in detail the operation of the Hantek4032L as well as installation of the software.

The device has a sufficient number of input channels and is capable of simultaneously observing a lot of information or data flow direction control information, and in some way of capturing narrow pulse interference.

It has the feature of delayed ability to capture the required observation points around the waveform, in a variety of digital information capture function.

The Hantek4032L has intuitive and flexible displays to facilitate dynamic analysis, can transform the information, and the user can use the binary, decimal, hexadecimal or ASCII that information to facilitate the repair process and debug.

It can be triggered in a variety of ways, can display a very long data stream, on the basis of the analysis of that part of the information to make accurate positioning, and capture appropriate information for software analysis by using its tracking function trigger operation procedures. For hardware, trigger function can be detected in the system and that the interference and Burr.

The Hantek4032L has reliable Burr detection ability. As competition in digital circuit, the signal crosstalk, interference and power coupling factors, often mixed with irregular signal in the burr, which will run from an incorrect circuit.

Chapter 1 Getting started

This chapter focuses on the following topics:

- System Requirements
- Installing Software
- Installing Driver
- User Interface

1.1 System Requirements

Minimum System Requirements

Operating System

Windows XP/Vista/Win 7

Memory

128MB

Graphic Card

Microsoft DirectX supported

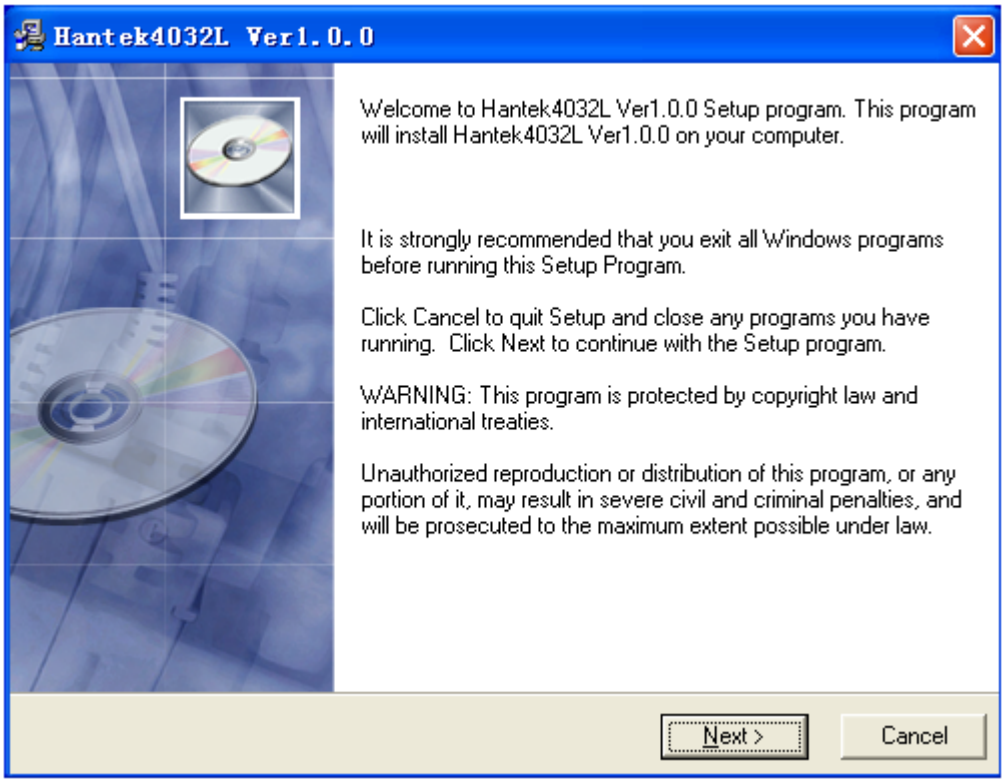
Screen resolution: 1024x768

Color depth: 16bit

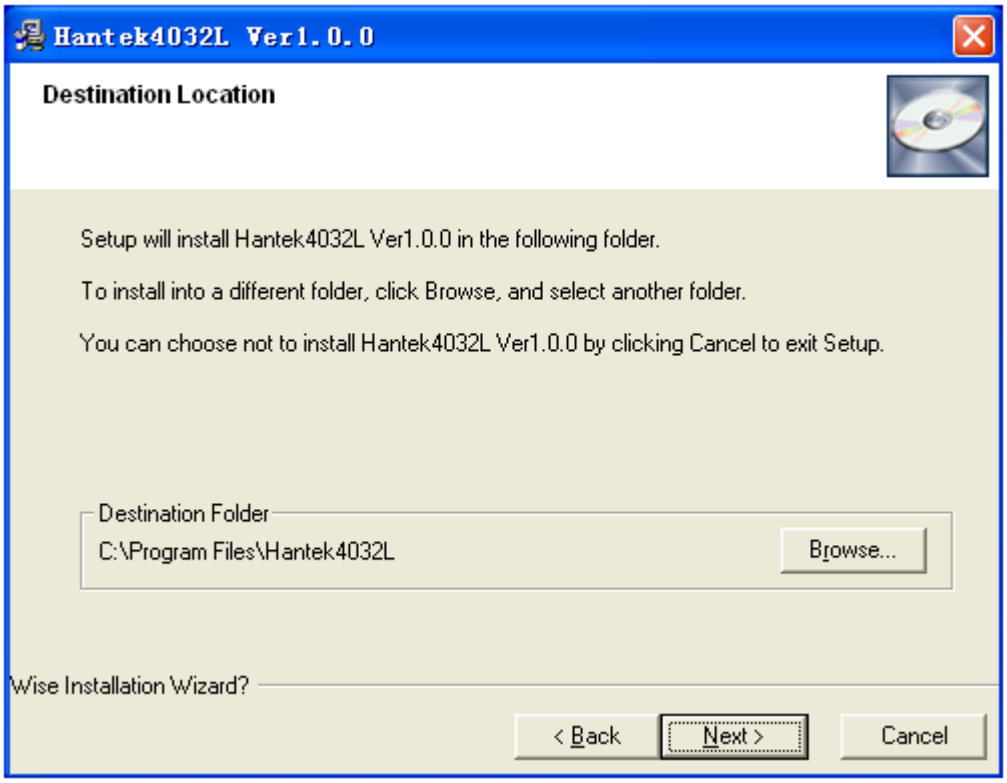
1.2 Installing Software

1. While in Windows, insert the installation CD into the CD-ROM drive.
2. The installation should start up automatically. Otherwise in Windows Explorer, switch to the CD-ROM drive and run "Setup.exe".

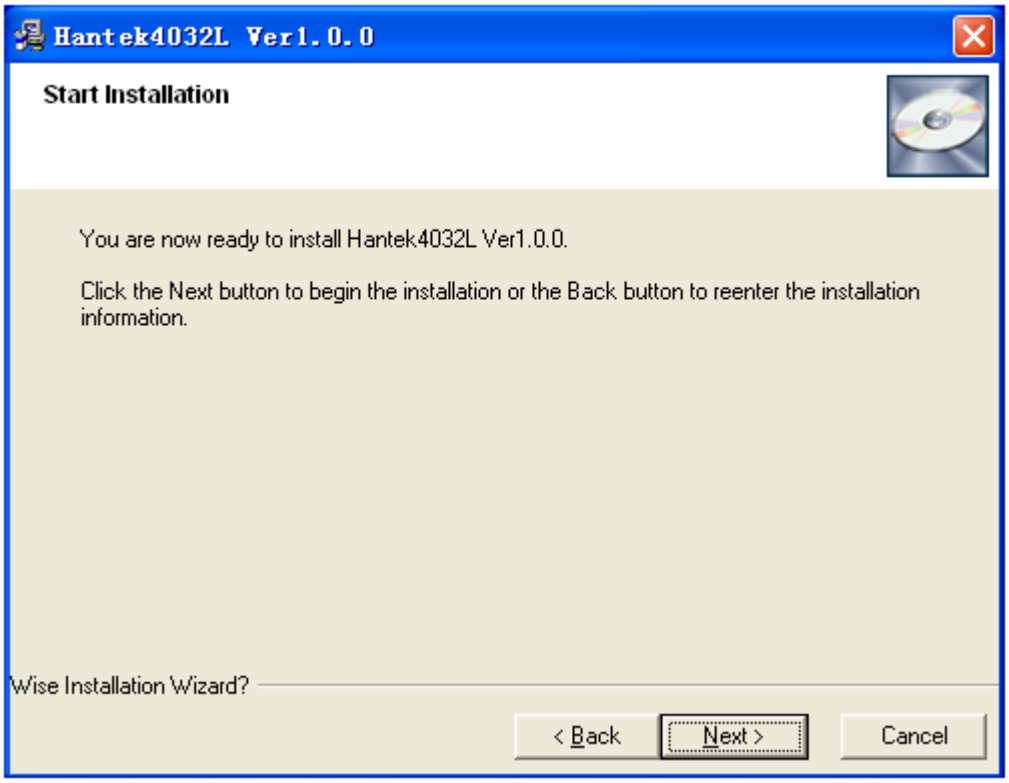
3. The Hantek4032L Installation is started. Click 'Next' to continue.



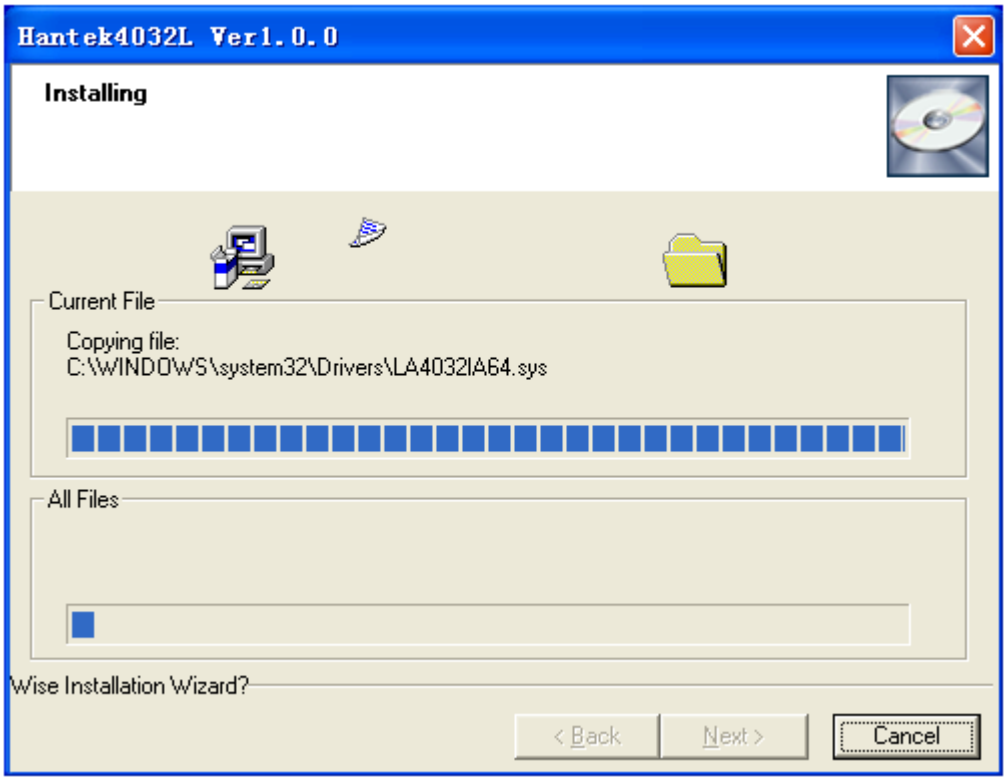
4. Choose a destination directory. Click 'Next' to continue.



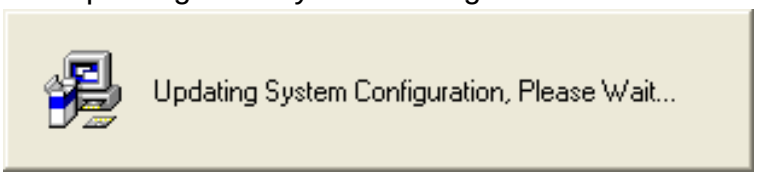
5. Check the setup information. Click Next to start copying of files.



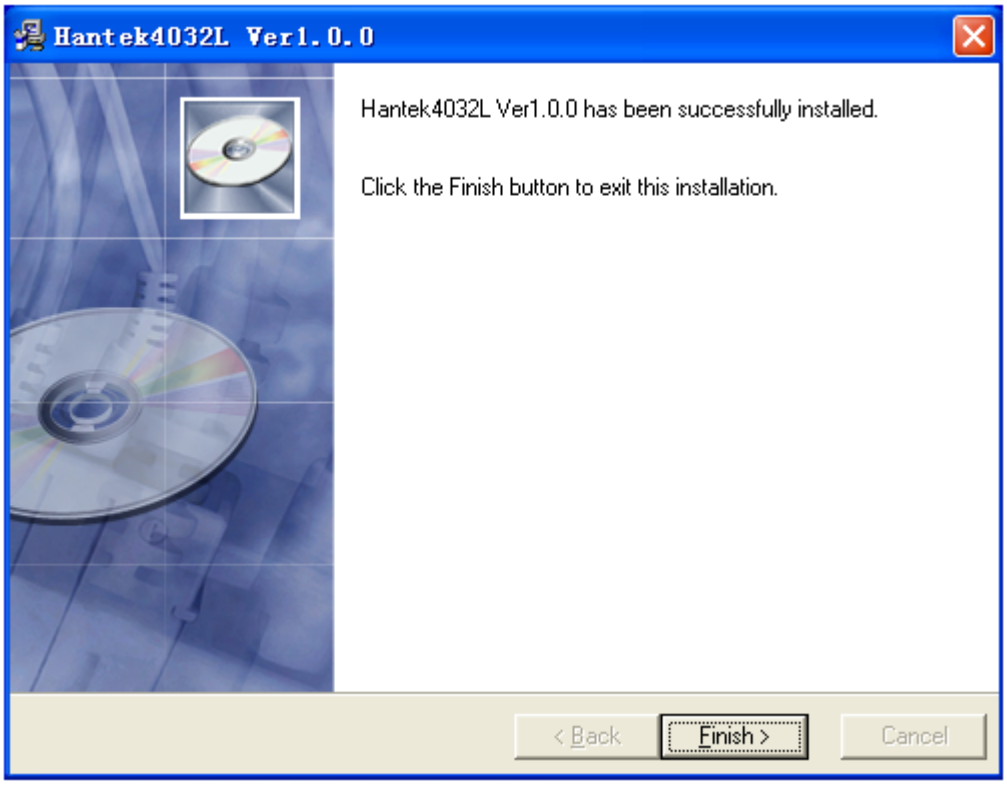
6. This status dialog is displayed during copying of files.



7. Updating Your System Configuration.



8. The installation is complete.



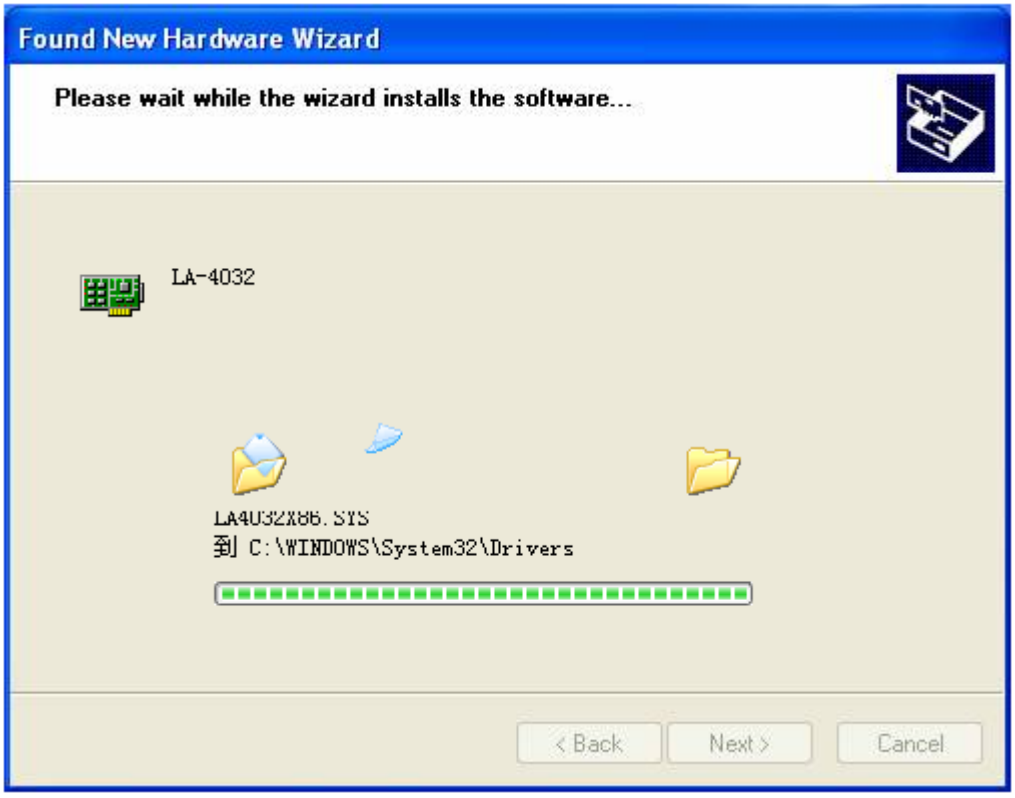
1.3 Installing Driver

1. Connect the A-Type Plug of USB cable to your PC's USB port.
2. Connect the B-Type Plug of USB cable to Hantek4032L's USB port.
3. New hardware is found.

4. New hardware search wizard starts.

5. New hardware search wizard starts to search.

6. New hardware wizard installs software.



7. Finish new hardware search wizard.

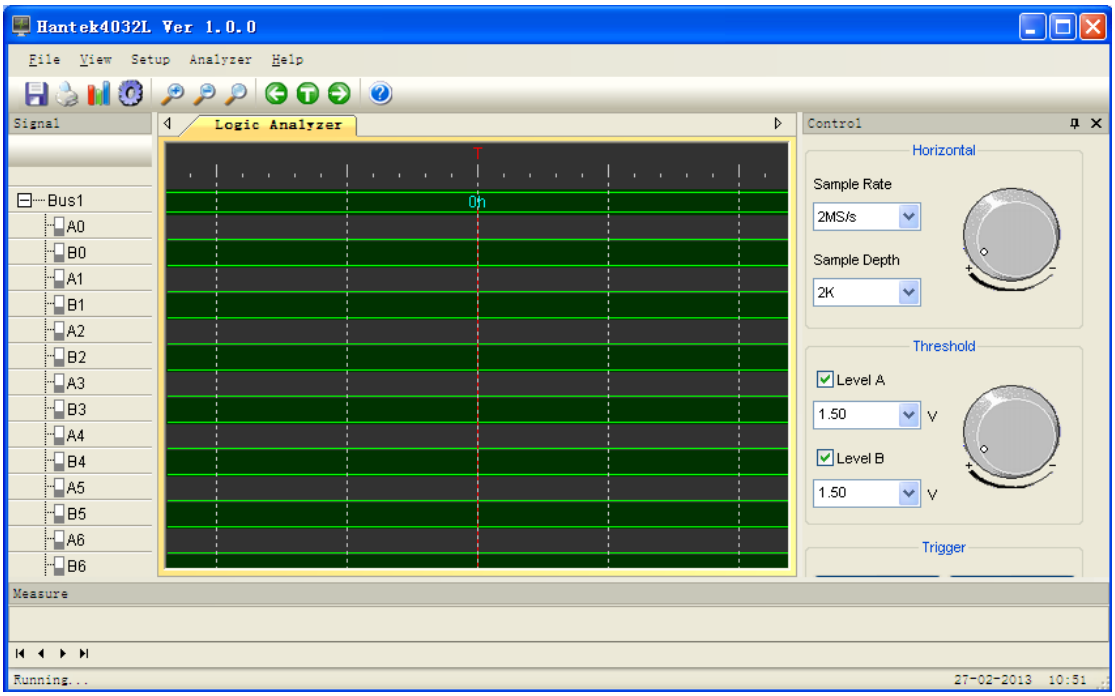
Caution:

Do not disconnect any device from the USB bus while the computer is communicating with the Hantek4032L, or you may lose data and/or your ability to communicate with the device.

If the LED is illuminated but then turns off, the computer has lost communication with the Hantek4032L.To restore communication, disconnect the USB cable from the computer, and then reconnect is. This should restore communication, and the LED should turn back on.

1.4 User Interface

Hantek4032L provides users with a simple and full-featured interface so that users needn't spend a lot of time to learn.
At the same time, it provides control panel, waveform panel, bus panel, measurement panel, trigger panel.

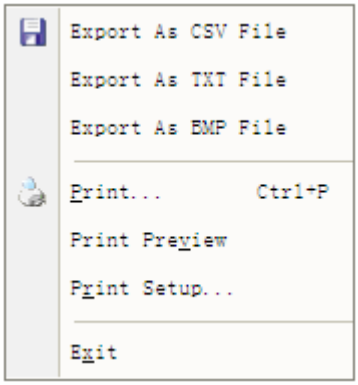


Chapter 2 Menu

This chapter focuses on the following topics:

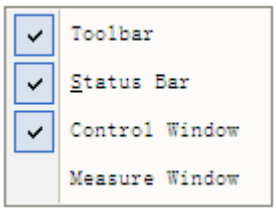
- File
- View
- Setup
- Analyzer
- Help

2.1 File



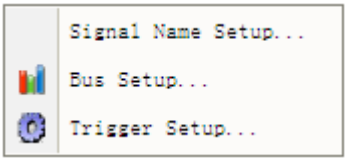
- **Export As CSV File:** Export data to file as “CSV”
- **Export As TXT File:** Export data to file as “TXT”
- **Export As BMP File:** Export data to file as “BMP”
- **Print…:** Print the current waveform
- **Print Preview:** Preview the current waveform
- **Pint Setup:** Setup print type
- **Exit:** Exit Hantek4032L

2.2 View



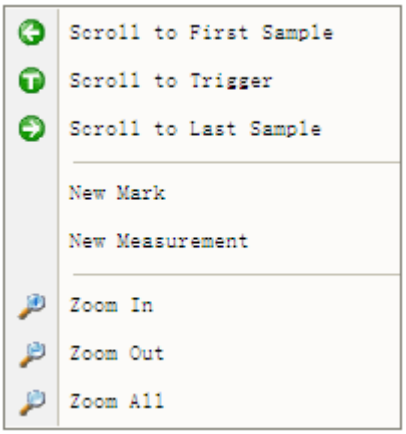
- **Toolbar:** Show or hide the toolbar window
- **Status Bar:** Show or hide the status window
- **Control Window:** Show or hide the control window
- **Measure Window:** Show or hide the measure window
- **Zoom In:** Enlargement waveform view
- **Zoom Out:** Reduction waveform view
- **Zoom All:** Show entire waveform view

2.3 Setup



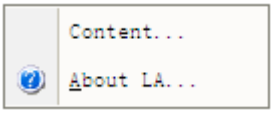
- **Signal Name Setup:** Modify the signal name.
- **Bus Setup:** Configure the bus and signals.
- **Trigger Setup:** Configure the trigger condition.

2.4 Analyzer



- **Scroll to First Sample:** Causes the waveform view to roll to the first sample position
- **Scroll to Trigger:** Causes the waveform view to roll to trigger position.
- **Scroll to Last Sample:** Causes the waveform view to roll to the last sample position
- **New Mark:** Create a new Mark
- **New Measurement:** Create a new measurement.
- **Zoom In:** Enlargement waveform view
- **Zoom Out:** Reduction waveform view
- **Zoom All:** Show entire waveform view

2.5 Help



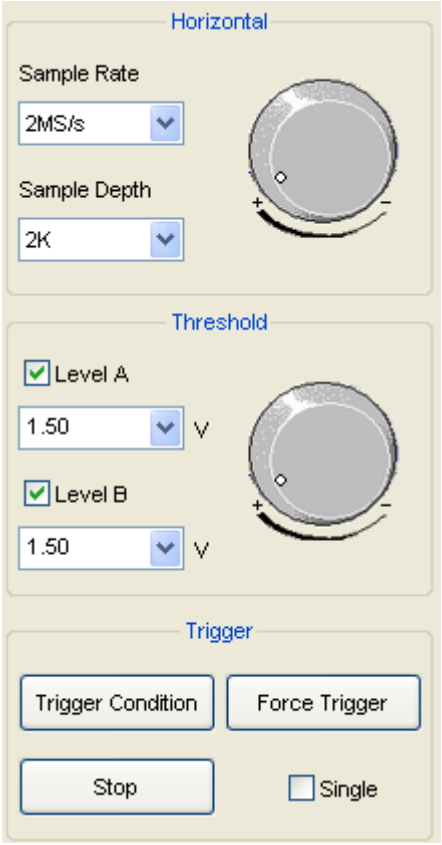
- **Help Content:** Open the User Manual
- **About:** Show the copyright of the device

Chapter 3 Advanced

This chapter focuses on the following topics:

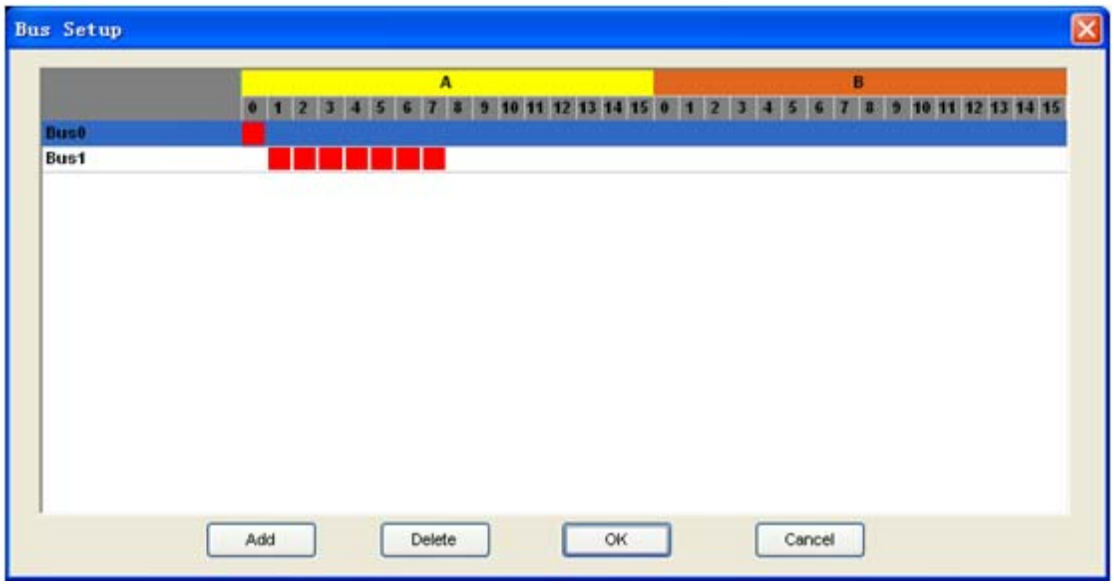
- Control Panel
- Bus Panel
- Waveform Panel
- Measurement Panel
- Export Data

3.1 Control Panel



- **Horizontal:**
  Set the clock and sample rate
  Sample Rate: User can select the sample rate from 1MS/s to 400MS/s.
  Sample Depth: User can set the sample depth 1k, 2k, 10k.
- **Threshold:**
  Configure the input trigger level.
- **Trigger:**
  Trigger Condition: Popup the trigger setup dialog.
  Force Trigger: Trigger immediately once.
  Stop: Stop trigger.
  Single: Trigger under the trigger condition once.

3.2 Bus Panel



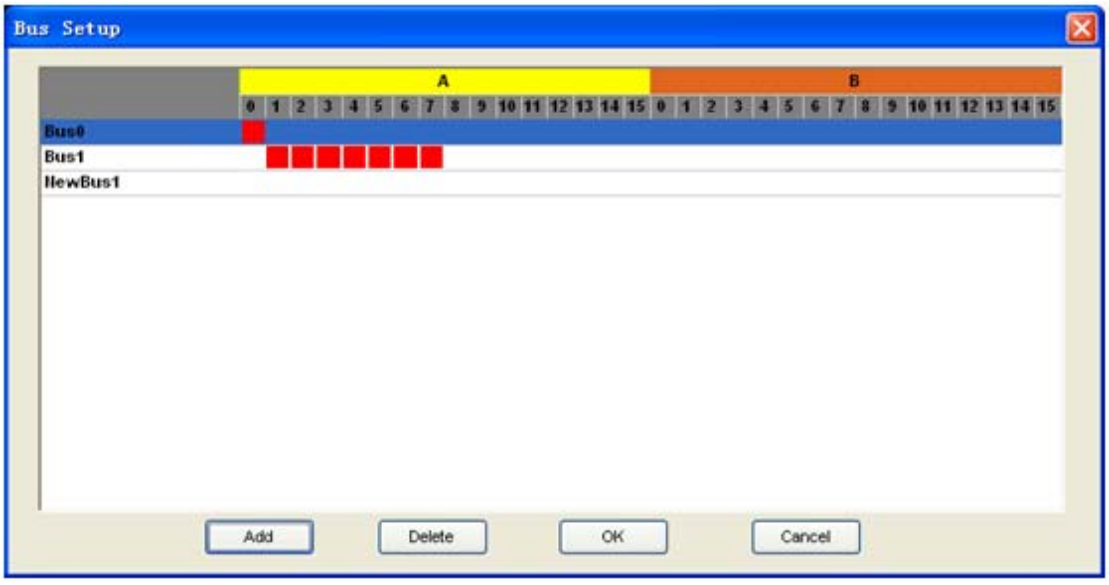
Click the menu “Setup”-> “Bus Setup…” to open the dialog.

Hantek4032L has 32 signals channels, A0 ~A15, B0~B15. You can assign the parts of them to some bus.

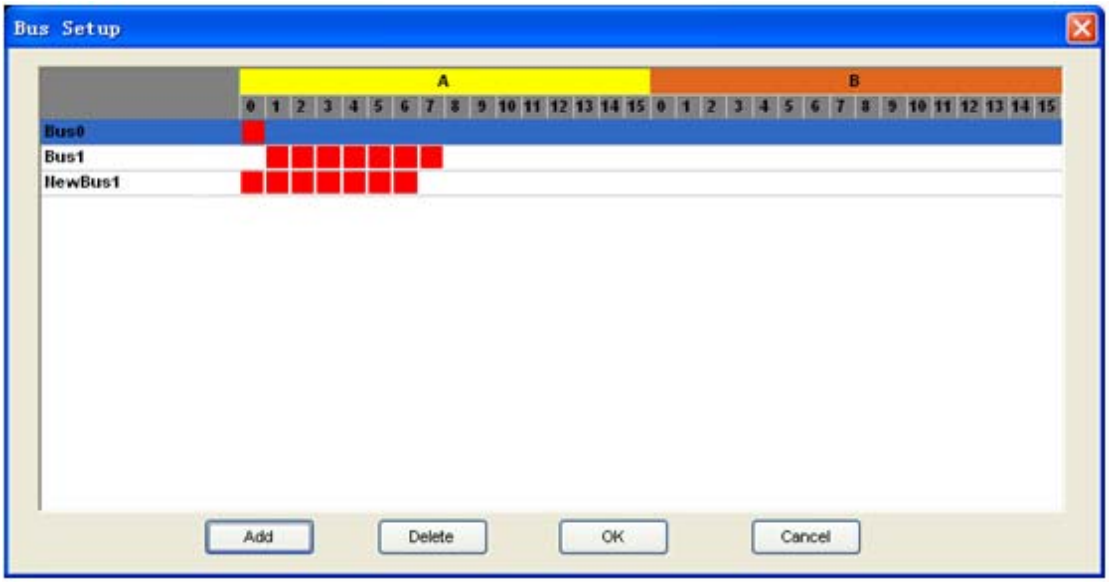
The list box contains all of the bus; you can add or delete the bus.

For example: Assign a bus “My Bus” which has 7 signals “A0, A1, A2, A3, A4, A5 and A6”.

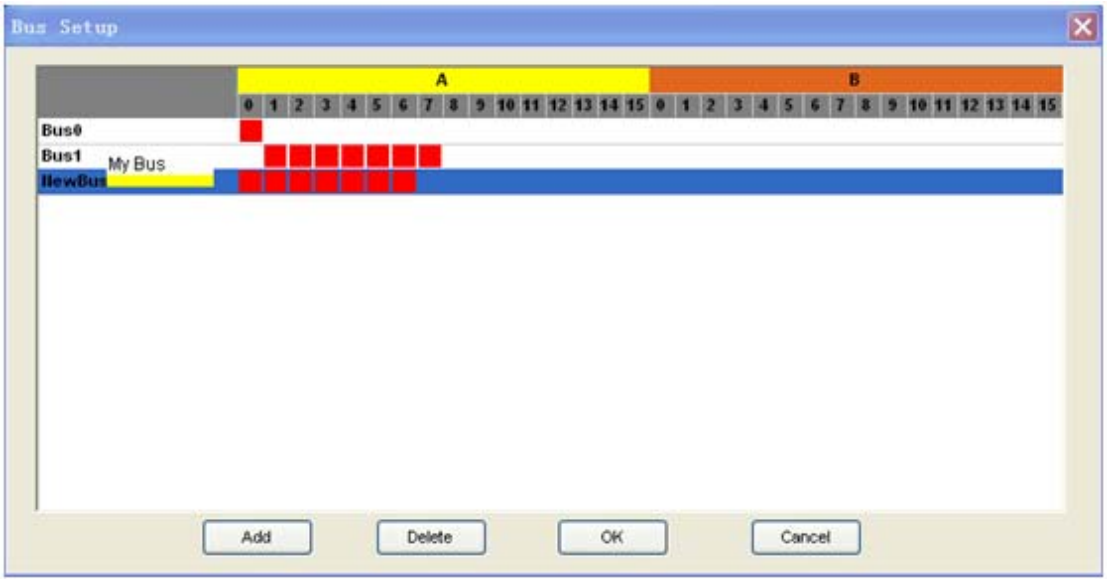
1. Click the button “Add”. Then a new bus is added to the list.



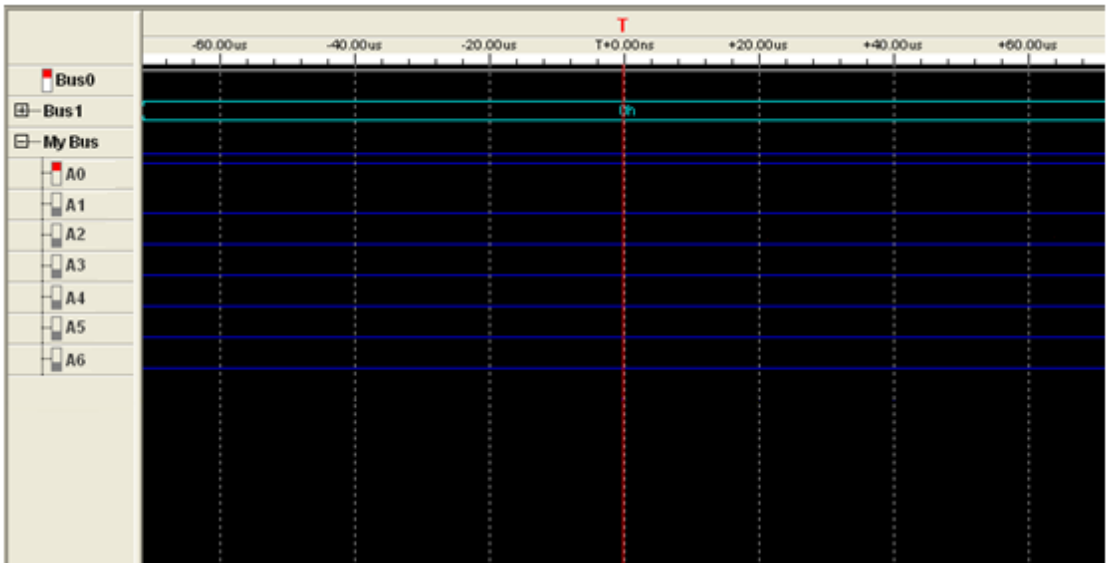
2. Click the pane under the A0, A1, A2, A3, A4, A5, and A6. If the pane is filled of red, it means you have add the signal to the bus.



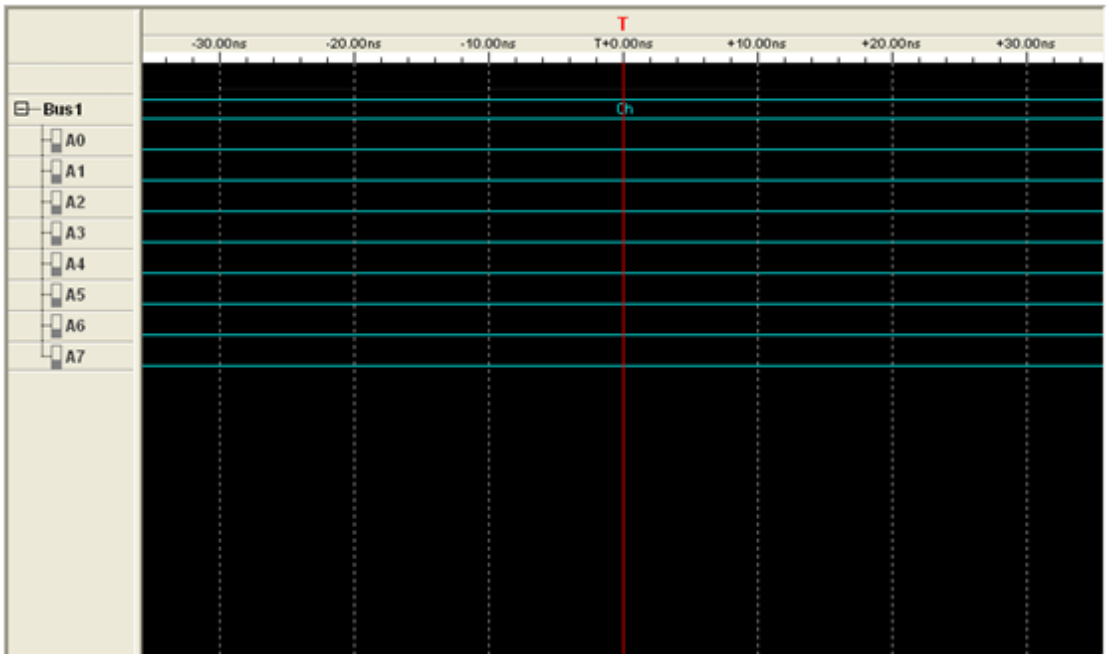
3. Double-click the name of the bus, which is “NewBus1” in this example. Then popup an edit box, in which you can input the bus name “My Bus”.



4. Then Click “OK”, the “My bus” has been added to the waveform.

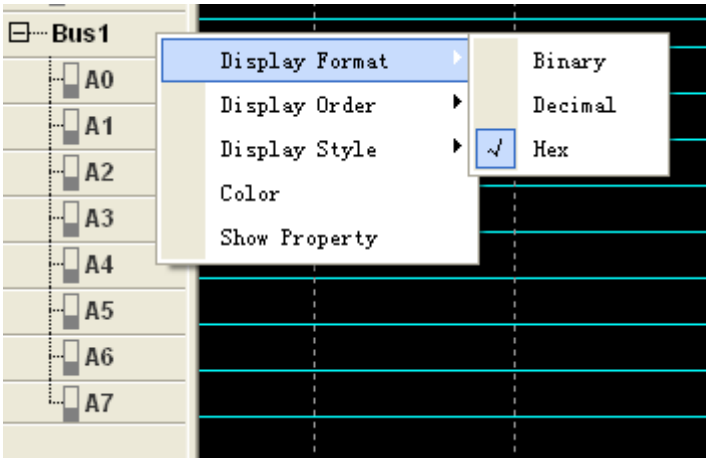


3.3 Waveform Panel



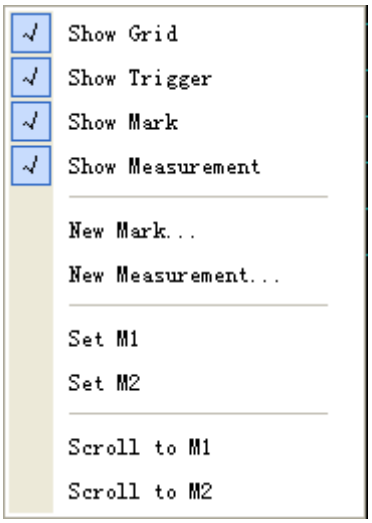
You can observe the waveform by the waveform panel in the main window. The list contains all of the bus in bus panel in the left part of the waveform panel.

Click the name of the bus with the right mouse button, you can configure the bus.



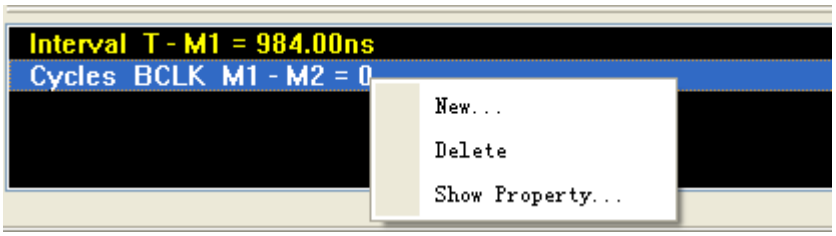
1. **Display Format:** The format of the bus data displayed on the waveform.
2. **Display Order:** The order of the signals displayed in the list.
3. **Display Style:** You can set the display style of the bus in the waveform, Analog or Digital.
4. **Color:** You can modify the color of the bus displayed in the waveform.
5. **Show Property:** Open the bus setup panel.

Click the waveform with the right mouse button, the waveform help menu popup. You can operate the Hantek4032L by the menu.

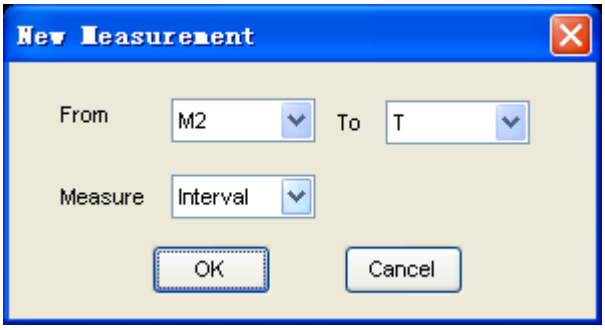


3.4 Measurement Panel

Click the measurement panel with the right mouse button, then the menu popup.



Click the “New” in the popup menu or “Analyzer”->”New Measurement” in the main menu, you will add a new measurement to the list in the measurement panel.



Select the “Measure” combo box. You can modify the types of measurement. There are 4 types for you, such as Interval, rate, transitions and cycles.

Click the “Delete”; you can delete the measurement item selected in the list.
Click the “Show Property”; you can modify the measurement.

Also, you can click the main menu “Analyzer”->”New Mark” to add new mark for measurement.

3.5 Export Data

Click the menu “File”; you can export the data to file.

If you select the CSV file, you will export the data as the following.

	A	B	C	D	E	F	G	H	I	J	K
1	Sample Pe	Trigger S	Compress	Data							
2	500 MS/s	2048	FALSE								
3	Sample Nu	NewGroup1	ACLK	BCLK	A0	B0	A1	B1	A2	B2	NewGroup2	AC
4	0	ffh	1	1	1	1	1	1	1	1	11h	
5	1	ffh	1	1	1	1	1	1	1	1	11h	
6	2	ffh	1	1	1	1	1	1	1	1	11h	
7	3	ffh	1	1	1	1	1	1	1	1	11h	
8	4	ffh	1	1	1	1	1	1	1	1	11h	
9	5	ffh	1	1	1	1	1	1	1	1	11h	
10	6	ffh	1	1	1	1	1	1	1	1	11h	
11	7	ffh	1	1	1	1	1	1	1	1	11h	
12	8	ffh	1	1	1	1	1	1	1	1	11h	
13	9	ffh	1	1	1	1	1	1	1	1	11h	
14	10	ffh	1	1	1	1	1	1	1	1	11h	
15	11	ffh	1	1	1	1	1	1	1	1	11h	
16	12	ffh	1	1	1	1	1	1	1	1	11h	
17	13	ffh	1	1	1	1	1	1	1	1	11h	
18	14	ffh	1	1	1	1	1	1	1	1	11h	
19	15	ffh	1	1	1	1	1	1	1	1	11h	
20	16	ffh	1	1	1	1	1	1	1	1	11h	

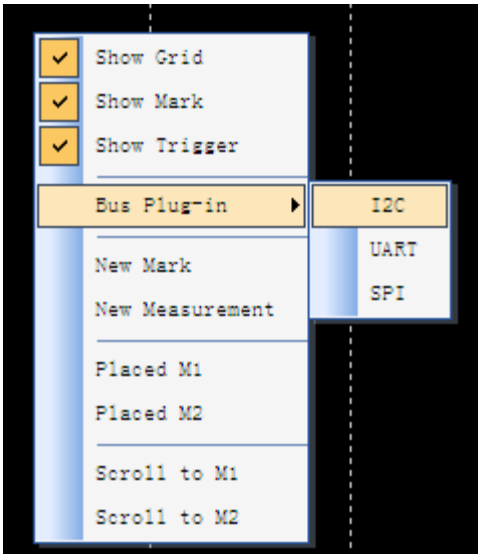
Chapter 4 Bus Plug-in

This chapter focuses on the following topics:

- Summary
- Example

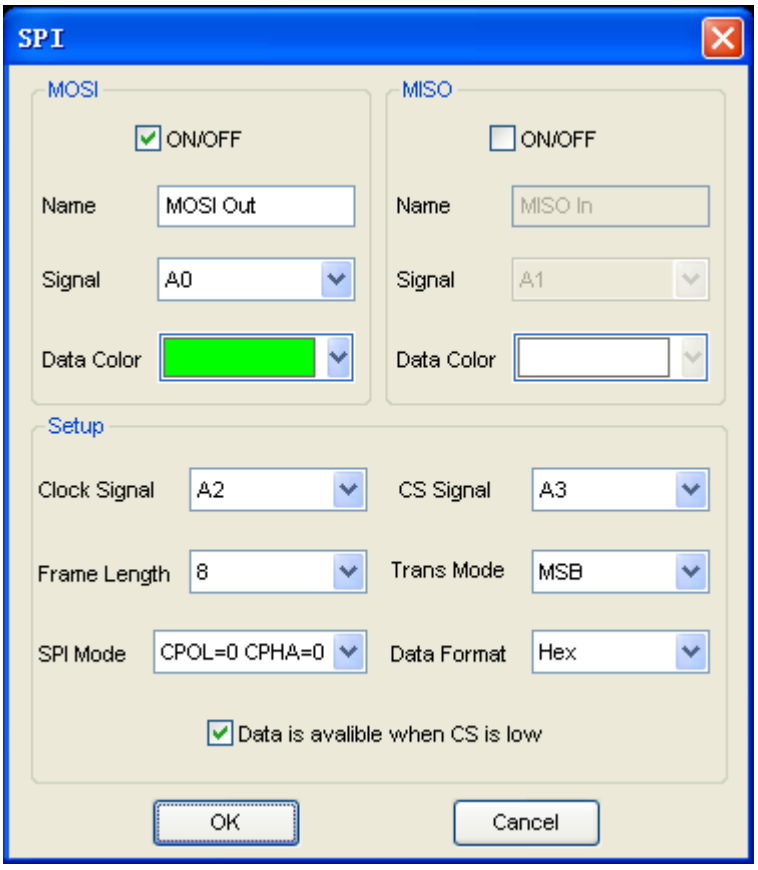
4.1 Summary

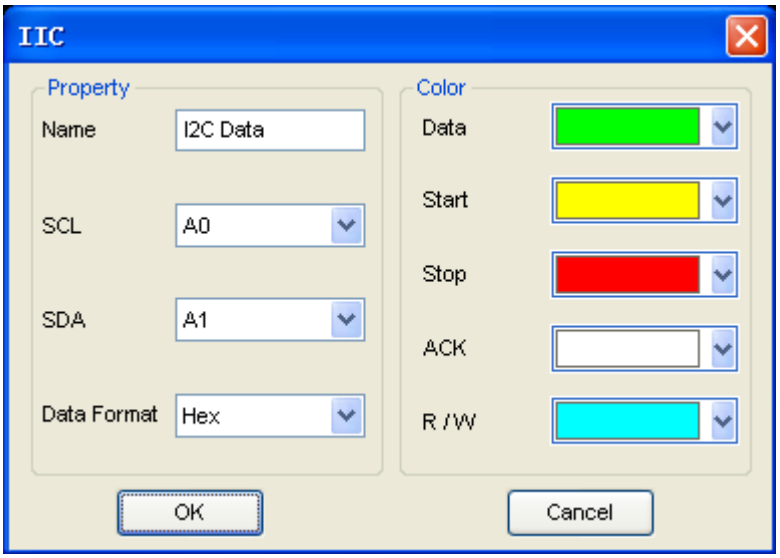
Click right mouse, select “Bus Plug-in”-> “I2C”.



The list box contains all of the plugs installed in your computer. You can add them to waveform by checking them.

User can modify the property of the plug in the box.



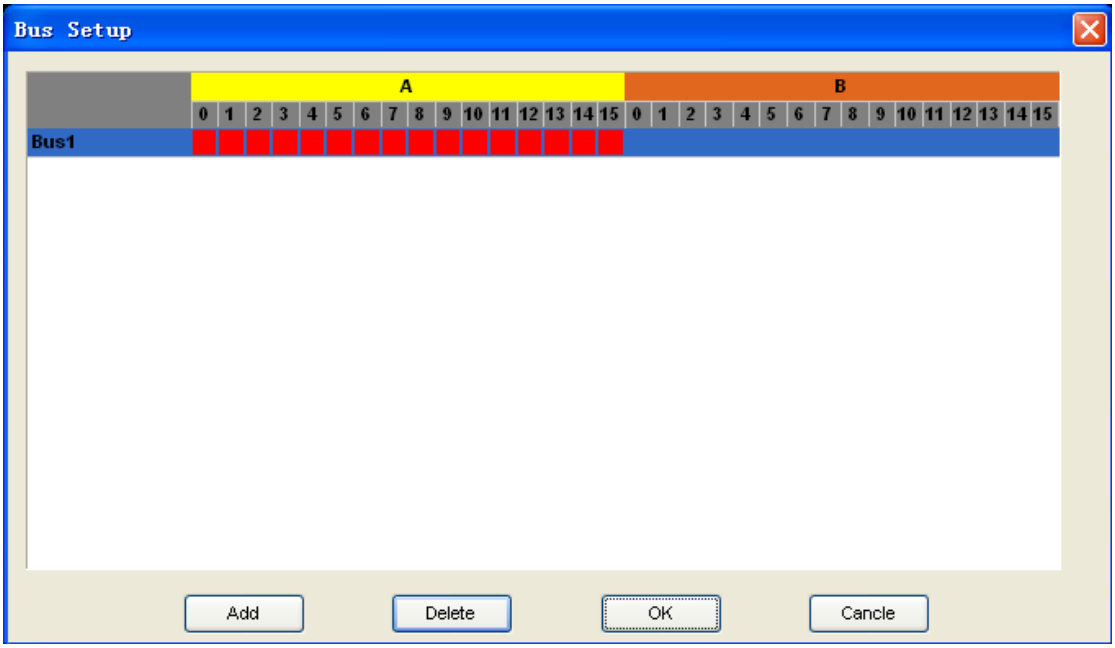

IIC
Property
Name
I2C Data
SCL
A0
SDA
A1
Data Format
Hex
Color
Data
Start
Stop
ACK
R / W
OK
Cancel


UART
RXD Bus
ON/OFF
Name
RXD Data
Signal
A0
Data Color
TXD Bus
ON/OFF
Name
TXD Data
Signal
A1
Data Color
Property
Baud Rate
9600
Data Length
8
Parity Mode
None
Trans Mode
LSB
Stop
1
Data Format
Hex
Other Setup
Start
Parity
Stop
Reverse
OK
Cancel

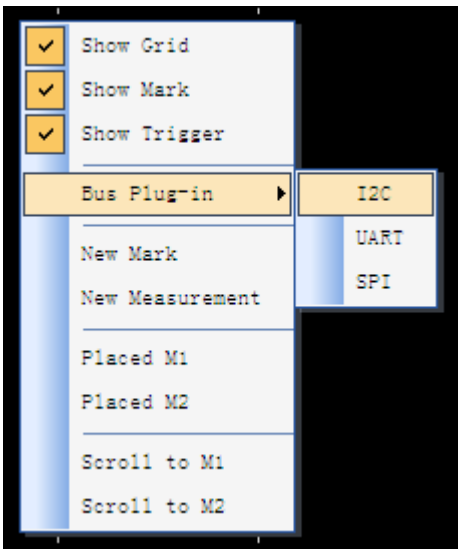
4.2 Example

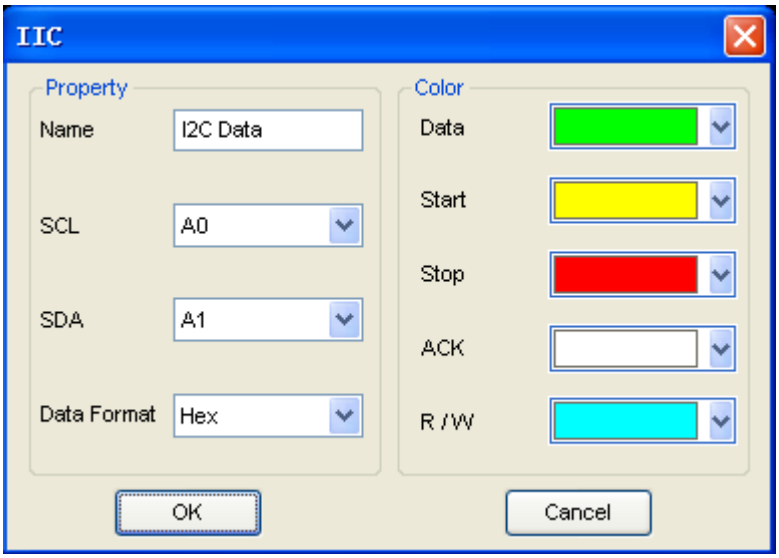
If you want to analyze the I^{2}C bus, you should go with the steps following.

1. Click menu “Setup”->“Bus Setup” or toolbar  , open the bus setup dialog.

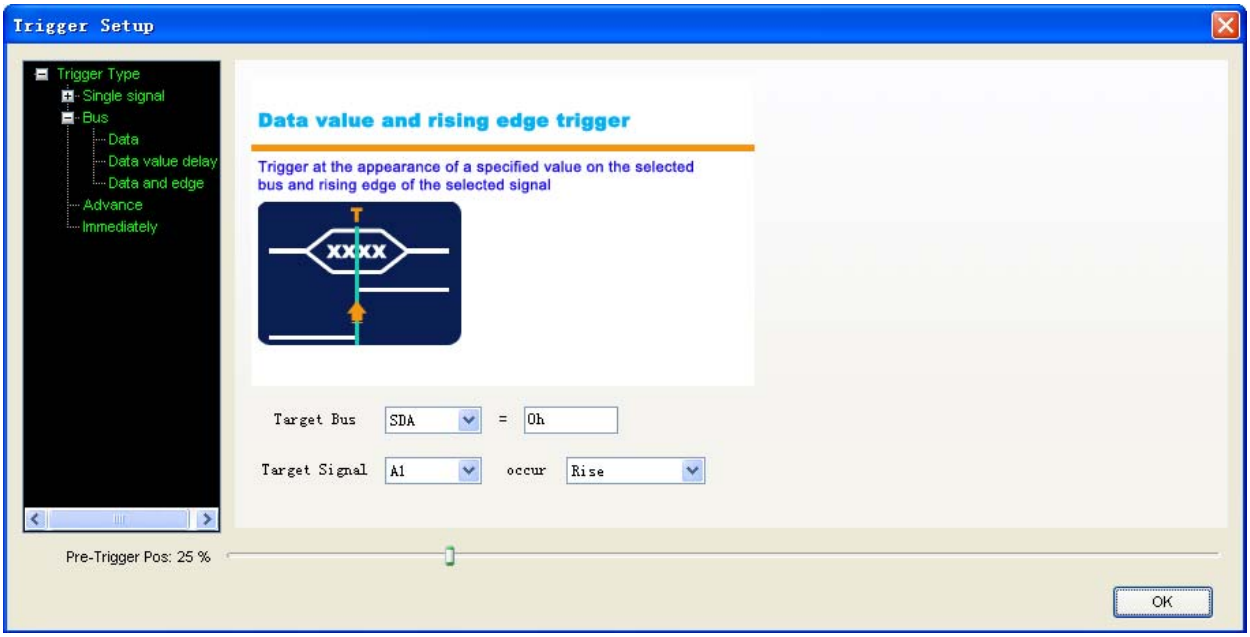


2. Open the plug manager and the I^{2}C setup dialog. Click right mouse and select “Bus Plug-in”->“I2C” to open the setup dialog.

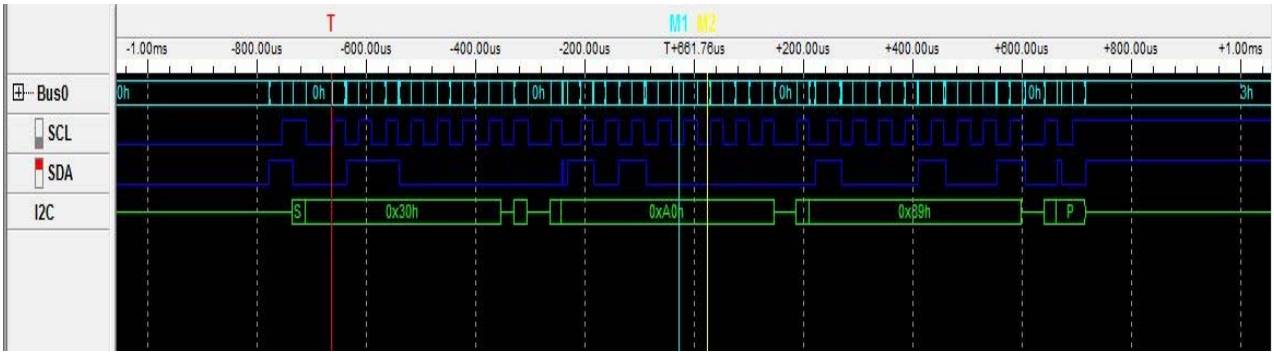




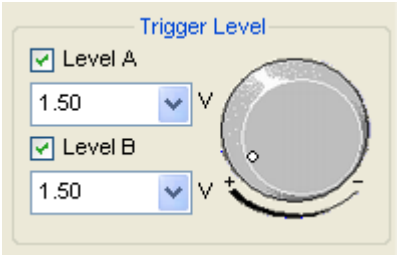
3. Click menu “Setup”-> “Trigger Setup” or toolbar  , open the bus setup dialog, do these steps:



4. Then you can see the following.



5. Usually, after doing the five steps, you can see the stable and sensitive I2C signals. If there is measuring instrument line interference, user can adjust the trigger voltage value. Set initial trigger voltage value for SCL and SDA is 1.5V, try to adjust the value to obtain the stable signal.



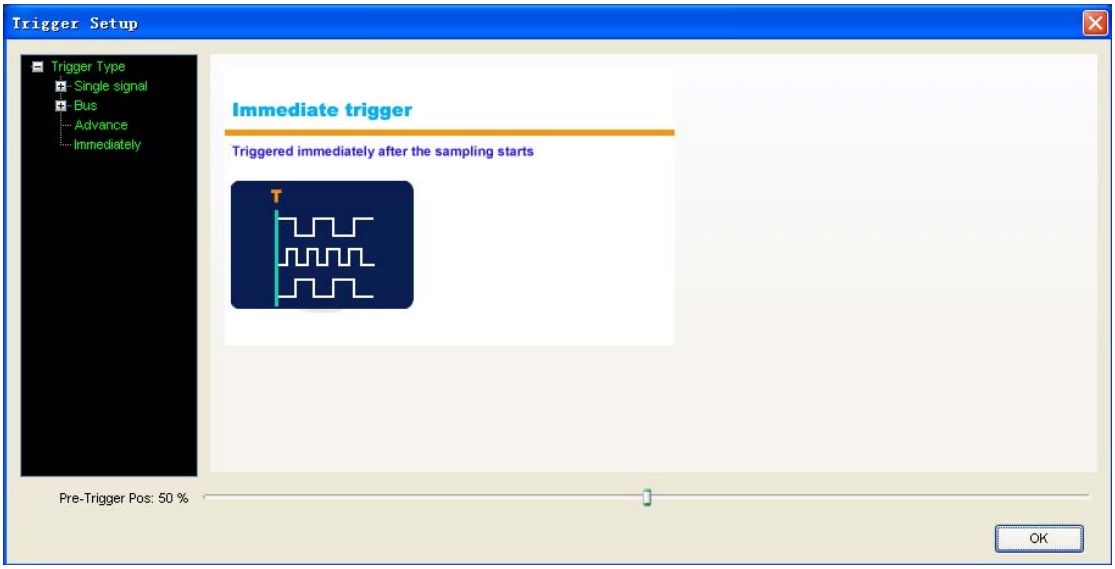
Chapter 5 Trigger

This chapter focuses on the following topics:

- Base Trigger Setup
- Advance Trigger Setup
- Immediately Trigger

5.1 Base Trigger Setup

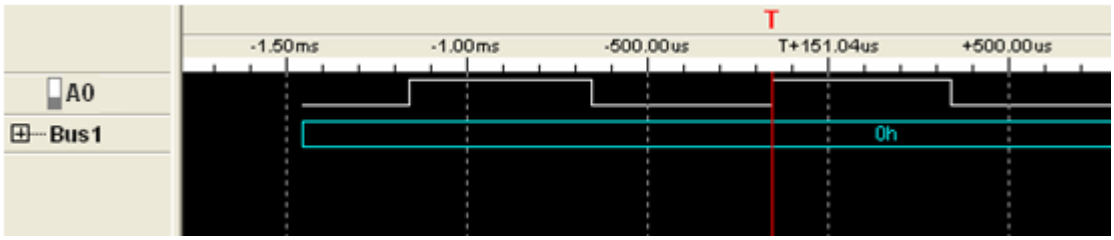
Click the menu “Setup”-> “Trigger Setup”, you can configure the trigger condition.



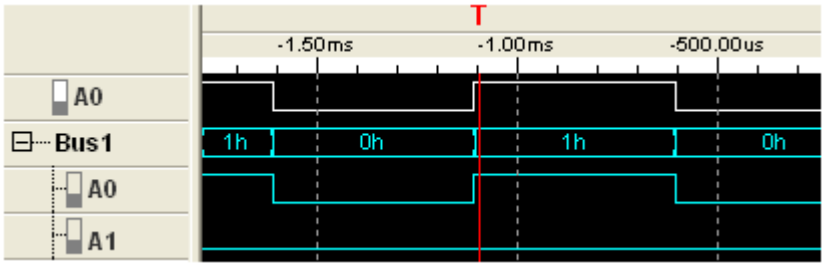
Hantek4032L provides 6 base triggers for you.

- **Single signal**: Rising edge; Falling edge; Rising or falling edge.
- **Bus:** Data, Data value delay, Data and edge

1. **Rising edge:**
   Select the “Rising edge” in the tree; select the signal in the combo box. Then it will triggered by a rising edge appeared on the selected signal.



2. **Falling edge:**
   Trigger by a falling edge appeared on the selected signal.
3. **Rising or falling edge:**
   Trigger by a rising or falling edge appeared on the selected signal.
4. **Data:**
   Trigger at the appearance of a specified value on the selected bus.



5. **Data value delay:**

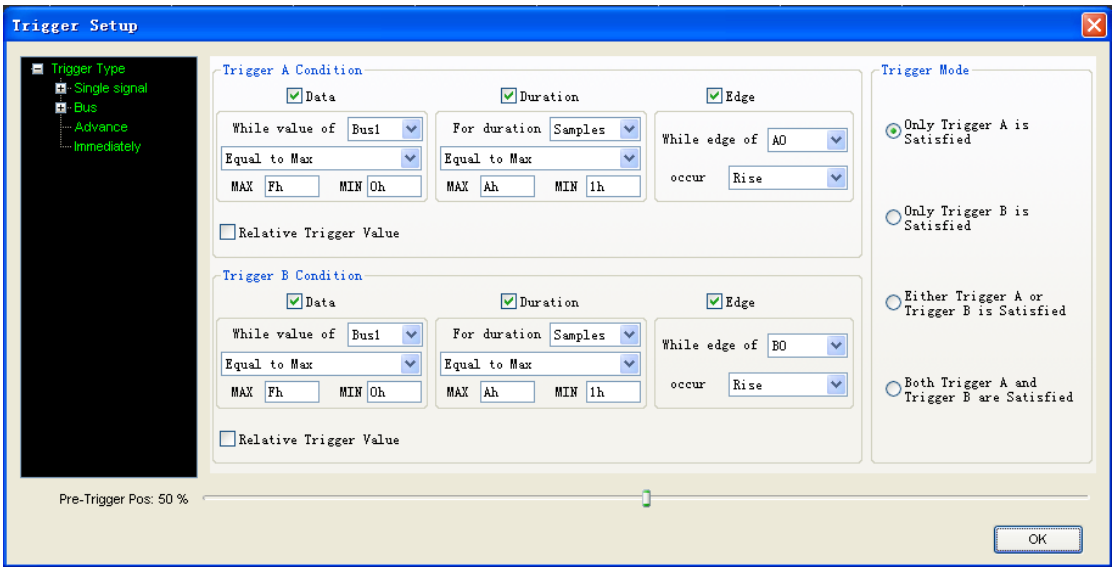
   Trigger at x time after the appearance of a specified value

6. **Data and edge:**

   Trigger at the appearance of a specified value on the selected bus and rising, falling, or rising or falling edge of the selected signal.

5.2 Advance Trigger Setup

If the base trigger can't satisfies you, may be you want the advance trigger. Click the "Advance" in the tree, then you can configure the advance trigger.



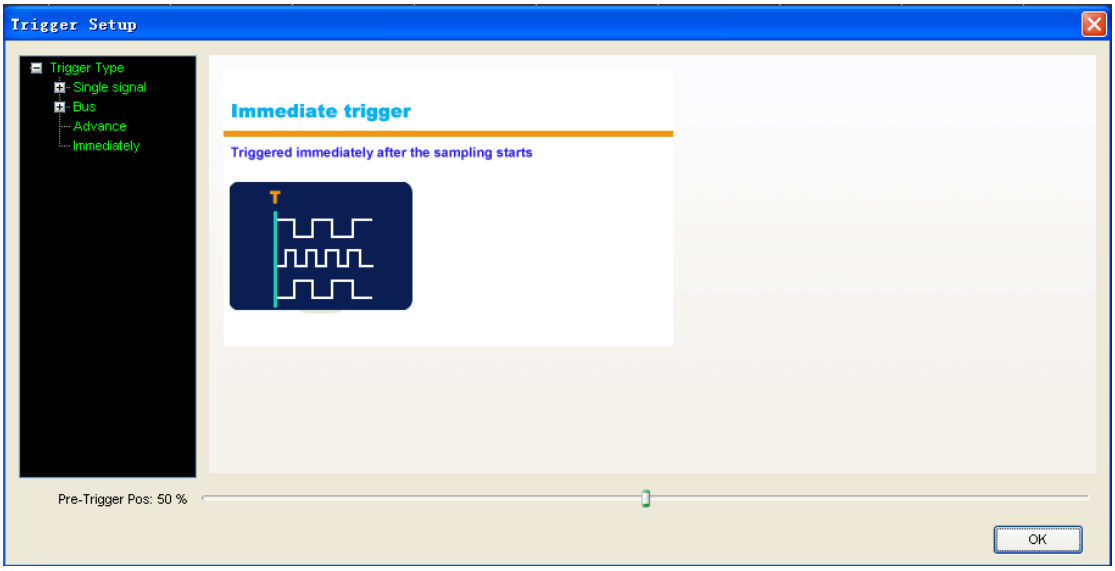
There are two trigger conditions: trigger A and trigger B. You can set the trigger mode by clicking the Trigger Mode group box.

There are four parts in each condition, Data, Duration, Edge and Relative trigger value.

5.3 Immediately Trigger

Click "Setup -> Trigger Setup" and select Immediately.

Immediately: Triggered immediately after the sampling starts.



Appendix

- Hardware specification
- Input connector pin assignments
- Block Diagram
- Cleaning and Maintenance

Hardware Specification

Sampled channels	32
High input impedance	200K (C=10p)
Input voltage range	-60V~60V
Logic threshold Range	-6V~6V
Max Sample Rate	400 MSa/s
Max input Signal bandwidth	150 MHz
Min time resolution	2.5ns
Sample Depth	64M
Buffer Depth	2G
Trigger's Max rate	200 MHz
Compatible input	TTL,LVTTL,CMOS,LVCOMS,ECL,PECL,EIA
Electrostatic Protected	15KV
Power Adapter	5V
Temperature range	-10℃~60℃
Dimension	Length: 105mm Width: 80mm Height: 25mm
Weight	0.38Kg
Accessories	A USB cable; A set Little Test Hook; A Power Adapt; A Logic Analyzer Cable A CD;

Channels

Level A

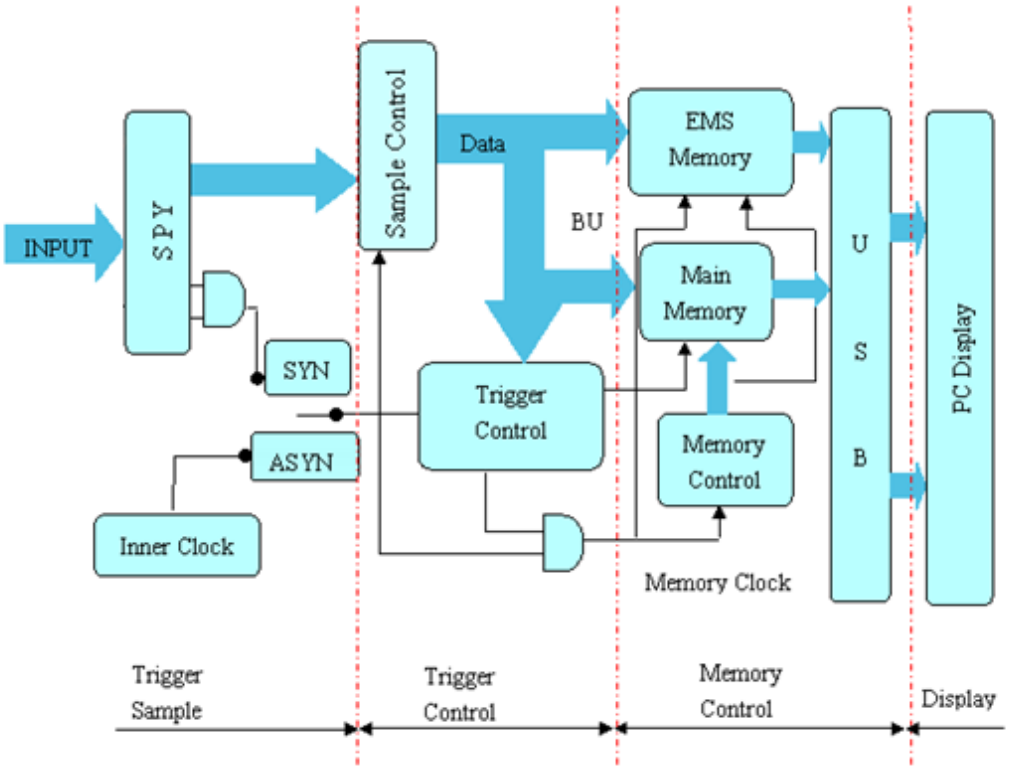
Pin Number	Wire ID	Wire Color
1	Ground	Black
2	ACLK	Grey
3	Ground	Black
4	A0	Grey
5	A1	Grey
6	A2	Grey
7	A3	Grey
8	A4	Grey
9	A5	Grey
10	A6	Grey
11	A7	Grey
12	A8	Grey
13	A9	Grey
14	A10	Grey
15	A11	Grey
16	A12	Grey
17	A13	Grey
18	A14	Grey
19	A15	Grey
20	AST0	Grey

Level B

Pin Number	Wire ID	Wire Color
1	Ground	Black
2	BCLK	Grey
3	Ground	Black
4	B0	Grey
5	B1	Grey
6	B2	Grey
7	B3	Grey
8	B4	Grey
9	B5	Grey
10	B6	Grey
11	B7	Grey
12	B8	Grey
13	B9	Grey
14	B10	Grey
15	B11	Grey

16	B12	Grey
17	B13	Grey
18	B14	Grey
19	B15	Grey
20	AST1	Grey

Block Diagram



Cleaning and maintenance

Cleaning

In order to maintain the cleanliness of equipment, you need to check whether the channels are dusty or not. Please clean the out surface of the equipment follow these matters.

1. Use velvet cloth contact the surface of the equipment.
2. Pease do not use any corrosive or chemistry.

Caution: Please make sure the equipment is dry enough before going to work. Avoid mangling the equipment or hurting body because of water!

Maintenance

Don’t put the equipment under the sun for a long time. Put it in wind to the best of one's abilities

Caution

In order to not mangle the equipment, you should not put it in fog, water or impregnate.