# Leaptronix®

PLA Series Operating Manual

# Leaptronix®

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### Warranty Description of Logic Analyzer

Leaptronix provides a one-year warranty of spare parts and assembly, from the date of delivery, for the products produced and sold by itself. In the event of any defect within the warranty period, Leaptronix will deliver materials and repair the defect products at its own cost, with exception of consumables. To acquire the warranty services, the customers shall, at the beginning of warranty, notify Leaptronix by the following ways, and make proper arrangements for the services:

- (1) Fill data in the product warranty, and send the product warranty to Leaptronix by fax.
- (2) Notify Leaptronix service personnel by telephone the complete data in the product warranty.

In the occurrence of warranty, the customers shall, at its own cost, package and deliver the defect products to the agents or distributor service center designated by Leaptronix.

If the locality of customers and Leaptronix service center are at the same country, Leaptronix will pay the mailing expenses; otherwise, the customers shall pay all transport expenses, tariffs, taxes and any other expenses.

This warranty doesn't apply to any defect, failure or damage arising from improper use, incorrect or insufficient maintenance and servicing. Leaptronix will not deliver services in either of the following cases:

- Damage not caused by Leaptronix personnel during assembly, repair or servicing.
- (2)Damage caused by improper use or connection to incompatible equipments.
- (3)Any damage or malfunction caused by use of non-Leaptronix consumables.
- (4)Damage arising out of modification or integration with other products, in respect of which subsequently leads to more difficulty or time in services. This warranty is provided by Leaptronix, which assumes no warranty of any transaction and resale for special purposes. Repair or replacement of defect products by Leaptronix shall be deemed as a remedy measure for the customers within the warranty period. Under no circumstances will Leaptronix be liable for any indirect, special, incidental or consequential damages, whether or not giving warnings in advance.

### Warranty Description of Consumables of Logic Analyzer

The spare parts or assembly components other than the analyzer body and junction box are consumables not covered in the warranty service. The spare parts and assembly components shall be checked within 30 days after procurement; in the case of any abnormality, the designated agents shall be notified immediately, and defect spare parts or components shall be attached for replacement.

#### List of consumables or assembly components:

• 16CH signal capture cable

• USB Cable





# **Chapter 1 Product Description**

#### 1-1 Product Overview

Since its founding in 1980, Leaptronix was always devoted to IC burning and measurement, and also committed itself to delivering perfect R&D environment and top-quality measuring instruments.

In response to the measurement demands and further combination with other industries in digital times, Leaptronix was established to offer the most important digital measurement instrument: Leaptronix, typically represented by "PLA Series".

PLA Series is a fault-free digital signal analyzer with 16-32CH, 100~250MHz sampling rate and 100MHz, which enables real-time tracking and capture of targeted signals on an independent instrument, but also stores, visualizes and analyzes the printed waveforms. So, it's a perfect tool for analysis and debugging, helping you to complete your task for rapid troubleshooting and product development.

#### 1-2 Safety Notes

All operations, maintenance and servicing must adhere to the following safety notes and precautions. Our company shall not assume any responsibility for any unexpected results arising from misuse of the instruments due to failure of following the safety notes.

- 1. Don't use this instrument nearby combustible gas or flame.
- Don't remove the housing of instrument during operation, or adjust and replace spare parts in order to avoid misoperation and unnecessary danger!



#### WARNING!

This symbol warns you of the danger. Failure to correct operation or compliance with the operating procedure may lead to personal injury. Continuous use is prohibited unless the operating procedure is fully understood.



#### CAUTION!

This symbol reminds you of the danger. Failure to correct operation or compliance with the operating procedure may lead to instrument damage. Continuous use is prohibited unless the operating procedure is fully understood.

#### **1-3 Product Specifications and Characteristics**

	_	Specific	ation		
	Item	PLA-1016	PLA-2532		
Time sequence analy	vsis(capture frequency)	100MHz,Max(10ns)	250MHz,Max(4ns)		
State analysis(Extern	nal clock)	100MHz(Max)	100MHz(Max)		
Bandwidth		100MHz	100MHz		
Channel		16CH	32CH		
	Total memory	256 KBytes	2MBytes		
Memory	Memory depth	128k bits x 16CH	512k bits x 32CH		
	Trigger number	1~255	1~255		
	Trigger mode	Pattern/Edge / AND / OR	Pattern/Edge / AND / OR		
	Trigger channel	16CH	32CH		
	Advance/delay trigger	YES	YES		
Trigger	Trigger PAT	3 (Edge or Pattern)	3 (Edge or Pattern)		
	Continuous/discontinuous trigger	YES	YES		
	Trigger output	YES(TTL Level)	YES(TTL Level)		
	Trigger pulse width	YES	YES		
	Bus analysis	YES	YES		
	Glitch capture	YES	YES		
Reference voltage	Range	-4V~+4V	-4V~+4V		
Reference voltage	Accuracy of reference voltage	± 50mV	± 50mV		
Max. input voltage		± 30V	± 30V		
Input impedance		100K $\Omega$ shunted by $\approx 10 pF$	$100 \text{K}\Omega$ shunted by $\approx 10 \text{pF}$		
	Operating temperature	0°C~45°C(32°F~113°F)	0°C~45°C(32°F~113°F)		
Temperature	Storage temperature	-40°C~75°C(-56°F~167°F)	-40°C~75°C(-56°F~167°F)		
Data skew		10ns typical	4ns typical		
PC Link interface		USB 2.0	USB 2.0		
Power supply		USB	USB		
Dimension	Length x width x depth(cm)	15cm x 8cm x 3cm	15cm x 8cm x 3cm		
Dimension	weight	230g	240g		

#### 1-4 Accessory List

After getting the package of the logic analyzer, please check if the standard accessories are complete according to the under list at once:

#### 1. PLA-1016

NO	Name	Quantity	
01	PLA-1016	1	
02	Signal capture cable	1(16CH)	
03	CD-R	1	Including software, driver and manual
04	USB Cable	1	
05	Service warranty card	1	
06	Package acceptance form	1	Listing product package content

#### 2. PLA-2532

NO	Name	Quantity	
01	PLA-2532	1	
02	Signal capture cable	2(16CH)	
03	CD-R	1	Including software, driver and manual
04	USB Cable	1	
05	Service warranty card	1	
06	Package acceptance form	1	Listing product package content

\* Check if the accessories and quantities are complete according to the above list. Otherwise notify the company or local agent immediately for timely handling.



#### **1-5 Optional Components**

• 16CH signal capture cable



• USB Cable





#### **1-6** System requirements

- 1. Operating system Microsoft Windows 2000 Microsoft Windows XP Microsoft Vista 32
- 2. CPU Windows 2000, Windows XP Home, Pro: 300MHZ or above
- 3. Memory Win2000 Pro: 128MB or above (Win XP Home, Pro: 256MB or above)
- 4. Hard disk space Minimum for 50MB available hard disk space

#### 1-7 Appearance and function introduction

1. Logic analyzer main unit



3. Signal lead set

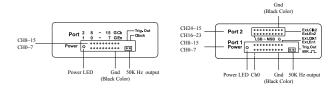


4. Back panel(USB port)

2. USB cable



- 5. Front panel
  - Panel
  - (1). Description of PLA-1016 Front (2). Description of PLA-2532 Front Panel



### **Chapter 2** Check the instrument

#### 2-1 Check prior to Installation

- The ex-factory instruments are already tested and checked. Please unpack and check firstly to ensure the instruments are free of damage during the transportation.
- Check if the accessories and quantities are complete according to the list of accessories, otherwise notify the company or local agent immediately for timely handling.

# **Chapter 3 Installation and Execution**

#### 3-1 Installation of Software

- 1. Software is mainly used to make the captured signal waveform of PLA for saving, visualization, search and printing.
- 2. Software has a communication interface USB 2.0, so USB driver shall be installed.
- 3. Application software attached onto PLA (or "download area" of Leaptronix website) shall be installed into PC: After the program is unzipped, an installation key will pop up, click this key and follow the steps on PC display for installation.
- 4. After completion of installation procedure and steps, button () will appear at PC desktop, indicating the completion of installation.

#### **3-2 Operation of Software**

Click LA's button () at PC, enter into PLA operating display as follows:

÷⊡ (a) /	aCtop Icol Help		0 6		10 M			4.0						
ar 100 100 1				247		-								
laveform Listi		Marrie	by Depth											
NV 2.546	-	(Per l	Channel]	Auto	•			0.0us		Delay	50% / 50%	-		
lus/Signal	Trigger Pattern	0040	-15.000		-10.000us		-5.000us		0.0ns		5.000us	10.000us	 15.000us	20.0
сно	×	1001							0 1					0 1 0
CH1	×	010												
CH2	×	0:					0 1						0 1	
ЭНЭ	×		1	0	. 1		ò	_		1 0	1 -	1 0		: 0
CH4	×	0												
CH5	×													
CHG	×													
CH7	x						1 :							



#### **3-3 Software System Requirements**

CPU: 3.0GHz or higher. Ram: at least 512MB. HD: 50MB. Port supporting USB2.0.

#### **3-4 Software Installation Steps**

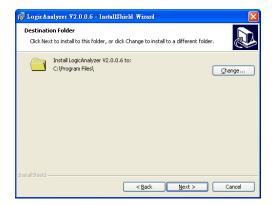
Step1: close all running programs.

Step2: place CD in the optical drive, and install by the following steps. If auto-play of the optical drive is activated, the following display will appear:



If Optical disc isn't automatically performed, press "Start" button of Windows, then press "Execute". Enter "D: \setup.exe" (assuming optical drive is: "D: \") in "Activate" field.

Step3: press "Next", the option display of installation path will appear:



Step4: start installation by pressing "Next", and finally press "Finish".





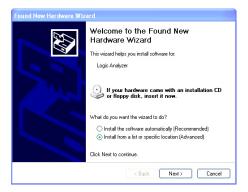
#### **3-5 Hardware Installation Steps**

Step1: Logic Analyzer is linked to PC via USB; in the case of first installation, the following display will appear:

Found New Hardware Wizard
The wizard could not find the software on your computer for
💤 Logic Analyzer
It is recommended that you connect to the Internet so that the wizard can search online and look for the appropriate software.
Yes, connect and search for the software on the Internet
No, do not connect to the Internet now
If you know another place where the software might be located, click Back and select the Advanced option.
< Back Next> Cancel

Select "No, do not connect to the internt now ".

Step2: the following display appears press "Next".



Select "Install from list or specific location"



Step3: the following display appears press "Next"

	ardware Wizard ose your search and installation options.
🧿 Searc	h for the best driver in these locations.
	e check boxes below to limit or expand the default search, which includes local and removable media. The best driver found will be installed.
	Search removable media (floppy, CD-ROM)
$\checkmark$	Include this location in the search:
	E:\Drivers\Printer\EnglishA\GDI\xp 🛛 Browse
🔵 Don't	search. I will choose the driver to install.
	e this option to select the device driver from a list. Windows does not guarantee th ver you choose will be the best match for your hardware.
0.00	
	<pre></pre>

Select "this location is included during search", and press "review".

🗉 🚞 Intel	^
🗉 🚞 Internet Explorer	
😑 🚞 LogicAnalyzer V2.0.0.4	
C Drivers	
C Projects	
C Messenger	
📧 🚞 microsoft frontpage	
🗄 🛅 Movie Maker	-

There is a "Driver" folder under the installed data folder (preset as: c:\program files\Logic Analyzer V2.0\); select the data and press "Confirm". Step4: after pressing "Confirm", select "Next" to start installation of the intended Driver.

Found New Hardware Wizard		
Please wait while the wizard installs th	e software	
Cogic Analyzer USB Device		
Ď	6	D
	< Back	Next > Cancel

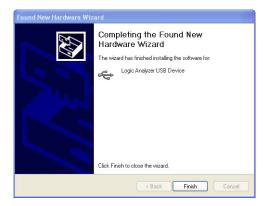
The following warning window will appear during installation:



Select "Continue Anyway" for completion of Driver installation.



Step5: after completion of installation, press "Finish".





#### 3-6 Software Execution

#### Method 1:

1. Press "Start" function key, select "all programs".



2. Start the software by selecting LogicLogicAnalyzer Software → LogicAnalyzer V2.0.



#### Method 2:

1. start the software by clicking directly the software tag on the desktop.



#### **3-7** Interface

#### 3-7-1 Model Selection



Select the types by pull-down menu.

#### 3-7-2 Operating Interface

- 1. Window
  - (1) .Waveform window

		Logic Analyzer 2001	MHz/4ns						-6
	unStop Search ]		Q Q ¥ 1	F 19 49 19	■ ≱ 🎨				
									В
veform Lis	ting -	Memory De IPer Chann	pith Auto	-	0.0us	Delay	50% / 50%	×	
,	1	(Per Donn	di '	_		1			
z:/Signal	Trigger Pattern	100us -15	80.000 us	-100.000us	50.000.e 0.0	ns E	0.000ue 1	00.000us	150.000us 200.
340	×								
H1	×		Statistica St						
42	×	ານແມ່ນແມ							
13	×	JUUUU	ມາມາມ	บบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบ	บบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบบ	ບບບບບ	າມາມາ	າມາມ	ມາມາມາມ
14	×	0 TOTO	101010	101010	10101010	10101	010101	07070	10101010101
H5	×	1 0 1							
HG	×	1 1 1 0							
H7	×	a	1 .	0	· · ·1				
D									
U		-							F 🗉
Semple Ro	le : 4nS Mea	nory Depth : Auto	Memory Percer	nt: 50%/50%					

- A: Functional option list.
- B: Tool list.
- C: Message list.

- D: Display of channel names.
- E: Display of trigger mode.
- F: Waveform display area.

#### (2). State Mode

- ci 🕾	Baj Tri	2 >> 1		<b>II</b> 🚜	Q	۹ 🖤	Sgr	2 4		<b>®</b>		
m Listing	1											
Sample Nu		ICH1	Тонг	Існз	ICH4	Існя	Існє	Існ7	Tiner	B		
	×	K	K	K	×	×	K	K		B		
-12	1	0	1	0	1	0	1	1	1210005			
-11	0											
-10												
-9												
-8												
-7												
6												
-5												
4												
-3												
-2									-2.00046			
-1												
0		0			0				0.0u5			
•1												
+2												
+3									+3.000uS			
+4												
-5									+5.000uS			
•6												
•7												
+8												
•9												
+10									+10.000./5			
+11												

A: State mode display area.

B: Display of channel names.

C: Display of trigger mode.

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#### 2. Menu

(1). File menu

<u>L</u> oad	
<u>S</u> ave	
C <u>h</u> angeModel	
Import	
Export	
Capture	
<u>R</u> eport	
<u>P</u> rint	
Exit	
	_

Load: load the files saved in PC. Save: save the existing data into file. ChangeModel: switch different model. Import: import the data of host computer to PC. Export: export PC data to the host computer. Capture: capture the existing display into file. Report: put the existing data into report. Print: print the existing waveform. Exit: close the existing programs.

#### (2). View menu

<u>H</u> andShift	HandShift: move waveform by mouse.
Zoom <u>I</u> n	Zoom In: zoom-in waveform.
Zoom <u>O</u> ut	Zoom Out: zoom-out waveform.
<u>G</u> rid Style	Grid Style: grid style switching.
<u>B</u> /W	B/W: background color switching.

#### (3). Run/Stop menu

<u>A</u> uto Scale	
<u>R</u> un	
Single Run	
Auto Store	
<u>E</u> rase	
Stop	

Auto Scale: auto-search. Run: continuous sampling. Single Run: single sampling. Auto Store: auto-saved. Erase: erase screen. Stop: stop.

#### (4). Search menu

Search Previous S	earch Setting: Start search function dialog box. earch Previous: Search previous date. earch Next: Search next date.
-------------------	--

#### (5). Tool menu

-		
	<u>T</u> rigger Edit	
	<u>C</u> hannel/Bus Edit	
	GOTO Cursor	

Trigger Edit: set trigger conditions. Channel/Bus Edit: Set Channel/Bus. GOTO Cursor: Position the cursor.

#### (6). Help menu



Default: ex-factory setting. About: software information.

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#### 3. List of Operations (1). File function list



A: Load. B:Save. C: Capture display. D: Print.

(2). Advanced function list



A: Call BUS setting dialog box. B: Call Trigger setting dialog box. C: Continuous sampling. D: Single sampling. E: Stop. F: Auto scale. G: Auto store. H: Erase

(3).Utility operation list



A: G: Search next. B: Zoom-out. C: New cursor. D: Cursor spacing display. E: Search previous. F: Search setting. G: Search next. H: Grid style. I: Background white. J: Handshift.

#### **3-8 Detailed Operations**

#### **3-8-1** File Functions

 Load Method 1: Select "File" menu and then "Load".

Method 2: Click the file folder pattern on the tool list.



 Save Method 1: Select "File" menu and then "Save".

Method 2: Click the disc pattern on the tool list.

- 3. Export
  - (1). Connect Logic Analyzer with PC via USB.
  - (2). Then, select "File" menu and Export, thus exporting data to Logic Analyzer.

4. Import

- (1). Connect Logic Analyzer with PC via USB.
- (2). Then, select "File" menu and Import, thus importing data from Logic Analyzer to PC software.
- 5. Capture

Method 1:

Select "File" menu and then "Capture" to call capture dialog box.

Method 2:

Click and select the camera pattern on the tool list to call the capture dialog box.

	<b>.</b>
Capture Capture Cancel	Comments
	A

Capture dialog box: A: if there is any input comment, the comments will be automatically added to left upper corner. 6. Report Print-out

Select "File" menu and then "Report Out" to call "Report Out Dialog Box".

Report Out	×
C C \ D Councerts and Settings Redum After Players Pl	Text File(154)
A File Name "bit Tester's name D	В
Data Range	)
From Start 💌	To End 💌
Report Out	Cancel

Report Out Dialog Box: A: Route selection B: File selection C: File name entry box D: Name of test personnel E: Selection of export range

#### 7. Print

Method 1:

Select "File" menu and then "Print" to call print dialog box.

Method 2:

Click and select the printer pattern on the tool list to call the print dialog box.



Printer		X
\\gany\SHARP AR-M160	A	up
Orientation C Portrait		в
✓ Printer	🗙 Cancel	

- Print dialog box:
- A: Printer currently selected
- B: Portrait or landscape

#### 3-8-2 Waveform capture

1. Continuous sampling

Method 1:

Select "Run/Stop" menu and then "Run" to capture continuously the waveform data.

Method 2:

Click dual arrow pattern on the tool list to capture continuously the waveform data.



2. Single sampling

Method 1:

Select "Run/Stop" menu and then "Single Run" to capture individually the waveform data.

Method 2:

Click single arrow pattern on the tool list to capture individually the waveform data.



3. Stop

Method 1:

Select "Run/Stop" menu and then "Stop" to stop all operations. Method 2:

Click the red square pattern on the tool list to stop all operations.



4. Auto-scale

Method 1:

Select "Run/Stop" menu and then "Auto Scale" to search automatically waveform data and set the system parameters.

Method 2:

Click the display pattern on the tool list to search automatically waveform data and set the system parameters.



5. Auto store

Method 1:

Click "Run/Stop" menu and then"Auto Store"to auto store the waveform. Method 2:

Click the waveform pattern on the tool list to auto store the waveform.



6. Erase screen

Method 1:

Click "Run/Stop" menu and then "Erase" to erase the screen. Method 2:

Click "Erase" pattern on the tool list to erase the screen.



#### 3-8-3 Waveform analysis

- 1. Grid style
  - Method 1:

Click "View" menu and then "Grid Style" to change the grid display mode. Method 2:

Click the grid pattern on the tool list to change the grid display mode.



2. Background color

Method 1:

Click "View" menu and then "B/W" to change the background color. Method 2:  $% \left( \mathcal{A}^{\prime}_{i}\right) =\left( \mathcal{A}^{\prime}_{i}\right) \left( \mathcal$ 

Click the B/W pattern on the tool list to change the background color.



3. Handshift

Method 1:

Click "View" menu and then "Handshift" to change the handshift. Method 2:

Click the palm pattern on the tool list to change the handshift.



4. Waveform zoom-out

Method 1: Click "View" menu and then "Zoom Out" to zoom-out the waveform. Method 2: Click zoom-in (-) pattern on the tool list to zoom out the waveform.



5. Waveform zoom-in

Method 1:

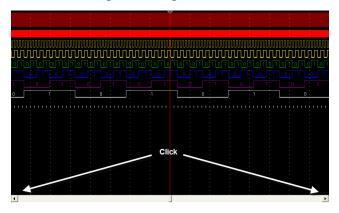
Click "View" menu and then "Zoom In" to zoom-in the waveform. Method 2:

Click zoom-in (+) pattern on the tool list to zoom in the waveform.



6. Waveform shift

Drag the scroll axle below the waveform display to shift the waveform or use handshift to drag leftwards or rightwards.



#### 7. Adjust the position of waveform

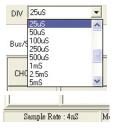
СНО	×
CH1	×
CH2	×
СНЗ	×
CH4	×
CH5	×
CH6	×
CH7	×

Press and drag the left mouse button on the left side to adjust the position of waveform. The selected channel is highlighted by a red box.

#### 3-8-4 Settings

1. Setting of interval time

Click the pull-down menu of the tool list under "waveform window". The setting is coming out an interval of a scale on the picture. After completion of setting, it will display corresponding sampling frequency use in the left corner.



2. Setting of memory depth

After completion of setting completion, it will show the memory depth by corresponding use at the left corner.

In the case of bigger memory depth and lower sampling frequency, it takes longer time to capture data. In such case, "Auto" option could be selected to enable automatic setting of memory depth for faster data capture. After finishing the setting, it will show the memory depth by

corresponding use at the left corner.

Memory Depth (Per Channel)	Auto	-
-150.000	Auto 512 1k 2k 4k 8k 16k 32k	
Memory Dept	] th : Auto	Me:

3. Setting of channel/BUS

Method 1:

Click "Tool" menu and then "Channel/Bus Edit" to call Channel/BUS edit dialog box.



# Method 2:

 Click right mouse button in waveform display under waveform mode, select "Advance BUS" from the pull-down menu to call Channel/BUS edit dialog box.



(2). Click right mouse button in data area under state mode, and select " Advance BUS" from the pull-down menu to call Channel/BUS edit dialog box.



#### Method 3:

Click "Bus" pattern on the action list to call Channel/BUS edit dialog.



# (1). BUS setting page

10
1
1
_

A: Channel state;

"Mode", "name" and "bits in channel" from left to right.

- B: Channel/BUS setting zone
- C: PORT voltage display
- D: Function key
- E: State display zone
- (2). Channel setting

lode	Name	Bits				Po	et.4							Po	rt 3							Po	e 2							Po	<b>R</b> 1			
					1	/olt ·	4:2	r						Volt		v						/oit:		v						Volt		٧		
			7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	CH0	1																																1
	CH1	1			_																												1	
A0	CH2	1	Y																															
per	CH3	1	Г	1																														
*	CH4	1																												1				
ser	CH5	۹,	Г		В																								1					
ier	CH6	1																										1						
ser	CH7	1	1																								1							

#### A: Current state;

This setting is valid only when the channel is BUS. Bits indicate the quantity of Bit(Channel) in the channel, 1 is single channel, 0 is shut-off; the others bigger than 1 is BUS.

B: Since "Auto" and "User" modes are valid only when the channel is BUS, the setting of channel is not affected even if Channel is displayed by numerical value or selection. (3). Bus Setting

BUS or Channel is set by dragging with left mouse button at Channel/BUS setting zone.

tode	Name	Bits				Po	at 4							Po	at 3						Pe	M2							Po	x1			
						Volt	4:2	Υ						Volt		Y.					Volt	2:2	Y.						Volt	1:2	Y		
					-			_			7		-				_			-							-	-		-			0
Jser	CH0	1	10		9		3	1	1		N.	0	9		2	1	1		0	9		2	1	1		1	0	9		2		1	-
110	an	- 1								Ŀ																						1	
	CH2	5	v	v	v	v	v		1	1									-	-	-	-	-	-	-	-	-	-	-	-	-	÷	
Joer	CH3	11	ť.					H		t										11	10	9	8	7	8	5	4	3	2	1			
Jser	CH4	A 1		-	-	-	-	-	E	r.									-	-	-	-	-	-	-	-	-	-	1	-	c	-	
Jser	CH5	1	t						1	T																		1			~		
Jser	CH6	1	t																								1						
Joer	CH7	1	1																							1							

A: Current state;

Auto represents auto-judgement mode.

User represents user-defined mode.

Bits indicate the quantity of Bit(Channel) in the channel, 1 is single

channel, 0 is shut-off; the others bigger than 1 is BUS.

- B: BUS display under Auto mode;
- C: BUS display under User mode;
- \* Auto mode

Since no arrangement issue exists in Auto mode, it's displayed by selection; MSB to LSB is arranged from left to right in this mode.

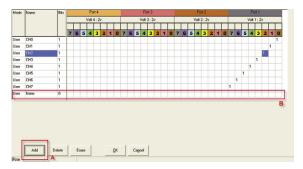
Switching mode: the mode is switched to "Auto" by clicking "User".

\* User mode

BUS arrangement is user-defined for numerical display. A smaller arrangement number of BUS indicates MSB, otherwise LSB.

Switching mode: the mode is switched to "User" by clicking "Auto".

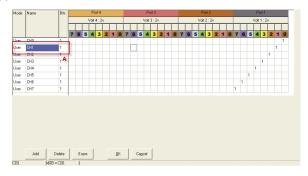
# (4). New channel



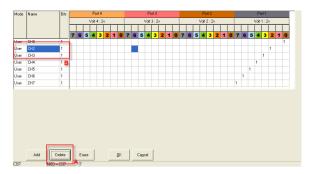
A: Click "Add" at the lower position.

B: Add a new void channel at the lowest position of all channels for the user.

#### (5). Delete channel



Firstly, select the channel to be deleted.

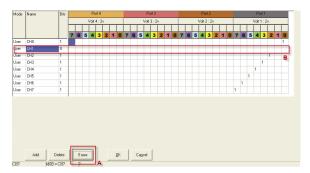


A: Click "Delete" at lower position.B: The selected channel will be deleted.

# (6). Erase channel

	Bits				Po	at 4							Po	et 3							Po	et 2							Po	nt 1			
				1	Volt	4:2	v					)	Volt	3:2	¢.						Volt:	2:2	v						Volt	1:2	v		
		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	
lse: CHO	 1																																1
Jser CH1	 1																															1	
Jser CH2	1																														1		
Jser CH3	1 <b>A</b>																													1			
Jser CH4	1																												1				
Jser CH5	1																											1					
Jser CH6	1																										1						
Jser CH7	1																									1							
Iser CH7	1																									1							

Firstly, select the channel to be erased.

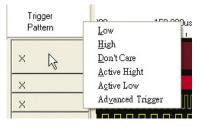


A: Click "Erase" at lower position. B: The selected channel will be erased. 4. Trigger setting

Simple Trigger setting

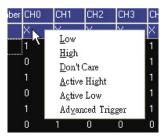
Method 1:

Call the rapid setting list by press right mouse button "Trigger/Pattern" field of the channel in the "waveform window".



Method 2:

Call the rapid setting list by press right mouse button "Sample/Trigger" field of the channel under "state mode".



## Advanced Trigger setting

Method 1:

Click "Tool" menu and then "Trigger Edit" to call Channel/Bus Edit dialog box.



Method 2:

Press right mouse button of waveform display under waveform mode, select "Advanced Trigger" from pull-down menu to call Trigger Edit dialog box.



Press right mouse button at data zone under state mode, select "Advanced Trigger" from pull-down menu to call Trigger Edit dialog box.



# Method 3:

Click "Trig" pattern on the tool list to call Channel/Bus edit dialog box.



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(1). Trigger setting page

Adv	ance Setti	ing																																		
Adv	Bus Adv	Trigg	et																																	
Edge	-		Pa	tterr	11																														Continuou	15
	Pattern 1		_		Po	et 4	_	_	_		_		Po	rt 3		_					Po	rt 2	_		_				Po	et 1				Ĩ	(€ Off	
		_	_					_		_	_	_		_	_			_							_	_	_	_	_							
	Pattern 2	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1		7	6 (	5	4	3	2	1	0	7	6	5	4	3					C On	
				tterr		^			^						^	^	^	-	. ^	_						î			^	^	-	-		1	Trig Counte	
	Pattern 3		r a	men		et 4							Po	rt 3	_		_	-			Po	rt 2				-	-	-	Po	irt 1	-	-	-	c II		er 1es
				Г			Г											Г	Т	1											Г	Т		1	Trigger M	
	Pattern OR	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1		7		5	4	3	2	1	0	7	6	5	4	3			0		<ul> <li>Interna</li> </ul>	
		X	×	×	×	×	×	×	Х	×	×	×	×	×	×	×	×	×	×	X	×	×	×	×	×	×	×	×	×	×	×	$\times$	$(\times$		(* meme	21
	Pulse Width		Pa	tterr					_																										C Extern	al
	widar		_	-	Po	et 4	_	_	_		_	_	Po	rt 3	_	_	_		-	_	Po	rt 2	_	_	_	_			Po	irt 1				1		
	A	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	Z	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0			
	A						_	-	X	×	5		×		-		-	×	XX				-		-	×							X	Ľ		в
						E	_	_	_	ъ.																										
						Т	E	iase	,	L			<u>o</u> k		Γ	Ca	gcel	٦																		
						L	_	_	_	c		-	_	-		-	-	-																		

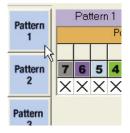
- A: Pattern mode switching.
- B: Trigger Counter, continuous/discontinuous and internal/external trigger setting
- C: Erase key.
- (2). Erase Pattern setting

Press the lower "Erase" key to erase all existing Pattern settings; All Trig states reset to "Don't Care" under Pattern mode. The settings are set as "CHO" "High" "<" "1" "us" under Pulse width

mode.

#### Pattern

(1). Pattern switching



Click the left Pattern key for mode switching.

(2). Setting of Pattern



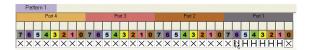
A: Pattern state zone.

To change the trigger mode of Pattern, call the state menu in the state zone by right mouse button:



The state of channel can be set by clicking the required state.

a. In the case of "Low", "High" and "Don't Care", press and hold the left mouse button on the state, then drag leftwards and rightwards to set rapidly the trigger state.



b. In the case of "Raising" and "Falling", press and hold the left mouse button on the state, then drag leftwards and rightwards to shift the position of "Raising" and "Falling".



- \* Note: only "Low", "High" and "Don't Care" trigger state can be selected under Pattern2 and Pattern3.
- \* Either "Raising" or "Falling" can be set under Pattern1 and Pattern OR.
- \* Under Pattern2 and Pattern3, the next Pattern is compared only when the setting state of previous Pattern is already achieved. Trigger is effected when the setting state of all Patterns is met.
- \* Under Pattern OR mode, Trigger is effected if either Pattern1 or Pattern OR state is met.

# Pulse width

Båge	Pattern 1		Continuous
	Pattern 2		C On
	Pattern 3		Trig Counter
	Pattern OR		Trigger Made
			Internal
	Pulse Width		C External
	- 4		
	A		
		Erace QK Capcel	

- A: Switch to PulseWidth setting page by clicking "Pulse Width" button of left Pattern column.
- B: Select the channel. (CH0~CH31)
- C: Channel name(auto-display).
- D: Select logic level. (Low, High)
- E: Select condition. (<, =, >)
- F: Enter time
- G: Select time unit

#### **Continuous and discontinuous**



A: Click "On" and "Off" in "Continuous" at right information column.

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- \* This function is effective only in the case of " Pattern2" and "Pattern3".
- \* If continuous/discontinuous is set as "On", trigger is effected only Pattern2 and Pattern3 match continuously Pattern state, without mixture of other states; otherwise no continuous data is required for triggering.

#### **Trigger Counter**



- A: Enter the intended times in the entry box of " Trig Counter" at right-hand information column, within the range of 1~255 times.
- \* If the entry exceeds 255 times, 255 times is limited during system setting.

#### Internal/External trigger



- \* If setting is set as "Internal", it selects the internal for sampling frequency.
- \* If setting is set as "External", it selects the external CLOCK for sampling frequency.

\*Caution!

Use the last channel (CH31) for LA Series to be external clock input.

Use the individual external clock input for LA Series.

#### 5. Voltage setting

			Po	rt 4			
		1	Volt (	4:2	/		
							15
7	6	5	4	2	2	4	0

Call the voltage setting dialog box by clicking the upper voltage display zone with left mouse button in BUS setting page.

Logic Level Setting
Set the setting to all ports
Settings
C Standar TTL (1.5v) 💌 🖪
© User define
c
OK Cancel

- A: Click this option, all Port voltages are set consistently, otherwise set individually.
- B: Standard voltage setting; "TTL", "ECL" and "CMOS".
- C: User define; user-defined voltage logic level.

\* Caution!

The quantity of preset voltage port for PLA Series is slightly different from LA Series, according to the mode to classify into one port and two ports.

6. Delay

0.0us	Delay
0.000	- Cidy

Call delay entry dialog box by clicking "Delay" key on the tool list.

Delay		
0		nS 💌
Clear E	KSP <	<b>A</b>
7	8	9
4	5	6
1	2	3
0		
4 <u>0</u>		Cancel

A: Select unit.

BKSP: delete a character by cursor. Clear: clear the contents in the entry box. " $\leftarrow$ ", " $\rightarrow$ ": left and right shift of cursor. 7. Change the channel name

Method 1:

Under the "waveform window", double click the channel name to call the name setting dialog box.

СНО	×
CH1 VS	X
CH2	X
СНЗ	X
CH4	X
CH5	X
CH6	X
CH7	X

# Method 2:

Under the "state mode", double-click the channel name to call the name setting dialog box.



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### Method 3:

Under "BUS" setting dialog box, double-click the channel name to call the name setting dialog box.

Mode	Name	Bits
User	СНО	1
User	CH1	δ 1
User	CH2	1
User	CH3	1
User	CH4	1
User	CH5	1
User	CH6	1
User	CH7	1

Name setting dialog box:

Name
CHO
1 2 3 4 5 6 7 8 9 0 BKSP
Clear q w e r t y u i o p
Caps a s d f g h j k l Caps
Shift z x c v b n m . Shift
Space <>
<u>Q</u> K <u>Cancel</u>

# 8. Switch BUS numerical display mode

Method 1:

Under the "waveform window", double click the "Sample/Trigger" field of the channel to call the numerical display options.



Hexadecimal: display in hexadecimal system. Decimal: display in decimal system. Binary: display in binary system.

## Method 2:

Under the "state mode", double click the "Sample/Trigger" field of the channel to call the numerical display options.

H7	bus1	Ti	imer		
	Indiana w	4			
	<u>B</u> ase Mode	•	<u>H</u> exadecimal		
	<u>A</u> dvanced Trigger		<u>D</u> ecimal		
	0404		<u>B</u> inary	N	
	0xD9	ł	0.000045	- 14	
	0xDE	.9	.000uS		
	0xDD	-8	.000uS		

Hexadecimal: display in hexadecimal system. Decimal: display in decimal system. Binary: display in binary system.

- 9. Cursor setting
  - (1). Add new cursor

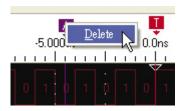
A new cursor is added into "waveform window" or "state mode" by clicking "Add" icon on the tool list.



\* The quantity of cursors is limited to 26.

(2). Delete cursor

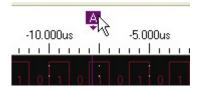
Call the function options by clicking the right mouse button on the cursor to be deleted.



Delete the selected cursor by clicking "Delete".

(3). Shift cursor

Press and hold left mouse button on the intended cursor, drag leftwards and rightwards to shift the position of cursor.



(4). Look for cursor

Method 1:

call the function options by clicking right mouse button on "waveform display zone" in "waveform window".

	<u>G</u> OTO ▶	GOTO Cursor
1	Search 🕨	GOTO Trigger
C	<u>A</u> dvanced Trigger	GO <u>T</u> O Begin
	Advanced Bus	GOTO <u>E</u> nd
•		
÷		· ·

# Method 2:

Call the function options by clicking right mouse button on "state display zone" in "state mode".

1	4				0.05		.9
	(	<u>10</u> TO		Þ	<u>G</u> OTO Cursor	N	~
	ŝ	earch		×	GOTO Trigger	NG	-8
U	1	dvanced	Trigger		GO <u>T</u> O Begin		-7
0	1	4 <u>d</u> vanced	Bus		GOTO <u>E</u> nd		-6
	υ		1		UXE 6		-5
					0.55		· .

Method 3:

Click "Tool" menu and then "GOTO Cursor" to call Channel/BUS edit dialog box.



a. Click "GOTO Cursor" to call the cursor and search the dialog box.



- b. Select the cursor to be searched from the pull-down menu.
- c. Enable the central point to align the trigger cursor by clicking "GOTO Trigger".
- d. Enable the central point to align the starting point of data by clicking "GOTO egin".
- e. Enable the central point to align the ending point of data by clicking "GOTO End".
- (5). Cursor time



Call the cursor time dialog box by clicking "Set" icon on the tool list.

CursorSet			×
A	•	То	B
		Add	Egit

A new cursor time display is added onto the tool list by selecting the starting and ending cursors and then clicking "Add".

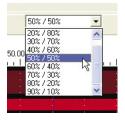


Click the left mouse button on the cursor time to switch between "cursor time" and "cursor frequency".



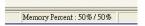
## 10. Show the setting of percentage

Click the pull-down on the tool list in the waveform window.



After completion of setting, the position of hollow point will switch according to the selecting percentage on the picture and proceed the trigger of the memory by selecting percentage.

After completion of the setting, it will show the percentage of corresponding use at the left corner.



\* After re-catches the data, it will renew status.

# 11. Data Search

#### Method1:

Click the pattern of binoculars on the tool list to call the information survey dialog box.



#### Method2:

Click the right mouse in the "waveform window" or "state mode" to call the information survey function dialog box by selecting "Search" and then selecting "Search Setting ".

GOTC	·	•		1 -	
Search	L	•	Search	Setting	
<u>A</u> dvanced Trigger			Search	Previous	
Advar	iced Bus		Search	Next	1
					1

-44.000nS
-40.000nS
Search Setting
Search Previous
Search Next
-24 000nS

#### Method3:

Click "Search" function list, and then click "Search Setting" to call the information searching function dialog box.

Search Setting	
Search Previous	
Search Next	

## 1. Data Search dialog box

CH0 CH0	A.	Value	-	Add
Data :	A		в	Delete
Mode G. Hax	C Dec	C Bin		Clear Al
Channel/Bus		Data	C	
			_	OK

- A: Channel selecting
- C: Information of the showing state (It can be only used if bus is the channel.) D: List searching
- B: Information searching D: List search
- 2. Change the information the searching list

Double click on the data column to call information edit dialog box.

Channel Bus0 - ADDR		Value 0	Add
Data: 29 Ma	ximum of data i	: 31	Delete
Mode C Hex	@ De	c C Bin	Clear Al
Channel/Bus	Name	Data	_
	Name CH2		
CH2		Data	-
Channel/Bus DH2 Bus0	CH2	Data 0	OK

Double click on the data column to call information edit dialog box.

(1). BUS focus window



(2). Channel focus window

Data Edit	
0	•
OK	Cancel

#### 3. Jump to the next and previous information

#### Method 1:

Click the pattern of "previous" and "next" on the tool list to match to the correspondence information.



# Method 2:

Click the right mouse button on the "waveform window" or "state mode" to jump to the correspondence information by selecting "search" and then clicking "Search Next" or "Search Previous".

	<u>G</u> OTO	•		<u> </u>
	Search	×.	Search Setting	
:	<u>A</u> dvanced Tri	gger	Search Previous	:
	A <u>d</u> vanced Bu	s	Se <u>a</u> rch Next	

<u>G</u> OTO	•	-32.000nS
Search	•	Search Setting
<u>A</u> dvanced Trigger		S <u>e</u> arch Previous
A <u>d</u> vanced Bus		Se <u>a</u> rch Next
		-16.000n5
1 1		-12.000nS



# **3-9 Shortcut Flow Process**

- 1. Link the Logic Analyzer to computer.
- 2. Switch the Logic Analyzer to PC Link mode.
- 3. Perform Logic Analyzer PC software.
- 4. Select device.



5. Auto-search

Select auto-search key on the tool list.



"Auto-search" can detect automatically if it's possible to capture signals, Auto-scale sampling frequency and memory depth. The waveform can automatically appear if it's captured.

2 🖬 🖬 🕯	alitop Icol Help	E = 10 A	ର୍ ଭ୍ 💗	* * * *		M 🖑					
/aveform List		Memory Dept	Auto	_		0.001	Delay	50% / 50%			
2.546	-	(Per Channel)	. lanes	-		1		lone vone	-		
lus/Signal	Trigger Pattern	00	00ws	-10.000us	5.000.0	0.0	na l	.000us	10.000us	15.000ws	20.0
сно	×	10101									10
CH1	x	ماتفاتك									
CH2	×		0 1								
сна	×	1	0	1	0	1	10	1	0		0
CH4	x	0 :				0;					
CH5	×										
CHG	×										
CH7	x				1 :	1					

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6. Change the channel name

(1). Call the name setting dialog box by double click the name display zone.

- -

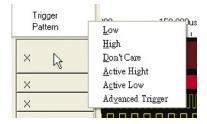
СНО	×
CH1 VS	X
CH2	Х
СНЗ	Х
CH4	Х
CH5	Х
CH6	Х
CH7	X

(2). All signals are named using dialog box.

Name
OHO
1 2 3 4 5 6 7 8 9 0 BKSP
Clear q w e r t y u i o p
Caps a s d f g h j k l Caps
Shift z x c v b n m . Shift
Space <>
<u>Q</u> K. <u>C</u> ancel

# 7. Trigger setting

(1). Call simple trigger options by double click "Trigger / Pattern" field.



(2). After completion of setting, the waveform is triggered according to the set trigger state.

Waveform List		Man	Death 1							50% / 50%	_		
DIV 2546		(Per l	by Depth Dhannel)	Auto			0.0us		Delay	50% / 50%	*		
Bus/Signal	Trigger Pattern	00.m	-15.000		-10.000us	 -5.000us		0.Dre		5.000us	10.00046	15.000us	20.000
CHO	Patien1 †	1.1											i li li
CH1	x	فالف											101
CH2	×	0:											0
CH)	×							1					0
CH4	x	01											
OIS	×												
CH6	×												: 0
047	x												0
		4					_						<b>)</b> -

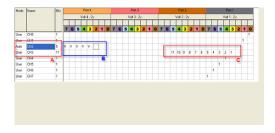
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# 8. Manial setting

(1). If auto-search is not used, the channel is set by pressing right button in the waveform display zone.

lus	-150.000us	-100.000us	50.000us	0.1	ns !	50.000us		100.000us		150.000us		200.0
							-					
					<u>G</u> OTO		۲. I					
					Search		•					
					Advanced	Trigger						
					110.0002.00	1112.0.1	- 12					
					Advanced	Bus						
							· .					
							_		_		_	

(2). BUS combination and Channel assignment are performed by means of dragging.



(3). Call the voltage setting dialog box by clicking left mouse button on the voltage display zone.

	Port 4									
	Volt 4 : 2v									
							1			
7	6	5	4	2	2	1	0			

(4). Set voltage in the dialog box.

Logic Level Setting
Set the setting to all ports
Settings
C Standar TTL (1.5v) 💌 🖪
Guser define     G
C
OK Cancel

(5). Switch to the trigger page by clicking the upper Trigger subpage.

	Advanc	e Setting	
	Adv Bu:	Adv Trigge	
1	Mode	Name	Bits

(6). Set advance trigger in the Trigger page.

	1	Pa	atten	n 1																											ſ	Conti	nuous
Pattern 1		_	1	Po	xt 4		_		-	_	Por	t3	_						Po	rt 2			_				Por	t 1	-	-		○ Of	
Pattern 2	7 ×	6	-	4	3 ×	2 ×	1 X	0 ×	7 ×	5 ×	<b>4</b> ×	3 ×	2 ×	1 X	0 X	7 ×	6 ×	5 ×	<b>4</b> ×	3 ×	2 ×	1 ×	0 X	7 ×	1000	5 ×	-	-	2 ×	1 ( ×>		C Or	
Pattern 3		Pa	atter		xt 4						Por	13							Po	nt 2							Por	11				Trig Co	unter times
Pattern OR	7 ×	6	5	4	3 ×	2 ×	1 ×	0	7 ×	5 ×	<b>4</b> ×	3 ×	2 ×	1 ×	0	7 ×	6	5	<b>4</b> ×	<mark>3</mark> ×	2	1 ×	0	7 ×	1000	5		-	2	1 ( ×>		<ul> <li>Trigg</li> <li>Int</li> </ul>	er Mod emal
Pulse Width							Port 2 Port 1								C Ex	ternal																	
A	7 ×	6		4	3 ×	2 ×	1 ×	0	7 ×	5 ×	<b>4</b> ×	<mark>3</mark> ×	<b>2</b> ×	1 ×	0	7 ×	6	5	<b>4</b> ×	3 ×	2	1 ×	0	7 ×		5 ×			<b>2</b> ×	1 ( × >			
					_																												

(7). Return to the waveform window, and capture the waveform by pressing dual-arrow on the upper tool list.



(8). After data capture, set trigger by repeating the above 6~7 steps.

/aveform List	ing T	Mer	oy Depth	Auto	•		0.0us	Delay	50% / 50%	•		
Bun/Signal	Trigger Pattern	me	150.000		-100.000us	-50.000		0nu	8.000us	100.000us	150.000us	2001
CH0	×											
CH1	×	1										
CH2	×	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1										
CH3	×	JUUU	JUUU	лл	າມາມາ	JUUU	www	່ານນານ	ມາມາມາ	JUUU	www	JUUL
CH4	x	010	1010	1011		10101	07070	10101	01010	10101	010101	010
CH5	×	1 0										
CHG	x											
CH7	×	0			0							) i

9. Return to waveform window, set the sampling frequency by clicking "DIV " pull-down menu on the tool list.

DIV	25uS	-
	25uS	~
	50uS	_
Bus/9	100uS	
Duore	250uS	1000
	500uS	
	1mS	
CHC	2.5mS	_
	5mS	~

10. Set the memory depth by clicking "Memory Depth" pull-down menu on the tool list.

Memory Depth (Per Channel)		Auto 💌	
(i or or i	(i or originitoly		^
	-150.00	2k	=
		4k 8k	
		16k	1000
	-	32k	×

11. Enter Delay value by click "Delay" key on the tool list.



Enter Delay value into the dialog box with Delay.

Delay				
۵	ns 💌			
Clear	KSP <	A		
7	8	9		
4	5	6		
1	2	3		
0				
<u>D</u> K <u>C</u> ancel				

# **Chapter 4 Calibration**

# Description

It's advisable to calibrate the instrument since an error between setting and import/export value exists due to certain factors after a period of time (often 1 year).

# 4-1 Calibration Mode

Calibration modes are described below:

- 1. The user shall apply for calibration and then send the instruments back to the factory; this company provides ex-factory calibration report.
- 2. Calibration is recommended if spare parts are to be replaced (calibration expense is listed in the maintenance cost statement).
- 3 The repair and calibration shall be performed by the warranty method within the warranty period.
- \* No auto-calibration by the user is currently unavailable.

# Chapter 5 Maintenance, Repair and Utilization

# Description

Maintenance and repair is divided into: maintenance by users and maintenance by factory.

# 5-1 Maintenance by Users

- 1. The users may maintain the devices without removing the instrument housing.
- 2. It's required to prevent penetration of water droplet or other liquid.
- Corrosive cleaning agent or solvents or those with poor chemical-resistance shall be avoided when rubbing the instrument.

# 5-2 Maintenance by Factory

The components shall be maintained or replaced by the manufacturer or distributor in either of the following cases:

- 1. Continuous operation cannot proceed in the presence of error message.
- The front, lateral and rear panels cannot be operated due to damage of components, and the housing must be removed when replacing spare parts.
- \* Warning: please send back the products with original packaging materials, or package carefully to avoid damage of products due to vibration, collision and falling.

# 5-3 Troubleshooting

- Description: please read carefully the operating instructions if certain problems or doubts are encountered when logic analyzer is employed.
- 2. Operating questions and countermeasures:
- Q1: Unable to execute the main application or can only use display mode. please check by the following procedures:
- Ans: 1. Check if the driver is installed successfully.
  - 2. Make sure that USB cable and PLA USB port are well connection.
  - Try anther USB device. If it OK, means the USB port is normal. If not OK, means the USB port maybe damaged.
  - 4. Try another USB cable.
- Q2: Why is the power indicator (red) highlighted after startup, but no on-screen display exists?
- Ans: 1. Make sure the each channel and DUT has been connected properly.
  - 2. Make sure the grounding cord of measurement channel is linked to the ground joint of the DUT correctly.
  - 3. Make sure that the setting of trigger level is fit to the signal level of the DUT.
  - 4. Make sure that the setting of trigger level is 4 times higher than the DUT.
  - 5. Make sure that the setting of the trigger is accurate. If the signal does not fit to the setting of trigger, please simplify the conditions of trigger or modify the condition.
  - 6. Make sure if the setting of trigger counter setting is too many times.
  - 7. If use external sampling signal to sampling, the counters of sampling maybe not enough. In this situation, please try to capture the internal sampling signal to verify it normal or not, if it shows normal, we can be sure the result of the above are correct.
  - \* If you still have problem, do not hesitate to contact to our customer service dept. Let us to help you to solve the problems.