# **Leaptronix**®

LA-100P User's Manul

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### Instructions on Warranty of Logic Analyzer

Leaptronix provides its manufactured and sold products with a one-year warranty on the parts and assembly dating from the delivery date. In event of a defect merging during the warranty period, Leaptronix will provide data for free and repair the products suffering from a defect; however, disposable data are beyond the warranty scope.

To share the service provided by this warranty, customers should, in the beginning of the warranty period, make Leaptronix it known to Leaptronix through following manners and conduct proper arrangement for the smooth realization of services:

- To fill in the product warranty with complete content and deliver it to Leaptronix through fax.
- (2) To inform personnel in Leaptronix's service center of the complete contents of various items in the product warranty through a telephone call.

In case of a occurrence of warranty event, a customer should be liable to pack the product suffering from a defect properly and to deliver it to a agent or distributor service center designated by Leaptronix, with freight born on him or herself. In case that the customer is in a country the same as the service center of Leaptronix, Leaptronix will be liable to pay the back freight of product. Otherwise, the customer needs to pay all freight, duty, tax and any other expense.

This warranty is not applied to defects, invalidation or damage caused by any improper use, and improper or insufficient maintenance and attention. During the warranty period, Leaptronix shall not provide services to customers under following circumstances:

- (1) Damages caused by personnel on behalf of Leaptronix during installation, repair or services
- (2) Damages caused by improper use or connection with incompatible equipment
- (3) Any damage or functional abnormality caused by a use of disposable data not provided by Leaptronix
- (4) Any amendment or combination with other products which results in the fact that difficulty or time of service-providing thereby rises

This warranty is provided by Leaptronix. Leaptronix shall bear any responsibility for any sale or resale bearing a specific purpose. Repairing or replacing products suffering from defects is a supplementary measure of Leaptronix to protect the rights and interests of customers during the warranty period. Leaptronix shall bear no any responsibility for any indirect, particular, accidental or consequential damage, no matter whether a pre-reminder is available or not.

# Instructions on Warranty on Consumptive Accessories of Logic Analyzer

Parts or subassemblies beyond the main machine itself and external box are all consumptive accessories and therefore are not in the warranty scope. It is necessary for a customer to check whether there is any defect of parts and subassemblies within 30 days dating from the purchase date and, if any abnormality, to deliver the product to an agent designated for marketing with the part or subassembly attached so as to replace it with a new one.

List of Consumptive Parts or Subassemblies

 8CH Data Pod (Including rainbow strand group) 8CH Lead Set





Test Probe







#### 1-1 Product Overview

Since its establishment in 1980, Leaptronix has been devoting itself to the record and measurement of IC, with the goal to provide manufactures with a perfect R & D environment and superior measuring instruments. Considering the measuring need of various products in digital era, our company has intensified the combination with various industries and established a measuring instrument business group (Leaptronix), providing digital system with the most important and basic instruments, i.e. the series products of logic analyzer. The LA-100P is one of the representative of products of the Test & Measurement.

The LA-100P is 32 channels, 250MHz timing, 100 state Logic Analyzer. It help minimize the risk by providing the most reliable, accurtate data captre and the most complete view of system behavior, These products are ideally suited for you on hardwae & software debug, parametric and mixed signal testing and complex debugging. Moreover, their compact size and ability to connect to a PC make it an ideal solution for use at remote sites.

### 1-2 Safety and Precautions

All operations, maintenance and repair services should be subject to following safety precautions; our company shall bear no responsibility to any unpredictable phenomenon resulting from an improper use of this instrument while failing to follow the precautions presented in this manual.

- 1. Please confirm advance to the use of power supply that a correct input AC voltage has been adopted and that a correct fuse has been installed. Specific standards and specifications are shown in the instructions of the product.
- 2. Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the mains power cord. You must not negate to protective action by using an extension card (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.
- 3. Only fuses with the required rated current, voltage, and specified type should be used.
- 4. Do not operate or use this product beside any flammable gas or fumes.
- 5. It is prohibited to use this product with its shell dismantled, or to adjust or replace internal parts so as to avoid improper motions of instrument and unnecessary dangers.



#### WARNING!

This sign means that attention should be paid to dangers may happen and that personal injuries will possibly happen in case that the operator fails to operate correctly or to follow the procedure. Under his circumstance, the operator should not continue with the operation with a exception that he or she indeed knows the operation procedure.



#### CAUTION!

The Caution sign demotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not corretly performed or adhered to, could result in damage to or destruction of part of the product. Do not proceed beyond a Caution symbol until the indicated conditions are fully understood or met.

### 1-3 Specifications and Characteristics of Product

]	Items	Specifications	
Time sequence and	alysis (frequency capture)	250MHz~25Hz(4ns~40ms)	
State analysis (ext	ernal clock)	100MHz~1Hz(10ns~1sec)	
Bandwidth		100MHz	
Channel		8CH x 4(0∼31)	
MEMORY	RAM Size	2M Bytes	
MEMORI	Storage Depth per Channel	512kbits x 32CH	
	Trigger Counter	1~255	
	Condition	Pattern / Edge / AND / OR	
	Channels	32CH	
	Pre/Post Trigger	YES	
TRIGGER	Trigger Levels	3 (Edge or Pattern)	
	Continue Trigger	YES	
	Trigger out	YES(TTL Level)	
	Pulse Width Trigger	YES	
	Bus Analysis	YES	
	Glitch Capture	YES	
m lub	Range	-4V~+4V	
Threshold Range	Acuracy	$\pm 50 \mathrm{mV}$	
Maximum Input V	Voltage	$\pm 30 \mathrm{V}$	
Impedance		$100 \mathrm{K}\Omega\mathrm{shunted}$ by $10\mathrm{pF}$	
	Operating	0°C~45°C(32°F~113°F)	
Temperature	Storage	-40°C∼75°C(-56°F∼167°F)	
Data Skew(Chann	el to Channel)	2ns typical, ±4ns MAX	
Interface		USB 2.0	
D	Power Source	AC:90~240V,50~60Hz	
Power	Fuse	AC 250V/2.0A	
D. D	Normal consumed power	18.0W	
Power Dissipation	Max Power Dissipation	20.0W	
D: .	(Length x Width x Height)	31cm x 9cm x 15cm	
Dimension	Weight	3.8kg	

# **Leaptronix**®

# **Chapter One: Product Instructions**

### 1-4 Standard Accessories of LA Series Products

NO	Title of Accessories	Qty	Remark
01	Main Unit	1	
02	Data Pod	4sets (32CH)	Including rainbow strand group
03	Lead Set	4sets (32CH)	
04	Test Probe	l package	36 pieces
05	CD	1	Including,line, connecting software, drive program, manual
06	USB 2.0 Cable	1	
07	Warranty Card	1	
08	Packaging Confirmation Form	1	List out the packing subassemblies of product
09	User's manual	1	
10	AC power cord	1	Three-wire type
11	Chinese Operation Edition	1	

### 1-5 Selection of Accessories

- 8CH Data Pod (Including rainbow strand group)
- 8CH Lead Set





• Test Probe

USB A to B Cable





### 2-1 Inspection Advance to Installation

- Although the instruments has undergone a precise test and
  inspection ahead of the delivery, customers are also expected,
  after unfolding the box, to confirm whether there is any
  abnormality advance to use so as to confirm whether there is any
  damage occurring during the delivery. After that, the product can
  be used if no problem found.
- 2. Customers should, based on the accessory tables of various machine types, check whether the items and quantity of accessories in the package are correct and complete and, if not, present the problem to our company or our local distributor immediately for a disposal.

#### 2-2 Places for Placement and Use

- This instrument is formed a circulatory heat elimination system through the fans and air holes on shell. Therefore, it should be placed at a ventilated place. In addition, it is prohibited to block the circulatory heat elimination holes.
- 2. Environmental temperature for operations and use: 0  $^{\circ}\text{C}\!\sim\!45^{\circ}\text{C}$
- 3. During the operations of this product, there may be an electromagnetic field occurring and instruments placed near it will possibly affect one another during operations. In case of the latter phenomenon, please keep a distance between this instrument and any other instrument larger than 10cm. It is also required to use it at a place far away from any high magnetic field or interference.

### 2-3 Specifications of Input Power Supply

- Advance to connecting AC power supply, please confirm the adopted AC power supply meets the specifications of the input voltage accepted by this instrument. The input voltage of instrument is shown in the literal instructions on the backboard.
- 2. Specifications of the input voltage can be used by this instrument are AC  $90{\sim}240V$ , 50/60Hz.

Caution: Please confirm whether the input voltage adopted by this instrument is in line with its specifications of voltage first.

### 2-4 Use of Standby Fuse

In case of a need of the standby fuse, please confirm the specifications of fuse first:

- Specifications of the adopted fuse should be 220V/2Amp.
- The product has already been enclosed with a standard fuse in the fuse base.

Caution: Buying a new fuse to replace the original one should follow the standard specifications, or it may lead to the damage of instrument.

#### 2-5 Connection of LA System

#### 2-5-1 Connecting Sequence of LA System

(1)LA main unit →(2)Data Pod(Including rainbow strand group)

Connecting Relation of system is as bellow:



- \*\*Caution: Please do not place the Lead Set on the port the LA main unit directly to avoid the damage of the LA.
- \*\*In event of any fracture or damage, it is necessary to send the product to the manufacturer for a repair or replacement.



### 2-5 Connection of LA System

#### 2-5-2 Instructions on Subassemblies

• Data Pod (including high-density rainbow cable)



 Connect the Data Pod to the LA main unit.

#### Lead Set

The Single-pin of the signal and graound leads can be connected directly to the target system.



Connector plugs into the socket of data pod.

- \*\*In event of any fracture or damage, it is necessary to send the product to the manufacturer for a repair or replacement.

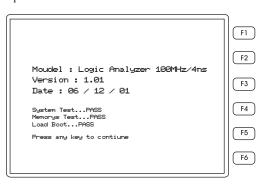


#### 2-6 Self-Test

- It is required to insert one terminal of power line on AC-in position at left side of LA and another terminal on the AC power socket.
- Pressing down "1" on the AC power switch to switch from "0" to "1".
- switch to switch from "0" to "1".

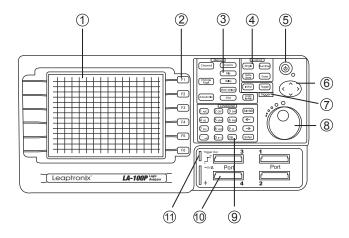
  3. And then pressing down the orange-yellow power switch on the upper part of front panel

of LA, and then the product will be under on state; the red LED indicator light will lighten; buzzer will give a sound lasting for one minute; LA will undergo a self-test of system. Finally, it will enter into the initialization frame shown as bellow, indicating the completion of on-state test.



4. While shutting down the machine, press down the power switch for 2-3s and then loosen it, and the system will shut down after storing the data.

### 3-1 Instructions on Front Panel





### 3-1 Instructions on Front Panel

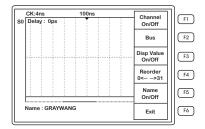
NO.	Item	Function Description	
1	Display Function	It is a system display zone, displaying wave form, information and functions.	
2	Hot keys F1∼F6	They are detailed hot keys of system and their adjustment should be made through the connection with primary function-control keys on the panel.	
3	Menus	Such keys include Channel, Change Page, Auto-Scale, Cursors, File, Utility, Main delays, Grid and Logic levels.	
4	Capture	Such keys include three capture manner hot keys (Single, Auto-store and Run/Stop) and wave form erase hot key.	
(5)	Power-control key	It is the key acting as a power switch.	
6	Direction key	It is used to control the wave form through left-right move, zooming up & down, and to set Sample Rate.	
7	Trigger key	It is used to choose between Int/Ext Clock and setup of Triggering state.	
8	Rotary Encoder	It can be used to make left-right and bottom-top motions of various items.	
9	Character key	It is used to realize figure input and literal editing functions.	
10	Signal input port	It can provide 4 sets of signal input ports.	
(1)	Trigger Out	It can send out a " (rising) signal" to provide to another set machine. It can be adopted during a synchronous action.	



#### 3-1 Instructions on Front Panel

#### 3-1-1 Instructions on Menus (Project) Control Key

1. Channel Setup key: in event of a need to set a channel, pressing down the channel key. There are 6 functional boxes at right side of LCD which can be used in correspondence with hot keys  $F1 \sim F6$ . Functions of these hot keys are as follows:



- F1 Channel on/off: to set the on or off state of various channels.
- F2 Bus: to set bus.
- F3 Display of numerical value: to display numerical values on wave forms. Such item can be set as on or off state.
- F4 In order of precedence 0~31: to conduct the order and display various channels and their names (CH0~CH31)
- F5 Name on/off: to switch between the display state and non-display state of channel names. When it is on, such names will be displayed completely; when it is off, no even one such name can be displayed. As shown in above diagram, motion state is on and "On" is in red.
- F6 Exit: to set functions for the exit channel.



#### 3-1 Instructions on Front Panel

#### 3-1-1 Instructions on Menus (Project) Control Key

- 2. Change Page It is a key to switch page.
  - a. In case that the quantity of channels or bus displayed on the screen is bigger than 16, pressing down this key will switch to the second page, that is, to display signals beyond these 16 channels; if pressing down again, will switch back to the original.
  - b. If use together with the "Utility", can also realize the switch of functional frame.
  - c. If use together with "Trigger", can also realize the switch of functional frame.
- 3. Auto-scole Automatic adjustment key: it is for automatic search function, search for the capture signal wave forms under existing state and, after the search, give out a "bi" sound and automatically display on LCD. This needs 3-5 second to show the results.
- 4. Cursors It is a key to realize setup of cursor. Pressing this key can display cursor T (there are 7 vertical cursors, i.e. A-F) and display the time interval among various groups, i.e A∼B,A∼T, B∼T C∼D,C∼T,D∼T,E∼F,E∼T,F∼T, shown with a unit of ns/us/ms.
- ※ Press key "A → B" in cooperation, and it will display that B is a full line, which indicates that B is under the enable state; "←" and "→"can move cursor B and change the time interval between B ~ A and B ~ T; pressing it for another time, and it will display cursor C and C is under a intelligent state; "←" and "→" can move cursor C and change the time interval between C ~ D and C ~ T.
- \*\* Press key "<" to make cursor T to be enable the axis and the fame to face left; while press ">", and the frame will go to right; pressing "Λ" and "V" will make the frame wave form switch to a zooming-in and zooming-out state respectively.
- \*\*Pressing the cursor-setup key can return to T cursor frame. At this time, it can be used together with the our direction keys to make the switch among left, right, zooming-in and zooming-out.



#### 3-1 Instructions on Front Panel

#### 3-1-1 Instructions on Menus (Project) Control Key

- File It is a file-setup key.
   After pressing down this key, F1~F4 can be used as hot functions for file management.
- F1 Load Setting: It possesses 5 space items for choice. The precondition is that there must be system setup data stored, only under this circumstance, setup can be read and used.
- F2 Save Setting: there are 5 space items can be used to store the system setup data.
- F3 Load Waveform: there are 5 space items can be used to read the stored system setup and signal wave form data.
- F4 Save Waveform: there are 5 space items can be used to store system setup data and those capture signal wave form data.
- F6 It is used to return to the primary frame.



#### 3-1 Instructions on Front Panel

#### 3-1-1 Instructions on Menus (Project) Control Key

6. Utility General Key:

Press this key to use its functions according to F1, F2, F3, F4, and F5 functions.

- a. Brightness: it can be used to adjust the brightness of LCD; there are two manners to adjust such brightness, i.e. "++" and "--".

b.Display Mode Waveform: it can set the screen display in a wave form or in literal. (If used together with "Change Page", it can also be used to switch page.

- F2 B/W (black or white color of LCD background): it is used to set the color of LCD.
- F3 PC-Link: it can be applied to send the capture signal wave form to PC via USB2.0 interface for magnification, observation and printing. Please refer to Chapter Five for the details of computer link.
- F4 RAM Size: it can be used with rotary encodor to adjust the volume of memory.
- F5 Language (setup of interface language): it can be applied to select the language used in the operating interface.
- F6 It can realize the function to return to the primary frame.



#### 3-1 Instructions on Front Panel

#### 3-1-1 Instructions on Menus (Project) Control Key

- 7. (Main delays) It is a key for setup of proportion of memory. After entering into the frame, there are three options in all can be used, i.e. F1: 10%, F2: 50% and F3:90%. Let's take F2: 50% for example, it means to take trigger center as the axis and "T" axis as a reference, the baseline will display at a 50% position on LCD frame. Rotary encoder can realize the adjustment of different proportions.
- 8. Gold It is a key used to switch the on or off state of the grid. Pressing down this key can control the vertical scale of broken line of time axis on LCD.
- 9. Logic loyels It is a key for logical comparison level key. Pressing down this key can cooperate with hot keys F1 $\sim$ F3 to set and change logical comparison level key. System preset value are: TTL: 1.5V CMOS: 2.5V ECL: -1.3V
- \*\* After pressing down this key and selecting one option among F1, F2 and F3, the value of logical comparison level will display on the lower part of LCD frame.
- \*\*The level values can be adjusted and set through the rotary encoder or "V" and "  $\Lambda$  "key.
- \*\*After the setup, system will merely use a single logical compilations level to act as the high or low reference value.
- \*The adjustable scope of system is  $-4.0V \sim +4.0V$ .

### 3-1 Instructions on Front Panel

#### 3-1-2 Instructions on Control Keys for Sampling:

- 1. Single It is a single-click trigger key:
- It is applied to the capture and display of a single signal. LCD will display a "Pat" mark on the upper part of LCD. The signal capture will stop immediately once realized.
- 2. (Auto-store) It is an auto-store key:

It is used to display the test results in an overlapping manner, reserving the test results of each time on the screen. At this time, the upper part of LCD will show continuously reverse "Pat" mark.

- \* Pressing Run/Stop can make this function invalid.
- 3. Run/Stop It is a start/halt key.

It is used to control the start or halt of trigger. The switch actions will display on the upper part of LCD. In case that there is capture data meet the trigger condition, there will be a "Pat" mark with its white part twinkling. If there is no such mark, it means that external signal is different from the trigger mode set by the user. "Stop" means halt.

- \*\* Pressing Run/Stop will trigger the signal, updating and displaying the signal wave form capture in the latest time. Such data will be immediately displayed on LCD after the capture of each time. It can continue with the capture of signal wave form.
- \*\* Pressing RUNJSTOP for another time will stop the signal capture. After that, LCD will display the signals capture in the last time.
- 4. Erose It is a clear key.
  - a. It can clear the automatically saved overlapping frames. In general, this is a function in cooperation with the auto-store key.
  - b. Under the functional list of Trigger, pressing such key which can set the trigger condition for all channels to be "Don't Care".



### 3-1 Instructions on Front Panel

### 3-1-3 Instructions on Control Keys for Trigger

It is an internal/external clock key.

It can be used to switch between internal and external modes.

- F1 Internal mode: it is triggered by the internal clock signal of LA, i.e. asynchronous trigger mode or time mode.
- F2 External mode: it is triggered by the external clock signal of LA, i.e. the synchronous trigger mode or state mode.

<sup>\*</sup>The selected mode will make the characters in blue.

#### 3-1 Instructions on Front Panel



2. (Trigger) It is the trigger key.

After pressing down this key, F1 $\sim$ F5 stand for the trigger manners which can be selected.

- F1 a. Continuous on/off: it is used to set the multi-level trigger condition to be continuous or non-continuous.
  - b. Trigger times: it is used to set which times of the trigger. (Can be switchable by using  $\binom{\mathsf{Chonge}}{\mathsf{Poge}}$ ).
- F2 a.Pat 1: it means to select the single-level trigger condition (Can be switchable by using (Change )).
  - b. Pulse wave width: it is used to set the trigger condition of pulse wave width by making use of ">", "=" and "<".</p>
- F3 Pat 2: it means to select the two-level trigger condition.
- F4 Pat 3: it means to select the three-level trigger condition.
- F5 OR Pat: it means to execute the trigger condition of "OR".

**\***Setting for trigger condition:

- F1: L (Low) F2: H (High) F3: X (Don't Care)
- F4: F5: F6:Back (Active High rising) (Active Low falling)
- \* Use the rotary encoder to move the red cursor to the various channels.
- Then, pressing keys F1∼F5 for seting the trigger state of this channel.
- \*\* Each channel can be displayed on screen for setup or amendment. Those channels beyond consideration can be set as "Don't Care" or to not display on the LCD screen. To quit this setup, just press F6.



#### 3-1 Instructions on Front Panel

### 3-1-4 Alphabet & Number Keys

Alphabet & Number Keys



- 1. Numerical keys: there are ten figures, i.e. 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The English letters and other symbols contained by these numerical keys can be showed by pressing this key.
- 2. (DEL) : it can be used to cancel characters.
- 3.  $(A \longleftrightarrow B)$ : it used to switch among cursors A-F.
- 4. is used to make the cursor right forward, is used to make the cursor left forward.
- 5. Enter: it is an input key.



### 3-1 Instructions on Front Panel

#### 3-1-5 Special Hot Keys:



Is a key for selection of directions including upward, downward, leftward and rightward.

- 1. Pressing "  $\Lambda$  " and " V " can realize the magnification, zooming-down, logical level, trigger level and Sample Rate selection of wave form.
- Pressing "<" and ">" can make the wave form to be observed from forward and backward directions. Under the trigger, the key can move the level.



Is a rotary encoder. It has functions as bellow:

- To select the channel which you would like to display or to set title.
- 2. To select the channel which you would like to set trigger condition.
- 3. To set the logic level value.
- 4. To set the storage proportion of memory data.

#### Hot keys: F1~F6









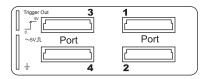


- 1. They are used to relate to F1 $^{\sim}$ F6 functions during setup of Channel/File/Utility/Main delays/Logic levels/INT/EXT/Trigger.
- F1~F6 can be subject to the functional instructions display on the right side of LCD screen by the system at the right time.

### 3-1 Instructions on Front Panel

#### 3-1-6 Trigger Out Port:

1. Port1~4: there are 4 sets of



Port 1 stands for CH0~CH7.

Port 2 stands for CH8~CH15.

Port 3 stands for CH16~CH23.

Port 4 stands for CH24~CH31.

Each port will use one set of data pod and one Lead set of 10-signal capture lead (including GNDx2).

2. Base square-wave Clock:



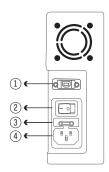
LA-100P provides one set of 5v square-wave Clock for the calibration and self-measurement of each channel. During the operation, the base square-wave of a channel can be displayed on the screen via contacting the Probe Lead or hook.

### 3. Trigger Out:

When the LA is triggered, it will send out a "  $\int$  " (rising) signal to provide to another instrument for synchronous motions.



### 3-2 Instructions on Side Interface



- 1. It is a USB2.0 interface for use of PC-Link.
- 2. It is a switch for AC input power supply ("0" and "1" stands for OFF and ON respectively). The power switch on the front panel can be valid only when this AC power switch is under an ON state.
- 3. It is an AC fuse base.
- 4. It is a three-plug socket for AC power line.



### 3-3 Instructions on Rear Panel

Diagram for Rear Panel:



- 1. Instructions on cautions
- 2. Instructions on Product Title and S/N
- 3. Safety regulations



### 4-1 Quick Operation Guide

Flow Chart for quick Operations of LA-100P

check model, appearance and accessories of

instrument

**\** 

confirm whether the specification of input power supply adopted and that of the instrument is coincident.



Turn-on of power supply and completion of self-test



Instructions on Quick Operations of LA-100P

- Check whether the instrument is correct or normal.
  - a.Check whether the model of instrument is correct and whether its accessories are complete.
  - b.Check the appearance of instrument is normal.
- 2.Confirm the specifications of input power supply of instrument.
  - a.Confirm that the specifications of power supply adopted by the instrument and that of the external AC input power supply must be coincident.
  - b.Insert the AC power line enclosed with the product.
- 3.Self -Test of power on
  - a.Turn on the switch on the panel at left side of instrument from "0" to "1".
  - b.Press down the power button on the upper right on front panel of instrument. When power on, there is a "bi" given by the buzzer and the power indictor light will lighten.
  - c.The system will undergo a self-test lasting for several seconds and then go to the operation frame.



### 4-1 Quick Operation Guide

Flow Chart for quick Operations of LA-100P Instructions on Quick Operations of LA-100P



(0~32) Set the quantity (0~32) and names of CH to use



Setup of Level to Use



- 4.Set the quantity and names of CH to use
  - a.After pressing "Channel", the quantity, on/off state and names of various channels can be set according to pages F1~F5.
  - b.Adjust the cursor to the functional position via the rotary encoder.
  - c.Set various conditions according to the actual application demands.
  - d.Press F6 to exit the CH setup.

### 5.Setup of Level:

- a.Press the key "Logic Levels" to set the type and value of level according to the functions provided by F1~F3.
- b.Select TTL, CMOS or ECL first and then adjust the level value through rotary encoder.
- c.Press F6 to exit the setup.



### 4-1 Quick Operation Guide

Flow Chart for quick Operations of LA-100P



Set the trigger state of each CH (Trigger State)



Execute the trigger and complete the signal contraction, OK

Instructions on Quick Operations of LA-100P

- Set the trigger state of each CH
  - a.Press "Trigger" to enter into the setup of trigger state.
  - b.Move to various channel through rotary encoder. The red position is the place for channel setup.
  - c.And then select one among the Low, High, X and "\\_" "\_" according
  - d.Press F6 to exit the setup.
- 7. Execute the trigger and complete the signal capture.
  - a.Power on the DUT and then press down "RUN/Stop" to capture the trigger signal in need.
  - b.Or to press "Single" to capture the single trigger signal and then stop.



### 4-2 Turn on the System Power Supply

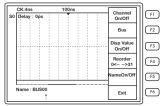
- Confirm that the specification of AC power supply adopted is coincident with that specification concerning input of the instrument.
- 2. Pull the AC power switch on left side of LA from "0" to "1" so as to start up the AC power supply.
- After pressing down the power switch on the upper right of front panel of LA, the red LED light will lighten, buzzer will give a sound sounding like "bi" and LCD screen will display characters such as self-test.
- 4.After the completion of self-test of system, LCD will, at its lower part, display information of "

Press any key to continue . . . ".

Then, enter into the operator interface by pressing any key (except for the power switch), or enter into the interface automatically after 8 seconds.

### 4-3 Setup the Channel Quantity and Titles

1. Pressing Channel can login into the channel-setting page as bellow: To select the channel which you would like to amended by using the rotary encoder first.



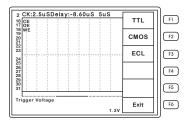
It is used to set or change the channel names. At the LCD lower left side shown: Name : BUS00

Instruction: 1. BUS00 under "Name" refers to the name of CHO.

- 2." ↑ " is the place where the channel name should be input. After changing it, the surplus characters can be deleted by pressing "DEL" directly. The channel name can include 8 letters at most and can be a combination of English letters and figures.
- After pressing (Enter), CHO can change the name and switch the channel via rotary encoder.
- 4. Pressing F6 can quit out this setup.
  - F1 :It is used to display or not display this channel. Rotate the rotary encoder to set the selected channel and then press down F1.
  - F2 : It can provide 16 sets of bus display. Each set of bus can bear 2-16 channels.
  - F3 :It is used to set the numerical values, ON means to display and OFF means not to display.
  - F4 :It is used to display channels on the screen in a CH0 $\sim$ CH31 sequence.
  - F5 :It is used to select the display or non-display state of switch key of this channel. When "On" is in red, it means to dispaly names of various channels; when OFF is in red, it means not to display such names.
  - F6 :Pressing it can quit out this page.

### 4-4 Adjusting the level of Channels

1. Pressing Logic levels will login into the page fore setup of logic level as bellow:



 This state corresponds to three hot keys with a function of adjustment, i.e. F1, F2 and F3.

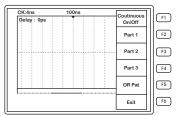
Pressing [f] means that the logic level is TTL with a preset value of 1.5v. Under this circumstance, the voltage values can be adjusted and changed through the rotary encoder or "\" or "\" according to the voltage of signal which would like to capture.

- After an adjustment, press F6 to exit and save the original set value. When pressing "Logic Levels" key again, it will dispaly the previously set mode and value.
- Pressing F1~F3 again will restore the original standard system set value and enter into a state under which level can be adjusted through rotary encoder. After a user has finished the adjustment of "logic level", modes and set values of all channels will be the same.



### 4-5 Setting the Trigger State of Channels

1.Pressing Trigger will login into the page for setup of trigger state of channels as bellow:



2.Options for trigger states will be displayed at the right side of LCD.

F1: a. continuous (on)/non-continuous (off) b. trigger times

F2: a. level one, b. pulse width

F3: level two

F4: level three

F5: OR level

F6: exit

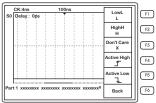
3. After entering into the second page by pressing Proge, pressing F1 can, in cooperative use of rotary encoder or numeric keyboard, set the which times the trigger to be happen.

4.After entering into the second page through pressing Change hope , the trigger condition of pulse wave width can be set by ">", "=" and "<" after pressing F2 (setting manner is shown in 6-2-b of Chapter Six).



### 4-5 Setting the Trigger State of Channels

5. After entering into level one by pressing F2 on the first page, the present state of each channel will be displayed at the lower part of LCD.



Pat 1 xxxxxxxx xxxxxxxx xxxxxxx xxxxxxxx

\*Initial state is "Don't Care".

6.Move the cursor to the channel position through rotary encoder, and the "x" at the lower part of LCD refers to the position of set value for such channel.

Pressing F1 can change the set value of such channel to be L, that is, to set the trigger at a low level.

Pressing F2 can change the set value of such channel to be H, that is, to set the trigger at a high level.

Pressing [F3] can change the set value of such channel to be "Don't care", that is, to set it to be under a state of ignorance.

Pressing (F4) can change the set value of such channel to be "(T4)", that is, to set it under a state in which it will be triggered when switching from a low level to a high level.

Pressing [F5] can change the set value of such channel to be "\\_", that is, set it under a state in which it will be triggered when switching from a high level to a low level.

7. And then make the cursor to CH1 through rotary encoder. Pressing will change the set value of CH1 to H.

Pat 1 xxxxxxxx xxxxxxxx xxxxxxx xxxxxxHL

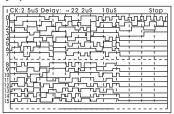
8. Pressing F6 will quit out the setup.

\*In the 32 channels, only can set one set of Edge Trigger condition.

\*\*In a need to cancel all of the trigger conditions, just press Trigger and then Frase

### 4-6 Executing Trigger Signal Capture

- After the completion of the whole setup, use the probe hook which connecting with the data pod to hook the DUT.
- 2. Power on the DUT, the LA will start capturing the triggered signal wave form.
- There are three different manners to capture the triggered signal wave form and they can be selected according to actual demand.
- 4.Manner one: Pressing Single means to capture the signal triggered in a single time and the capture will stop after that, with wave form displayed on the LCD screen.



\*\*When executing and stopping the capture, the upper right of LCD will display "Run" and "Stop" respectively.

Manner two: after pressing Run/Stop , the upper right of LCD will show "Run" and the first signal wave form the capture will display on the LCD; the capture second one will replace the first one. Pressing it again will stop the signal capture and LCD screen will display the signal wave form capture in the last time.

Manner three: after pressing Auto-Store , the upper right of LCD will show "Run"; the signal wave form will be automatically capture and displayed on LCD. At this time, the capture signal wave form will be reserved and displayed on LCD screen in an overlapping manner.

Pressing Run/Stop can stop this signal capture state.

Pressing \_\_\_\_\_ can clear the saved signal wave forms which overlapped on LCD automatically. This key is used to cooperate the automatic saving.



### 4-7 Observing the Wave Form of Capture Signal

After captureing the trigger signals through any one of the above three manners, the observation can be done according to the actual demands to check the signal forms of various channels.

Switch of display pages can be realized by pressing Change Page

- LA-100P can use and display 32 CH; while one LCD screen can display 16 CH. The observed page can be changed to Pagel or Page2 though the page-switch key.
- 2. Contents displayed on Page1 and Page2 are CH0~CH15 which is the preset value and CH16~CH31 respectively.

### Zooming-in, zooming-out and T Cursor Replacement of Wave Form:

- 1. Pressing  $\wedge$  above " $\Lambda$ "can zoom in the wave form on LCD screen
- Pressing "V" below can zoom out the wave form on LCD screen.
- 3.Pressing " < "at left side of < can move the T cursor to left; in event of a fixed sampling rate, then the recruitment of replacement a delay of each time should be subject to the times of zoom-in or zoom-out.
- 4. Pressing ">" at the right side of > can move the T cursor to right; in event of a fixed sampling rate, then the data of replacement delay of each time should be subject to the times of zoom-in or zoom-out.

#### Time Calculation of Cursors A~F and T Cursor:

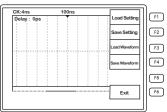
- Pressing Cursors A~F and T Cursor will emerge on the LCD page at the same time.
- 2.Pressing (A←B) can switch among cursors A∼F and the selected one will be a solid line. "→" and "←" can be used to move cursor to the initial and ending position of the wave form to be calculated, and the lower part of the wave form will display the time difference between the two cursors.



### 4-8 Save and Load of Wave Form

#### Save of Wave Form

 Pressing the "File" to enter into the frame for setup of save and load functions of wave form data as bellow:



- F1: Load Setting F2: Save Setting F3: Load Wave form F4: Save Wave form F6: exit
- 2.Pressing F4 can login into the frame for saving of wave form.

  There are 5 groups for saving wave form data. Press F1 to save such data on the position by F1.
- 3. Pressing F6 will return.
- 4. Pressing F3 can login into the frame for seting loading the wave form. There are 5 groups of data for downloading.

  Pressing F1 at this time can download the wave form data of F1 and pressing F6 for another two times can return to the wave form observing frame.



### 4-8 Save and Load of Wave Form

System Set Save



As shown in above diagram:

- 1.Pressing F2 can login into the frame for seting the save function.

  There are 5 groups can be used for system data saving. Pressing F1 means to save such data to the position designated by F1.
- 2.Pressing F6 can return.
- 3.Pressing F1 can login into the frame for seting the load function.

  There are 5 groups can be used for sytem seting the data downloading.

  Pressing F1 can download the system setup data of F1 and pressing it for another two times can return to the wave form observing frame.
- 4.Pressing F6 twice can return to wavefrom windows.



## 4-9 Power off LA System

- 1. Under the power on state, in order to shut down LA, just press down
- 2. Will emerge at the lower part of LCD screen after that.
  Save Boot Wait....
  The LA will be shot down after 3-4s after the system save the data.
- 3.Shut down AC power supply or pull put AC power line. In case that the instrument will not be used for a long term, it is necessary to close the AC Power switch at left side of LA by switching from "1" to "0".

### 5-1 Installation of PC-LINK

- Adoption of PC- Link is to send the capture signal wave forms on LA to a PC for saveing, observation, search and print.
- USB 2.0 is adopted by LA. The LA USB driver needs to be installed.
- 3. To install the PC-Link application software which enclosed with LA-100P (or downloaded from the website of Leaptronix) to a PC. The first thing to do is to decompress the program. After that, there will emerge the install button. Clicking this button and following what shown on the PC page can finish the installation. 4. After the completion of installation, there is a LA icon shown on the screen.

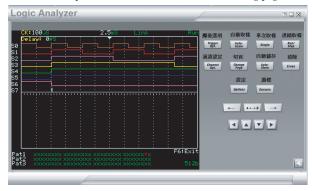
### 5-2 Operations of PC-LINK

- 1.In case that the LA-100P has capture the triggered signal wave forms, such signal wave forms can be uploaded to PC through a USB 2.0 interface for observation.
- 2.After pressing on the LA main unit, LCD will display F1~F5.
  - Selecting F3, the PC Link function and pressing it down. The LA-100P has prepared for the transmission of wave form data.
- Clicking icon of on the PC, get into the following page.



### 5-2 Operations of PC-LINK

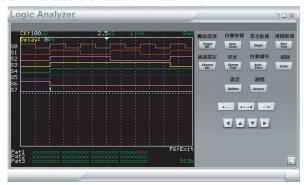
- 5-2-1 Uploading the Signal Data of the LA Main unit into PC
- 1. After logging into the operating system, click "Start/Stop".
- 2. After detecting the hardware of LA, PC will download the signal wave form capture motions of LA shown the following page:



If the PC shows signal wave forms, it means the uploading has been finished.

### 5-3 Observing Signal Wave Form

#### 5-3-1 Instructions for Wave Form Data



1. List the signal wave by 8 channels on the upper part of page.

"Scale =2.5ms" means that the time of each grid on the page is 2.5s.

"Sample Rate=100us" means that capture the singal each time on every 100us.

"RAM Size=512 bits" means that the memory size of each channel is 512 bits.

"Pat1" refers to the trigger condition for level one.

"Pat2" refers to the trigger condition for level two.

"Pat3" refers to the trigger condition for level three.

### 5-3-2 Quantity and Names of Channels

The page shows that current channel quantity is  $24 \sim 31$  and corresponding channel names are CH24~CH31.



means the title of CH24' is CH24.

### 5-3 Observing Signal Wave Form

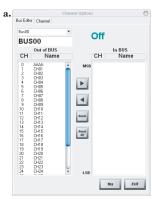
#### 5-3-3 Instructions on Setup and Observation of Wave Form Functions



- It used to zoom in the wave form on the page and to increasing the scanning frequency of instrument.
  - It is used to zoom out the wave form on the page and to decreasing the scanning frequency of instrument.
- It is used to leftward the wave forms on the page.
- :It is used to rightward the wave forms on the page.



it is a channel function key. You can click to set the bus and channels. The functions are as the following figure:

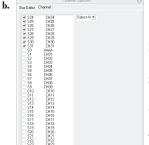


Procedure of set Bus.

- 1.To select Bus.
- 2.To select Bus (Bus00∼ Bus15) in the pulldown menu.
- 3.To select the channels in a sequence from MSB to LSB and add channels by pressing
- 4.Pressing to remove channels.
- 5.Pressing "YES" to finish the setup.
- Pressing Exit to quit out the setup.

### 5-3 Observing Signal Wave Form

#### 5-3-3 Instructions on Hot Keys for Setup and Observation of Wave Forms



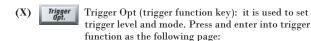
Procedure of Channel Setup

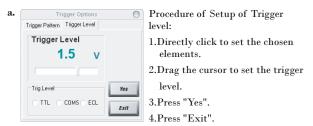
- 1.To select channel.
- Click the box ahead of channel which you would like to display.
- Pull-down menu is able to display or delete all the passages.
- 4.Pressing "YES" to exit.
- (III) Auto-Scale: it means to search the channels possessing signals and display them on screen automatically.
- (IV) Auto-Store: it means to save all of the test results on the screen.
- (V) Erase (deletion key): it means to erase the test results on the screen. This key is to be used with the automatic adjustment function.
- (VI) Change Page (page switch key): it is used to switch the display page.
- (VII) Single Single: it refers to single-time signal capture.
- (VIII) Run/Stop: it means to continue or stop the signal capture.
- (IX) Print: it means to print the test results.

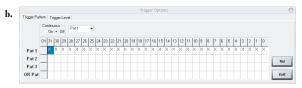


### 5-3 Observing Signal Wave Form

#### 5-3-3 Instructions on Hot Keys for Setup and Observation of Wave Forms







### Procedure for Setup of Trigger Mode

- 1. To set continuous trigger on/off.
- 2. To select the level quantity through pulldown menu.
- 3. Click the frame of Pat to set the trigger mode.
- 4. Press "Yes" key.
- 5. Press "Exit" key.

### 5-3 Observing Signal Wave Form

#### 5-3-3 Instructions on Hot Keys for Setup and Observation of Wave Forms





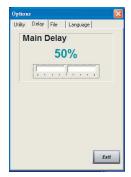
Procedure of Setup of File Save 1.Save Setting Save the parameters set by the user (including Clock, memory volume, channel and trigger) into PC.

- 2. Load Setting Call the parameters saved in PC and download them to LA-100P.
- 3. Save Image
  Save the current test results of
  the wave to the PC in a bmp
  format.
- 4. Load Image
  Call the wave form results saved
  in PC. However such results can
  not be downloaded to LA-100P.

### 5-3 Observing Signal Wave Form

#### 5-3-3 Instructions on Hot Keys for Setup and Observation of Wave Forms

b.



Procedure of Delay Setup:

- 1. Click delay button.
- 2.Set the delay value by dragging the cursor.
- 3.Press "Exit"







Procedure of Setup the Memory Volume

- 1.Click universal button.
- 2.Set the value of memory volume by dragging the cursor.
- 3.Press "Exit"

## Language Setup

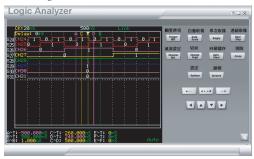
Language can be selected among English, classified Chinese and simplified Chinese.

### 5-3 Observing Signal Wave Form

#### 5-3-3 Instructions on Hot Keys for Setup and Observation of Wave Forms

(IIX) Cursor Setup Key

After click the "cursor", there will be 6 pieces of cursor lines emerging and the lower part of wave form will display the time difference among these cursors.



- 1.  $A \longleftrightarrow B$ : it means to switch the cursors (solid lines) to move in the sequence of  $A \to B \to C \to D \to E \to F \to A$ .
- 2. : it means to make solid-line cursors move to left side.
- 3. : it means to make solid-line cursors move to right side.

### 5-4 Exit Operations:

- 1. Click "x" button on the upper right of software.
- 2. Click F6 (Exit) on LA-100P to exit PC-LINK.
- 3. Make the software return to Windows operating system.

### 6-1 Capture of Simple Data

In case that you would like to observe the signals for DUT, but no idea about the logic level and trigger manner. Please just connect the LA. The signals will show on the LCD quickly. Operating steps are as bellow:

- 1. Connect the probe hook with the DUT signals.
- Press key Auto-Scale.

The LA can set the sampling frequency, logic level and trigger condition automatically. No matter how many channels, Auto-Scale function will automatically set each channel and display the measuring results with an optimum display manner.

### 6-2 Capture of Specific Events

- a.In case of a need to observe the specific events, you can use the function of set trigger condition. For example, to capture the continuous data 00, 01, 02 of counting register on 8 bits. The procedure is as follows.
  - 1. Press down the key of "Logic Levels" to set a logic level.
  - 2. Press down the key "Trigger".
  - 3. Press F1 to set on.
  - 4. Press down F4 to set three-level trigger condition.

  - 6.Press "V" to make the red cursor downward move to the level two.

  - $8. \mathrm{Press}$  " V " to let the red cursor downward move to the level three.
  - 9. Rotate the rotary encoder to set the conditions of channels on the level three as
    - XXXXXXXX XXXXXXXX XXXXXXX LLLLLLHL orderly.
  - 10. Press F6 to return and exit.
  - 11. Press Run/Stop to execute the signal capture.

### 6-2 Capture of Specific Events

b.In case of a need to observe the specific events input with digital signals, you can use of the function of set the trigger condition. For example, to capture the pulse wave width smaller than 4uS on the condition of the 8 bits counter CH0 High.

- 1. Press key Trigger.
- 2. Press Change Page to enter into the next page.
- 3. Press F2 to set the conditions of pulse wave width.
- 4. Rotate the rotary encoder to set Channel as Ch.0.
- 5. Press ">" to move the cursor leftward.
- 6. Rotate the rotary encoder to set condition H.
- 7. Press ">" to move the cursor rightward.
- 8. Rotate the rotary encoder to set the condition as "<".
- 9. Press ">" to move the cursor rightward.
- 10. Input figure "4" through the rotary encoder or the figure key.
- 11. Press to rotate the rotary encoder to set the unit as uS.
- 12. Press F6 to exit the setup.
- 13. Press Run/Stop to execute the signal capture.

### 6-3 Details of Signal Analysis

To analyze the measured signals, you can use the following three procedures. For example, if you would like to search information "00". And would like to know whether the interval among such information emerging each time is the same or not.

The procedure is as below:

- a. Setup of Bus Function
- 1. Press "Channel".
- 2. Press F2 to set Bus.
- 3. Rotate the rotary encoder to select Bus00. Pressing "<", can combine the selected channel in this Bus.
- 4. After rotating the rotary encoder and selecting channel. Press down Enter, the selecting order should be MSB~LSB. After completely selecting, the channel is combined, press down F6 to return and exit.
- 5. Press Run/Stop to execute the signal capture.
- 6. Pressing Run/Stop for again to halt the signal capture.
- b. Running of Search Function
- 1. Press down key Enter.
- 2. Press F2 to set the search condition.
- 3. Rotate the rotary encoder to select Bus00. Pressing ">" and rotate the rotary encoder to set the condition as "00".
- 4. Press key Enter.
- 5. Press F4 to search the last data.

## 6-3 Details of Signal Analysis

- c. Measurement by Useing Cursors
  - 1. Press key "Cursors."
  - 2. Move cursor A to the initial position 00 of the wave form by useing " → "and " ← ".
  - 3. Press F5 to search the next data.
  - 4. Press  $(A \longleftrightarrow B)$  to select cursor B.
  - 5. Move cursor B to the initial position 00 of the wave form by using → "and" ← ".
  - 6. Press F5 to search the next data.
  - 7. Press  $(A \longleftrightarrow B)$  to select cursor C.
  - Move cursor C to the initial position 00 of the wave form by using → "and " ← ".
  - 9. Press F5 to search the next data.
  - 10. Press  $(A \longleftrightarrow B)$  to select cursor D.
  - 11. Move cursor D to the initial position 00 of the wave form by using "  $\rightarrow$  "and "  $\leftarrow$  ".
  - 12. The time difference between any two cursors will display at the lower part of the wave form.
  - 13. Press F6 to exit the search function.

### 6-4 Setup of Advance or Delay Trigger

To look up the data of the certain time point advance or behind the trigger point, you can use the Advance/delay function. For example, if you would like to look up the data of 1ms behind the trigger point. The procedure is as below.

- 1. Set Trigger condition.
- 2. Press key Enter.
- 3. Press F1 and there will be a dialog box reading "±000s000m000u000n000p" emerge on the screen.
- 4. Rotate the rotary encoder to move the cursor.
- 5. Press the figure key 0 and set symbol as "+", which means to delay the trigger (press the figure key - and set symbol as "-", which means to set the advance trigger.
- 6. Rotate the rotary encoder to set the time as 1ms.
- 7. Press key Enter.
- 8. Press Run/Stop to execute the signal capture.

### 6-5 Save of Test Results

In case of a need to keep the test results for further analysis, you can save the wave form data by following steps:

- 1. Press key File.
- 2. Press F4 to save the wave forms.
- 3. Press F1 to save the wave forms to USER 1.
- 4. Press F6 to return and exit.
- 5. Press Rrn/Stop to execute the signal capture.

### 6-6 State Test

To conduct a state test, following steps should be done:

- 1. Connect the external CLK with the 32nd channel.
- 2. Press key Int/Ext.
- Press F2 to set it as an external CLK. At this time, the CK position of the upper left of screen will display Ext.
- 4. Press F6 to return and exit.
- 5. Press Rrn/Stop to execute the signal capture.

#### 6-7 Remote Control

In case of a connection need with PC, operating steps are as bellow:

- 1. Connect USB Cable with the LA and PC.
- 2. Press key Utility.
- 3. Press F3 to connect with PC.
- 4. Run the LA software on PC.
- When finish the Remote Control, press F6 to end the connection with PC.

# **Chapter Seven: Instrument Calibration**

#### Instruction

The instrument, after a period of use (one year in general), will be error between the defined value and the value at input/output because of many factors. Therefore, the LA needs to do calibration.

### 7-1 Calibration Manner

There are two conditions of calibration:

- The instrument user sends the instrument back for a calibration.
   Our company will present a calibration statement on ex-factory check result. The calibration charge is needed.
- When the goods send back for repair, we will change the spare part and suggest the user to do the calibration if necessary. (The calibration fee shall be extra listed in the Maintenance Fee List).
- \*\*The maintenance and calibration during the warranty period should be subject to the provisions of Warranty.
- \*We currently do not provide self-calibration of users.



#### Instruction

The difference between maintenance and repair of instrument is as bellow: maintenance is implemented by users themselves. The repair is implemented through sending the instrument to the manufacturer. Instructions are as bellow:

### 8-1 Maintenance Implemented by Users

- The users should implement maintenance under the precondition not to dismantle the shell of machine.
- 2. In case that the instrument adopts a correct AC input power supply, under this circumstance, if there is no any reaction by power on the Power Switch on the panel at left side on "1" and pressing the key Power on the front pannel. The problem may be the burning of fuse. When replacing the fuse, please pull off the AC power line first, and then open the fuse case and replace the old fuse with a standard one.
  - ©Caution: The failure of adopting the standard fuse will possibly lead to damage, burning of the instrument or a serious fire hazard. If so, the users fail to enjoy the warranty services.
- 3. Do not to cover or block the air holes of instruments so as to ensure a long-term normal use.
- 4. Water or any other liquid should be prevented from entering into the instrument.
- 5. It is necessary to avoid the use of any cleanser or solution which is easy to lead to a corrosion or chemical change.
- Please do not contact the LCD panel with any sharp article or heavy thump in a bid to avoid any scratch or damage.

### 8-2 Sending the Instrument to Manufacturer for Repair

In case of any circumstance as bellow, please send the instrument back to the manufacturer or a distributor for repair or replacement of parts.

- After replacing a correct fuse and confirming that AC power supply is on, still fails to start up the instrument normally to reach to the operator interface for use.
- After the start-up, the instrument lingers at the start-up page all the time and fail to login into the operator interface.
- The instrument shows error information during the operation, and can not be operated any more.
- Partial parts on front, left and rear panels of the instrument can not be used due to damage and the shell must be dismantled when replacing parts.
- \*\*Caution during sending it for repair at the manufacturer: Please send the instrument back to the manufacturer packed it with the original package or other material properly so as to prevent the product from being damaged due to vibration, dropping or collision.



### 8-3 Trouble Shooting:

- Instruction: before the operation for the LA, please study the Users' Manual first.
- 2. Problems Rising from Operation and Corresponding Measures:
- Q1: When the instrument is powered on, the power indicator light fails to lighten. What's the reason of this phenomenon?
- Ans: Check whether the power line is firm, whether the fuse in the fuse base is normal and whether the AC power switch is on the position of "1" or not.
- Q2: The power indicator light after starting up, however, there is no display on the screen. What's the reason of this phenomenon?
- Ans: The problem may be that the system fails to be started up.

  Please press Power Switch again.
- Q3: There is no signal reaction after pressing down keys F1~F6. What's the reason of this phenomenon?
- Ans: The keys F1~F6 at the right side of screen can merely be applied to a functional adjustment under the precondition that hot keys are pressed and keys F1~F6 emerge at the right side of LCD screen. It is not true that such keys can be operated under any circumstance.
- Q4: How to enable the probe lead to work with probe hook.
- Ans: It can be a resolution to input the probe lead tip to the pin of the probe hook. And then, use the probe hook to fix the DUT.
- Q5: Why signal wave forms fail to be capture while the DUT works normally?
- Ans: 1. Confirm the probe hook and the DUT point contact well first.
  - Confirm that there is no damage of signal cables at both ends of data pod and that the contact with the LA is well.

### 8-3 Trouble Shooting:

- Q6: How to know the probe lead singal and loop of each channel are normal or not?
- Ans: It can be a resolution to connect the probe lead to the LA base square wave to observe whether the square wave is capture or not.
- Q7: The DUT works normally, but fails to capture the wave forms after executing a trigger (whether the hardware lines connect well or not?) What's the reason?
- Ans: Confirm whether the trigger state, mode and level of LA are in line with the specifications of the DUT or not.
- Q8: The DUT test works normally; however, it fails to capture wave form after executing a trigger. What's the reason?
- Ans: It can be a resolution to press the blue key Auto-Scale (an automatic adjustment key) on the control panel. After that the signals of the point to be tested will be scanned automatically. Adjust the T cursor and zoom-in, zoom-out and other parameters after LA has captured the signal wave forms for observation.
- Q9: How to get the probe lead or hook and other consumable spare parts?
- Ans: Such items can be purchased from our service centers or sales departments