User Manual

TL-4X1-HD

4K HDMI Switcher 4x1

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Version: TL-4X1-HD_160712

Preface

Read this user manual carefully before using this product. Pictures shown in this manual is for reference only, different model and specifications are subject to real product.

This manual is only for operation instruction only, not for any maintenance usage.

Trademarks

Product model and logo mentioned in this manual are trademarks of our company. Any other trademarks mentioned in this manual are acknowledged as the properties of the trademark owner. No part of this publication may be copied or reproduced without prior written consent.

FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.

SAFETY PRECAUTIONS

To insure the best from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Unpack the equipment carefully and save the original box and packing material for possible future shipment

- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.

- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.

- Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.

- Refer all servicing to qualified service personnel.

- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.

- Do not put any heavy items on the extension cable in case of extrusion.

- Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.

- Install the device in a place with fine ventilation to avoid damage caused by overheat.

- Keep the module away from liquids.

- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.

- Do not twist or pull by force ends of the optical cable. It can cause malfunction.

- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

- Unplug the power cord when left unused for a long period of time.

- Information on disposal for scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.

Contents

1. Introduction

1.1 Introduction to TL-4X1-HD

TL-4X1-HD is an HDMI switcher accommodates 4 HDMI inputs.

Select any of the inputs by front panel button or IR Remote, the corresponding indicator on the front panel will illuminate to show real-time I/O connection status. Compliance with HDMI 1.4& HDCP1.4, TL-4X1-HD can transmit uncompressed 4K (max) signal.

The TL-4X1-HD boasts comprehensive audio capacities including PCM, Dolby Digital, DTS, and DTS-HD. It also provides an ARC audio output to transfer ARC audio to an external sound system.

1.2 Features

- 4 HDMI inputs
- Supports Hot-plug
- Compliant with HDMI 1.4, capable to transmit 4K signal
- High bandwidth: 10.2Gbps
- HDCP1.4 compliant, supports auto-detect for input HDCP compliant status
- Supports EDID management, including 5 embedded EDID data, 10 (max) user-definable EDID tables, and EDID data automatic capture and copy
- Intuitive indicators for power, switch mode, I/O connection status and audio output signal
- Convenient USB firmware updating

1.3 Package List

- 1 x TL-4X1-HD
- 2 x Mounting ears (separate from TL-4X1-HD)
- 4 x Screws
- 4 x Plastic cushions
- 1 x IR Receiver
- 1 x RS232 Cable
- 1 x IR Remote
- 1 x Power Adapter (DC 5V 1A)
- 1 x User Manual

Notes：Confirm all the accessories are included, if not, please contact with the dealers.

2. Panel Description

2.1 Front Panel

No.	Name	Description
①	Power	Illuminated red when device is powered
②	AUDIO	Bi-colored LED indicator for audio source ● Illuminated green when the audio is de-embedded from HDMI signal ● Illuminate yellow when the audio is ARC
③	Mode	Bi-colored indicator for current switch mode ● Illuminated yellow when in auto-switch mode ● Illuminated green in manual switch mode.
④	Input	Indicates the current input source, 4 in total, the indicator of the current input source is illuminated green
⑤	SOURCE/ AUTO	● Used as a video source selection button, press to switch among the 4 inputs source in sequence ● Used to change the switching mode, press and hold for **3 seconds or more** to toggle between auto-switch mode and manual switch mode.
⑥	FIRMWARE	USB port, used for firmware update & powering

Note: Output HDCP compliant status depends on input signal. When the input signal is encrypted, then output signal is encrypted and vice versa.

2.2 Rear Panel
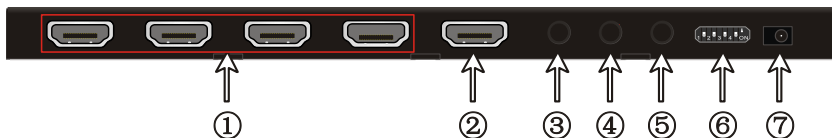
No.	Name	Description
①	IN	HDMI input ports. 4 in total, connect with HDMI or DVI source device such as DVD/BluRay, supports input signals up to 4k/ 1080p 3D & ARC
②	OUT	HDMI output port, connect to an HDMI display
③	AUDIO	Audio output port, connect with speaker to de-embed HDMI audio signal or output ARC audio
④	RS232	Serial control port, connect with control device (e.g. a PC) to control TL-4X1-HD
⑤	IR IN	Connect to IR receiver to pickup IR remote control commands
⑥	EDID	4-pin EDID DIP switchers to set EDID data, "1" stands for "On", "0" stands for "Off". Dial the switchers to change EDID data refering to the explainations in *4.4 EDID Management*.
⑦	DC 5V	Power port, plug a DC 5V power adapter into this port

Note: Pictures shown in this manual are for reference only, different model and specifications are subject on real product.

3. System Connection

3.1 Usage Precautions

1) System should be installed in a clean environment and has proper temperature and humidity.
2) All of the power switches, plugs, sockets and power cords should be insulated and safe.
3) All devices should be connected before power on.

3.2 System Diagram

The following diagram illustrates typical input and output connections that can be utilized with TL-4X1-HD:
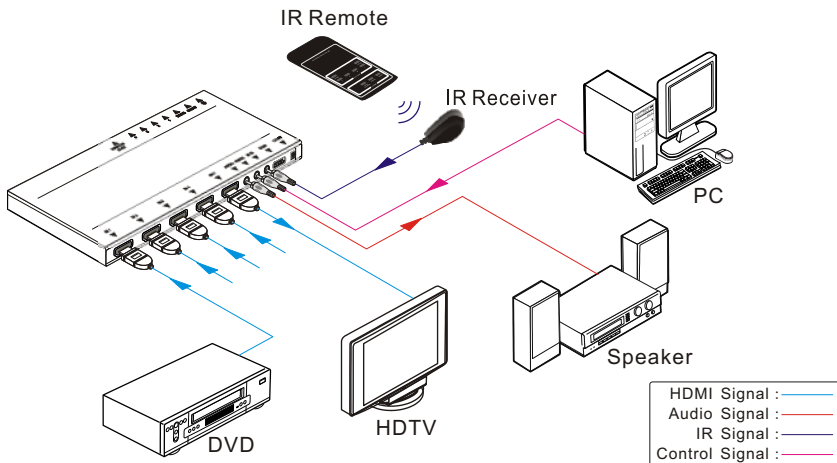

Figure 3- 1 Connection Diagram

3.3 Connection Procedures

Step1. Connect HDMI/ DVI source device(s) (e.g. BluRay/DVD) to the **HDMI INPUT** ports of TL-4X1-HD with HDMI cables.

Step2. Connect an HDMI display to the **HDMI OUTPUT** port of TL-4X1-HD with an HDMI cable.

Step3. Connect an amplifier to the audio output.

Step4. Connect the included IR Receiver to the IR IN to enable IR control.

Step5. Connect the control device (e.g. a PC) to the RS232 port to enable RS232 control.

Step6. Plug a DC 5V power adapter to the power port of TL-4X1-HD.

Note: All the ports support hot-plug.

3.4 ARC Solution

The ARC (Audio Return Channel) enables a display, via a single HDMI cable, to either send or receive audio via HDMI, upstream or downstream, depending on system set-up and user preferences, increasing user flexibility. Connect the devices according to the following figure:

Speaker

HDTV

Speaker

ARC Audio :
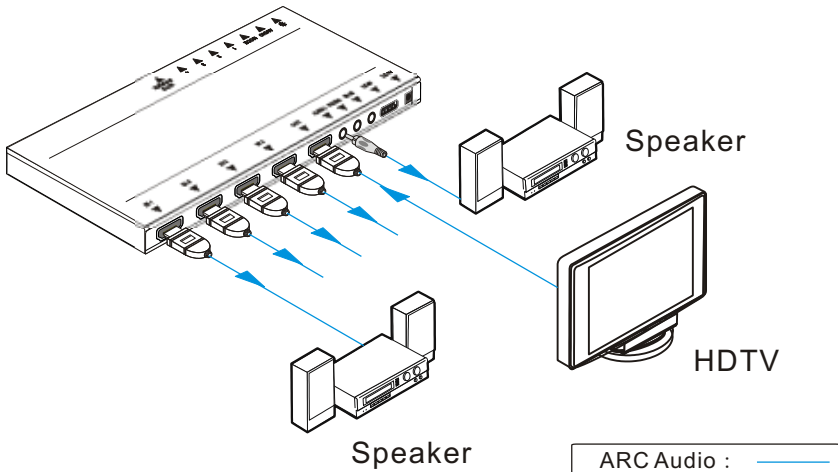
Note: All utilized devices including the HDMI cable should support Audio Return Channel functionality when connected to Audio Return Channel-enabled devices.

3.5 Application

The TL-4X1-HD has many applications it is suitable for, such as conference rooms, home theater, training rooms, and corporate board rooms.

4. System Control

4.1 Front Panel Control

The SOURCE/AUTO button on the front panel can be used to change input source or change between manual/auto switching modes.

➢ Select input source: Press the button to switch input 1~4, the corresponding indicator illuminate green.

➢ Change switching mode: The TL-4X1-HD supports auto and manual switching modes. Press and hold **SOURCE/AUTO** button for **3 seconds or more** to switch between the two modes. (Default: Manual switch.)

In auto-switch mode, source selection abides by the following principles:

● **New input principle**

Upon detecting a new input signal, TL-4X1-HD will switch to this new signal automatically.

● **Power rebooting principle**

Once rebooted, TL-4X1-HD will automatically select input 1 as the input source even if there is no connection in input 1.

● **Signal removing principle**

When the current display signal is removed, the TL-4X1-HD will detect all input signals with priority from INPUT 1 to INPUT 4. It will select the first available source to output.

In manual-switch mode, upon rebooting, the TL-4X1-HD will output the previously selected source signal.

4.2 IR Control

By connecting an IR receiver to the IR IN port, users can control the device via the included IR remote. Here is a brief introduction to the IR remote:
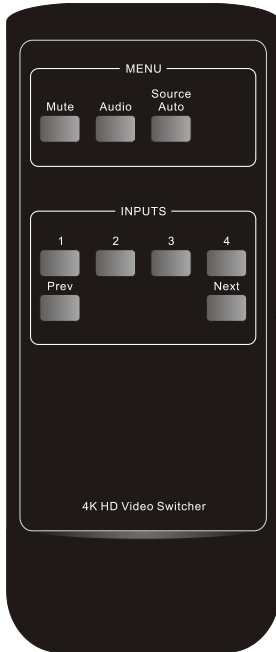
MENU:

Mute: press to switch on/off Audio& Video output

Audio: switches between HDMI signal and ARC audio

Source/Auto: this button functions identically to the SOURCE/AUTO button on the front panel

INPUTS:

1~4: press to switch input source, correspond2 to input 1~4 (discrete)

Prev/ Next: switch to the previous/ next input source in order 1~4

4.3 RS232 Control

TL-4X1-HD provides [1] 3.5mm RS232 port for serial port control. Connect TL-4X1-HD to the control device (e.g. a PC) with the included RS232 cable. Using correct communications parameters, a PC is capable of controlling the TL-4X1-HD via designed software, or via a 3rd party control system.

4.3.1 Installation/uninstallation of RS232 Control Software

Installation: Copy the control software file to the computer connected with TL-4X1-HD.

Uninstallation: Delete all the control software files in corresponding file path.

4.3.2 Basic Settings

First, connect the TL-4X1-HD with an input device and an output device. Then, connect it to a computer (using the provided RS232 cable) which has the RS232 control software installed. Double-click the software icon to run this software.

Here we take the software **CommWatch.exe** as example. The icon is showed as below:

The interface of the control software is showed as below:
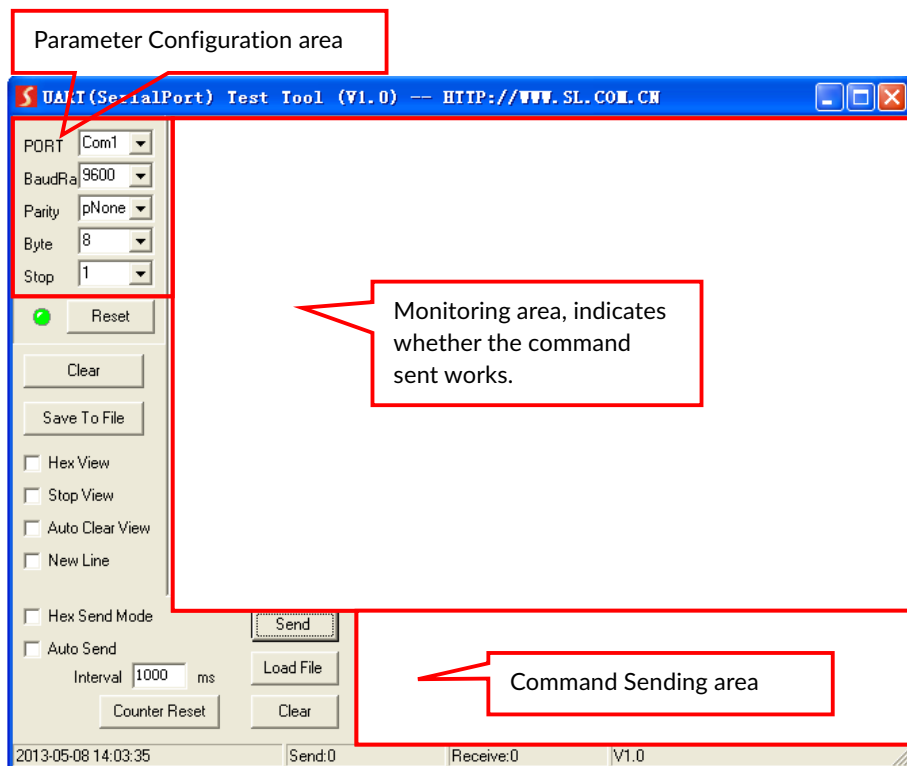
Please set the parameters of COM number, baud rate, data bit, stop bit and the parity bit correctly, only then will you be able to send commands in the Command Sending Area.

4.3.3 RS232 Communication Commands

Baud rate: 9600;   **Data bit: 8;**   **Stop bit: 1;**   **Parity bit: none.**

Command	Function	Feedback Example
[x]B1.	Switch audio and video signal of input x synchronously, x=1~4	AV: x -> 1
0B0.	Switch off output	Mute On
0B2.	Switch on output	Mute Off
600%	Inquire operation status, including I/O connection, switching mode, and ARC mode	AV: x -> 1 Manual/ Auto Switch Switch Device System/ Switch Device System
601%	Activate auto-switching mode	Auto Switch
602%	Activate manual switching mode	Manual Switch
EDIDUpgrade[x].	Upgrade EDID data via serial port, x stands for the table number. x=1~5, corresponding to the embedded EDID 1~5 tables x=6~15, corresponding to the 10 custom EDID tables	EDID Upgrade OK!
ARC [x]&	Switch on/off ARC audio output x=1, switch on ARC audio output x=0, switch off ARC audio output	Audio Return System (x=1) Switch Device System (x=0)

Note:

1. In above commands, "["and "]" are symbols for easier reading and do not need to be typed in actual operation.
2. Type in the complete commands including ending symbol ".".
3. Load the desired EDID file to the RS232 control software after sending command **EDIDUpgrade[x].** , it will show "EDIDUpgrade OK!" after the upgrade is completed.

4.4 EDID Management

TL-4X1-HD provides convenient EDID management to create effective communication between the display and sources.

In factory default status (Status: 0000), the TL-4X1-HD passes through EDID from the display to the sources. You can change the EDID data by adjusting the 4-pin EDID DIP switches.

Invoke EDID data:

Here is an introduction to the EDID data to be utilized:

*Note: '0' means the switch is down and '1' means the switch is in the up position.

➢ Embedded EDID data: 5 sets in total, the chart below illustrates the 5 Embedded EDID tables:

Table#	DIP Positions (From right to left)	EDID information
1	0001	1080P 3D 2CH
2	0010	1080P 3D Muiltichannel
3	0011	1080P 2D 2CH
4	0100	1080P 2D Muiltichannel
5	0101	3840x2160 2D (30Hz)

➢ Custom EDID data: maximum 10 sets, custom EDID data (.bin) and program the data into the device by sending command **EDIDUpgrade[x]..**

To get the corresponding DIP positions of a table number for EDID data, convert the decimal number to binary first. The chart below shows DIP positions for 6~15 (table numbers for custom EDID data):

Table#	DIP Positions	Table#	DIP Positions
6	0110	11	1011
7	0111	12	1100
8	1000	13	1101
9	1001	14	1110
10	1010	15	1111

Upgrade EDID data:

EDID data supports upgrade via serial port. Follow these steps to upgrade EDID:
Send command to upgrade the saved EDID data one by one.
Step1. Copy the upgrade file (.bin) to PC.

Step2. Send command EDIDUpgrade[x]. via the RS232 control software.

x is the table number of the EDID data

x=1~5, corresponds to the 5 embedded EDID listed in the above chart;

x=6~15, corresponds to the 10 custom EDID;

Step3. Click **Load File** and select the desired upgrade file (.bin). Press **Send** to start upgrade.

It will return "EDID Upgrade OK!" when the upgrade finishes. Reboot the unit, users can adjust the dip switchers on rear panel to invoke the upgraded EDID.

5. Firmware Upgrade

The TL-4X1-HD features a USB port for firmware upgrade on the front panel. Follow these steps to upgrade the firmware:

Step1. Copy the upgrade software and the latest upgrade file (.bin) to PC.

Step2. Connect the USB ports of the TL-4X1-HD and the PC via USB cable.

Step3. Double-click the update software icon (see as below).

It will enter the upgrade interface shown as below:
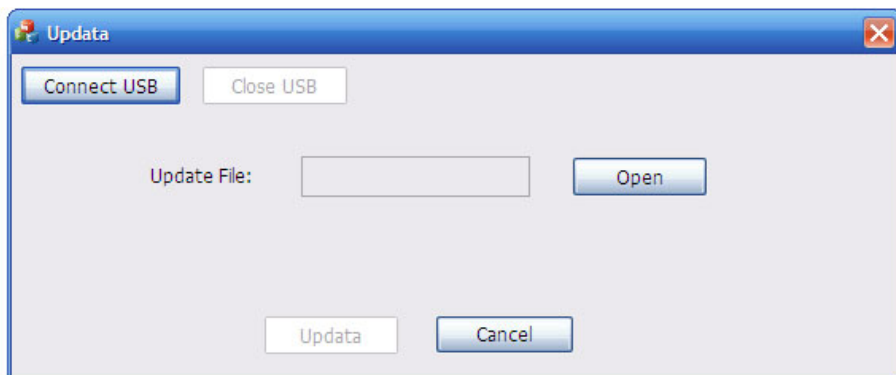
Step4. Click **Connect USB**.

Step5. Click **Open** to load the upgrade file, then click **Updata** to start firmware upgrading.

Note: 1. The USB port can also be used to power the device.

2. The COM number connected with PC is available only when from 1 to 9.

6. Specification

I/O Connections	
HDMI Inputs	Four(4) HDMI type A receptacle
HDMI Output	One(1) HDMI type A receptacle
Ed-embedded Audio Output	One(1) 3.5mm TRS jack
IR Input	One(1) 3.5mm TRS jack
RS232 Control	One(1) 3-pin pluggable terminal block
EDID Data Selector	One(1) 4-pin solider switch
Source Select Button(Front Panel)	One(1) button
DC 5V Power	One (1) 2.35 mm outside diameter, 0.7 mm inside diameter barrel (EIAJ-1)
Firmware Update	One (1) mini USB type B receptacle
Supported Video and Audio	
Resolutions	HDMI: 480I, 480p, 576I, 576P, 720p, 1080I, 1080p, 4Kx2K@30Hz DVI: 640x480@60Hz, 640x480@72Hz, 640x480@75Hz, 800x600@60Hz, 800x600@72Hz, 800x600@75Hz, 1024x768@60Hz, 1024x768@70Hz, 1024x768@75Hz, 1280x1024@60Hz, 1280x1024@75Hz, 1600x1200@60hz, 1920x108@60Hz, 1920x1200@60Hz
Video Compliance	HDMI, HDCP 1.4, DVI1.0
Bandwidth	10.2 Gbps
Embedded Audio Compatibility	PCM, Dolby Digital, DTS, and DTS-HD.
Input DDC Signal	5.0 volts p-p (TTL)
Input Video Signal	0.5 ~ 1.0 volts p-p
IR Carrier Frequency Range	33-55KHz at 5V
Chassis and Environmental	

Enclosure	Painted aluminum
Dimensions (W x H x D)	194mm x 12mm x 80.4mm (6.00in x 0.47in x 2.77in)
Shipping Weight	0.73Kg(1.60bls)
Operating Temperature (Environment)	-10° ~ +40° C (+14° ~ +104° F)
Operating Temperature (Chassis)	45° C(113° F)
Operating Humidity (Environment)	10% ~ 90% Non-condensing
Storage Temperature (Environment)	-15° ~ +70° C(+5° ~ +167° F)
Storage Humidity (Environment)	10% ~ 90% Non-condensing
Power, ESD, Regulatory	
Maximum Power Consumption	4.2W
Power Supply	5V at 1A
ESD Protection	15KV
Regulatory	CE, FCC
Other	
Standard Warranty	3 Year
Indicators	1 Power,1 Audio status, 1 switch mode, 4 Input status,1 Output connection status
Included Items	Installation guide, Power adaptor, mounting "L" brackets (2 ea), mounting screws (4 ea), Plastic cushions (4 ea), RS232 cable, IR remote, IR receiver

6.1 Supported Input Video Formats

Video Format	Resolution
HDMI	480I
	480P
	576I
	576P
	720P
	1080I
	1080P
	4Kx2K
DVI	640*480@60 hz
	640*480@72 hz
	640*480@75 hz
	800*600@60 hz
	800*600@72 hz
	800*600@75 hz
	1024x768@60Hz
	1024x768@70Hz
	1024x768@75Hz
	1280x1024@60Hz
	1280x1024@75Hz
	1600x1200@60Hz
	1920x1080@60Hz
	1920x1200@60Hz

Note: TL-4X1-HD supports 4k&1080p 3D HDMI signal, please use quality HDMI cables compliant with HDMI1.4 for reliable transmission when connecting.

7. Panel Drawing

194 mm

12 mm

80.4 mm

4x1 HDMI Auto-Switcher

TL-4X1-HD

FIRMWARE

8. Troubleshooting & Maintenance

Problems	Causes	Solutions
Color loss or no video signal output in HDMI display	The connecting cables may not be connected correctly or may be faulty.	Check whether the cables are connected correctly and in working condition.
No HDMI signal output in TL-4X1-HD while local HDMI input is in normal working state		
'Snowy' screen on output devices	Poor quality of HDMI cable	Change for another cable of good quality.
Cannot control TL-4X1-HD by control device (e.g. a PC) through RS232 port	Wrong RS232 communication parameters	Make sure the RS232 communication parameters are correct.
	Incorrect RS232 polarity	Use a null modem adapter
	TL-4X1-HD is broken	Send it to authorized dealer for repairing.
Audio static increases when connecting the video connectors	Bad grounding	Check the grounding and make sure it is connected well.

If your problem persists after following the above troubleshooting steps, seek further help from authorized dealer or our technical support.

9. After-sales Service

If there appear some problems when running the device, please check and deal with the problems referenced in this user manual.

1) **Product Limited Warranty:** We warrant that our products will be free from defects in materials and workmanship for **three years.** Please see warranty page posted on www.tlnetworx.com for more info.

2) **What the warranty does not cover:**
   - Warranty expiration.
   - Factory applied serial number has been altered or removed from the product.
   - Damage, deterioration or malfunction caused by:
     - Normal wear and tear
     - Use of supplies or parts not meeting our specifications
     - No certificate or invoice as the proof of warranty.
     - The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
     - Damage caused by force majeure.
     - Non-authorized service
     - Other causes which does not relate to a product defect
   - Delivery, installation or labor charges for installation or setup of the product

3) **Technical Support:** Email to our after-sales department or make a call, please inform us the following information about your cases.
   - Product version and name.
   - Detailed failure situations.
   - The formation of the cases.

Remarks: For any questions or problems, please try to get help from your local distributor.