

# USER MANUAL

## MHD44

PTN HDMI Matrix Switchers 4x4



Version: MHD442013V1.3

**NOTICE:** Please read this user manual carefully before using this product.

This manual is for operation instruction only, not for any maintenance usage. The functions described in this version are updated till May 2013. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

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**All product function is valid till 2013-05-24.**

## Update History

Version	Date	Update Content
1.0	2013.01.29	First Version.
1.1	2013.01.29	Modified the EDID commands.
1.2	2013.03.28	Updated the operation order of the buttons.
1.3	2013.05.24	Modified the system diagram.

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## 1. Introduction

### 1.1. Introduction of MHD44

MHD44 is a 4x4 HDMI matrix switcher with 4 HDBaseT outputs. It enables crosspoint switching from any input to any output or all outputs, and supports 3D, 4K x 2K & 1080P. It provides a nice solution for control room, conferencing room, commercial hall, government institution etc.

### 1.2. Package Contents

- 1 x MHD44
- 1 x Power cord
- 1 x IR remote (The cell battery is not included)
- 4 x Plastic cushions
- 1 x RS232 cable
- 1 x User manual

## 2. Features

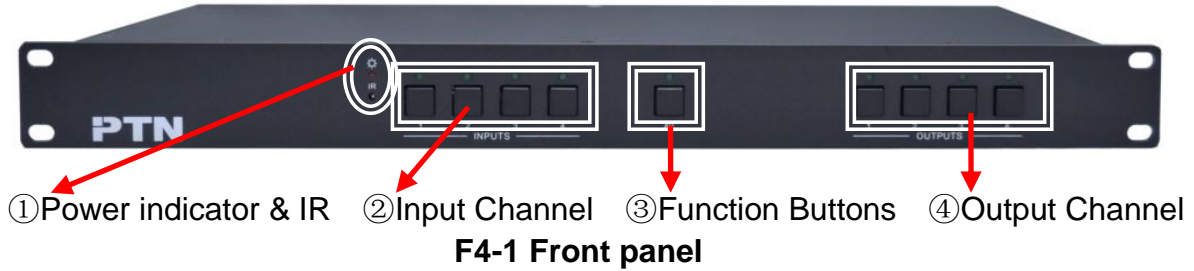
- HDTV compatible with High Definition Transmission resolution up to 1920\*1200@60Hz, support 1080P.
- HDCP Compliant and DVI compatible, supporting DVI1.0.
- Powerful EDID management.
- Three ways for system controlling: RS232, IR remote and the front panel.
- RS232 serial control port, easy for serial commands and third-part control.
- Optional TCP/IP control (works with PTNET).
- Front panel security lock to avoid unauthorized use when the matrix is installed in an unsecured environment.
- Built-in gain compensation technique and the synchronous signal correction technology, switching speed is less than 200ns (Max).
- With LEDs indicate the real-time running state.
- Internal international power supply (100Volt~240Volt AC, 50/60Hz) for worldwide compatibility.

### 3. Specification

Video Input		Video Output	
Input	4 HDMI	Output	4 HDMI
Input Connector	Female HDMI	Output Connector	Female HDMI
Input Level	T.M.D.S. 2.9V/3.3V	Output Level	T.M.D.S. 2.9V/3.3V
Input Impedance	75Ω	Output Impedance	75Ω
Video General			
Gain	0 dB	Bandwidth	6.75Gbit/s
Video Signal	HDMI (or DVI-D)	Maximum Pixel Clock	165MHz
Resolution Range	Up to 1920 x 1200 or 1080P@60Hz	Switching Speed	200ns (Max.)
CEC	Supports CEC wired infrared data pass-through using HDMI 1.4a standard.		
EDID and DDC Management	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using HDMI/DVI standards, EDID and DDC signals are actively buffered.		
HDCP Management	Compliant with HDCP using DVI and HDMI 1.4a standards. The built-in HDCP management technology can analyze HDCP key, and realize the handshake internally.		
Audio General			
Digital Audio	Supports HDMI audio transmitted through the RGB and Y, Cr, Cb lines, actively buffered.		
Control Parts			
Serial Control Port	RS232, 9-pin female D connector	Pin Configurations	2 = TX, 3 = RX, 5 = GND
IR Remote	Default IR remote	Front Panel Control	Buttons
Options	TCP/IP control by PTNET(PTN's programmable interface)		
General			
Power Supply	100VAC ~ 240VAC, 50/60Hz	Power Consumption	25W
Temperature	-20 ~ +70°C	Humidity	10% ~ 90%
Case Dimension	W483 x H44 x D235mm (1U high, full rack wide)	Product Weight	2.15Kg

## 4. Operations of the Control panel and the IR Remote

### 4.1. Operation of the Control Panel



Buttons	Function Description
INPUTS	Input buttons, ranging from "1" to "4".
OUTPUTS	Output buttons, ranging from "1" to "4".
AV	AV synchronal button: To transfer video and audio signal synchronously by the switcher. Example: To transfer both the video and the audio signals from input channel No.3 to output channel No.4. Operation: Press buttons in this order "AV", "3", "4".
VIDEO	Video button: To transfer only video signals from input channel to output channel Example: To transfer video signals from input channel No.3 to output channel No.4. Operation: Press buttons in this order "VIDEO", "3", "4".
AUDIO	Audio button: To transfer only audio signals from input channel to output channel Example: To transfer audio signals from input channel No.2 to output channel No.3. Operation: Press buttons in this order "AUDIO", "2", "3"

With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.

"Menu" + "Input Channel" + "Output Channel"

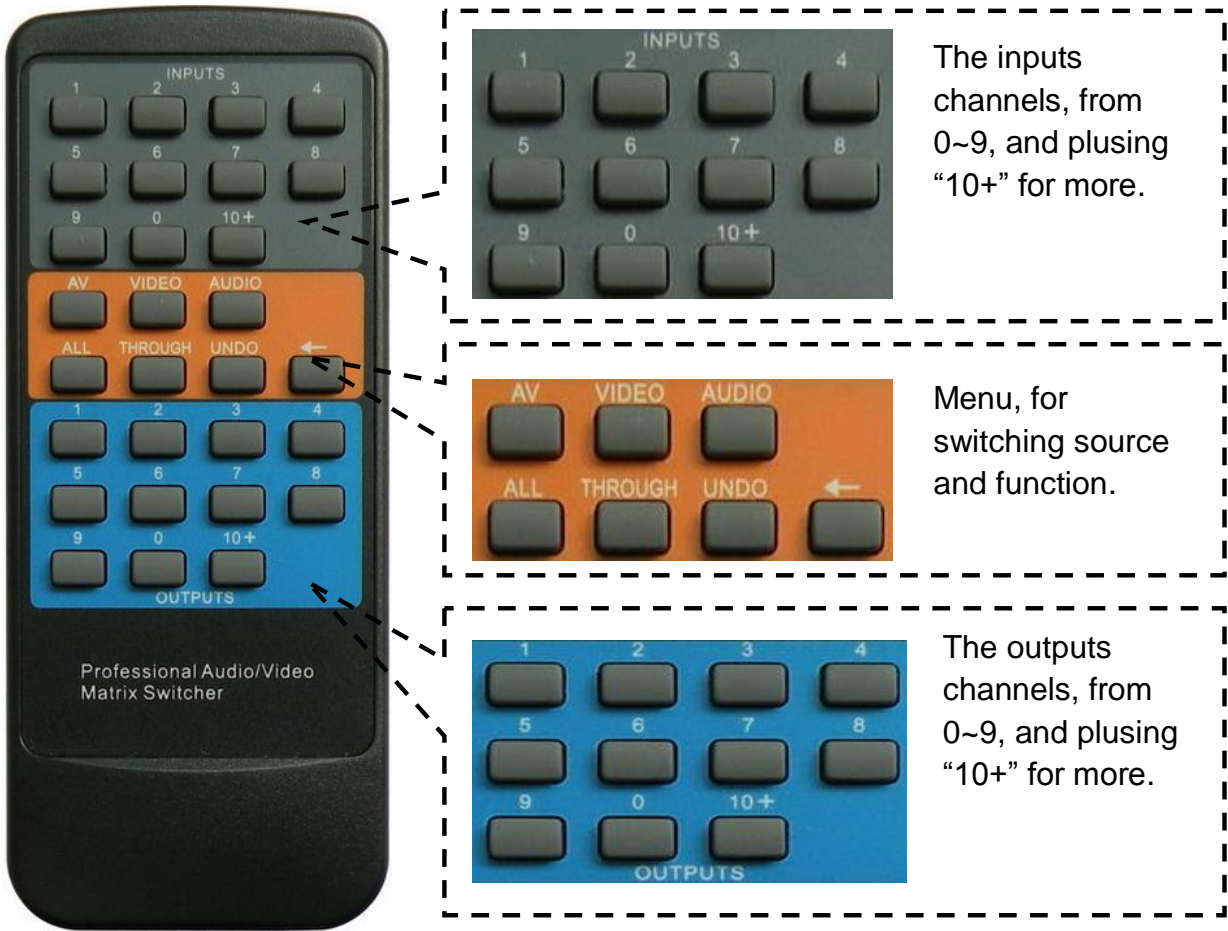
- 1) "Menu": "AV", "VIDEO", "AUDIO"
- 2) "Input Channel": Fill with the number of input channel to be controlled.
- 3) "Output Channel": Fill with the number of output channels to be controlled.

### 4.2. Usage of the IR Remote

With the infrared IR remote, the matrix switcher could be control remotely. Because the function buttons on the IR remote are the same with the ones on the front control panel, the IR remote shares the same control operation and command format with the control panel.

Operations of the IR remote are showed as follows.

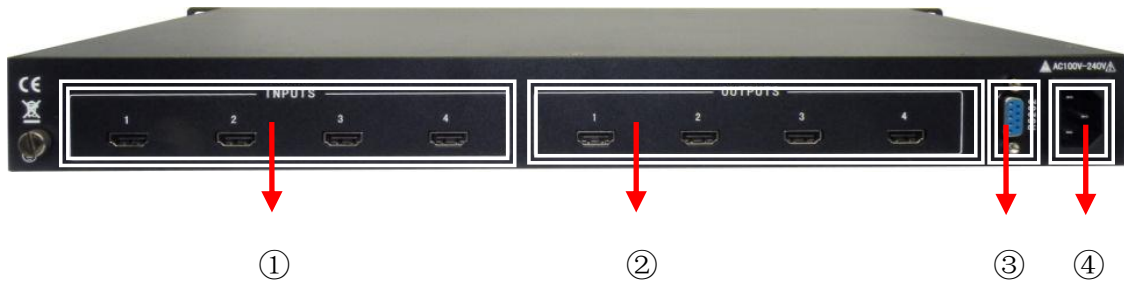
□ 3 steps Operation



F4-2 Panel of the IR Remote

## 5. External Connection

### 5.1. Introduction of the Input and Output Connectors



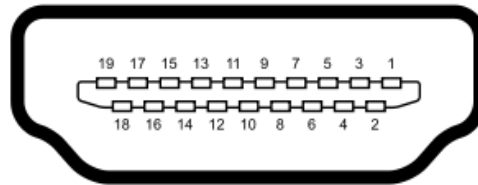
F5-1 Rear panel

Detailed description:

No.	Name	Description
①	HDMI INPUTS	HDMI-I connector.
②	HDMI OUTPUTS	HDMI-I connector.
③	RS232	The serial port, 9-pin female connector.
④	AC100V~240V	Alternating current for power supply.

**5.2. How to Connect with the Input and Output Terminals**

The HDMI matrix switchers may take DVD players, computers, graphic workstations and digital showing platform as their input signal source, and projectors, video recorders, displayers and amplifiers as their output signal destinations according to different situation.



F5-2 HDMI connector

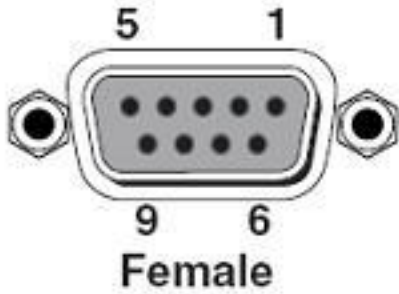
Table 5-1 HDMI pin function

Number	Signal Name	Number	Signal Name
1	TMDS Data 2+	20	SHELL
2	TMDS Data 2 Shield	19	Hot Plug Detect
3	TMDS Data 2-	18	+5V Power
4	TMDS Data 1+	17	Ground
5	TMDS Data 1 Shield	16	DDC Data
6	TMDS Data 1-	15	DDC Clock
7	TMDS Data 0+	14	No Connect
8	TMDS Data 0 Shield	13	CEC
9	TMDS Data 0-	12	TMDS Clock-
10	TMDS Clock+	11	TMDS Clock Shield

**5.3. Connection with RS232 Communication Port**

Except the front control panel, the HDMI matrix switcher can be control by far-end control system through the Ethernet control via the RS232 communication port. This RS232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.





No.	Pin	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

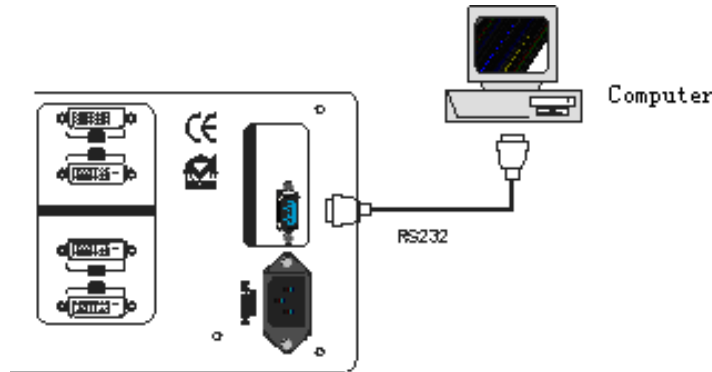
F5-3 9HDF

### 5.4. Connection with Computer

When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.

To control the switcher, users may use the public COM software.

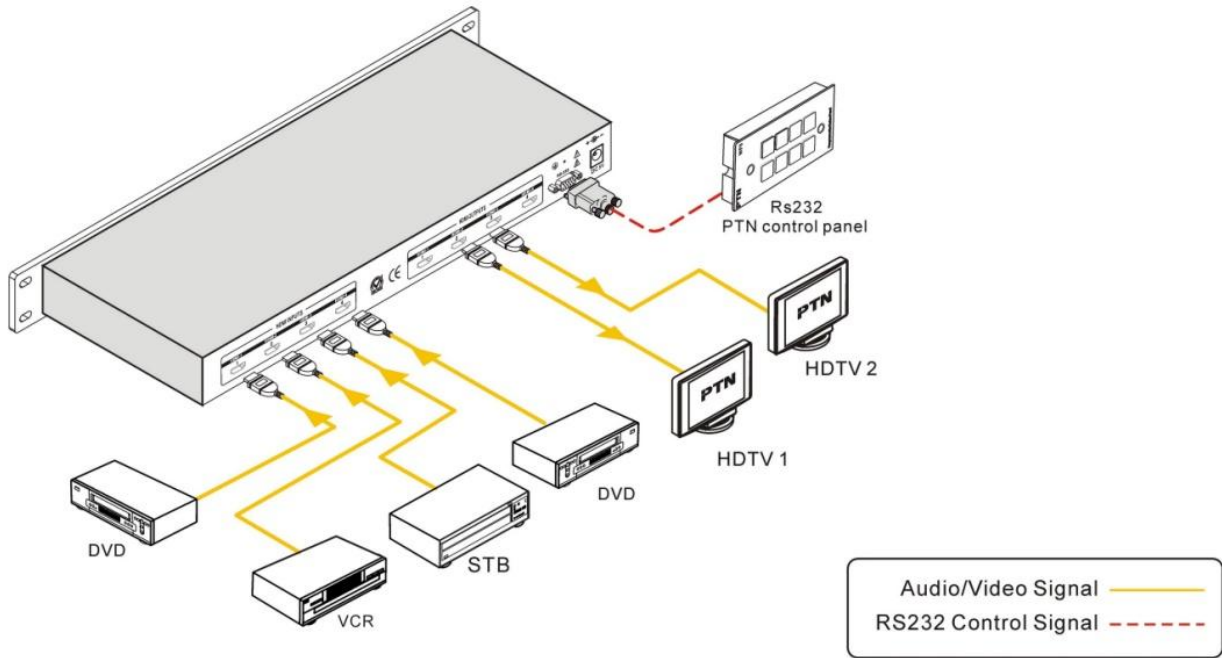
Please refer the details in *Communication Protocol and Command Codes*.



F5-4 MHD connecting to computer

## 6. System Diagram

In MHD switcher series, the numbers of the input/output ports are based on the product bought by the users. For example, MHD44 has four input ports and four output ports, numbered from one to four. According to different occasions, users can connect it to different source signal (computer signal, AV signal etc.) devices, such as DVD player, desktop computer, graphic workstation, digital stage etc. And connect the output ports to a projector, a video recorder, a display or an amplifier. The system diagram of MHD44 is showed as below.



F6-1 MHD44 system connection

## 7. EDID management of MHD44

The RS232 commands for EDID management of MHD44 include: "EDIDMon." & "EDIDMoff." (Please notice the text-transform, and the dot in behind.)

- When the command is correctly sent, all the connected displays will be blank for 2~3 seconds and recover again. And, MHD44 will send out a RS232 feedback command "EDIDMon." or "EDIDMoff."
- When we send the "EDIDMoff." to the MHD matrix switcher, it will recover the factory default EDID data.

## 8. Communication Protocol and Command Codes

Communication protocol: RS232 Communication Protocol

Baud rate: 9600      Data bit: 8      Stop bit: 1      Parity bit: none

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	^/Version;	Inquire the version of firmware
	/:MessageOf f;	Turn off the feedback command from the com port. It will only show the "switcher OK".

	/:MessageOn;	Turn on the feedback command from the com port.
	EDIDMOn.	Enable auto EDID management.
	EDIDMOff.	Disable auto EDID management.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 ... and so on.
Operation Command (PTN2.0 Command System)	[x1]All.	Transfer signals from the input channel [x1] to all output channels
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All\$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]\$.	Switch off the output channel [x1].
	[x1] B[x2].	Transfer both the video and the audio signals from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfer both the video and the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1]P[g].	Transfer both the video and the audio signals from the input channel [x1] to the output group [g].
	[g]PP[x2],[x3],[x4].	Together the output channels [x2], [x3] and [x4] to the output group [g].
	S[g].	Inquire the output channels of output group [g].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.
	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].

**Note:**

1. [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.
2. In above commands, “[” and “]” are symbols for easy reading and do not need to be typed in actual operation.
3. Please remember to end the commands with the ending symbols “.” and “;”.
4. Type the command carefully, it is case-sensitive.

### Detail Examples:

**1、 Transfer signals from an input channel to all output channels: [x1]All.**

Example: “3All.” to transfer signals from the input channel No.3 to all output channels.

**2、 Transfer all input signals to the corresponding output channels respectively: All#.**

Example: After running this command, the status of it will be: 1->1, 2->2, 3->3, 4->4.

**3、 Switch off all the output channels: All\$.**

Example: After running this command, there will be no signals on all the output channels.

**4、 Check the version of the firmware: /^Version;**

To check the version of the firmware.

**5、 Switch off the detail feedback command from the COM port: /:MessageOff;**

It will leave the “switch OK” as the feedback, when you switch the matrix.

**6、 Switch on the detail feedback command from the COM port: /:MessageOn;**

It will show the detail switch information when send the commands.

**7、 Transfer signals from an input channel to the corresponding output channel: [x]#.**

Example: “4#.” to transfer signals from the input channel No.4 to the output channel No.4.

**8、 Switch off an output channel: [x]\$.**

Example: “4\$.” to switch off the output channel No.4.

**9、 Switch both video and audio signals synchronously: [x1] B[x2].**

Example: “2B2,3,4.” to transfer signal from the input channel No.2 to the output channel No.2,3,4.

**10、 Inquire the input channel to the output channel [x]: Status[x].**

Example: “Status3.” to inquire the input channel to the output channel No.3.

**11、 Inquire the input channel to the output channels one by one: Status.**

Example: “Status.” to inquire the input channel to the output channels one by one.

**12、 Save the present operation to the preset command [Y]: Save[Y].**

Example: “Save7.” to save the present operation to the preset command No.7.

**13、 Recall the preset command [Y]: Recall[Y].**

Example: “Recall5.” to recall the preset command No.5.

**14、 Clear the preset command [Y]: Clear[Y].**

Example: “Clear5.” to clear the preset command No.5.

### 9. Safety Operation Guide

In order to guarantee the reliable operation of the equipments and safety of the staff, please abide by the following proceeding in installation, using and maintenance.

The system must be earthed properly. Please do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

- 1) Do not put the switcher in a place of too hot or too cold.
- 2) As the power generating heat when running, the working environment should be maintained fine ventilation, in case of damage caused by overheat.
- 3) Cut off the general power switch in humid weather or left unused for long time.
- 4) Before following operation, ensure that the alternating current wire is pull out of the power supply :
  - Take off or reship any components of the equipment.
  - Take off or rejoin any pin or other link of the equipment.
- 5) As to non-professional or without permission, please DO NOT try to open the casing of the equipment, DO NOT repair it on your own, in case of accident or increasing the damage of the equipment.
- 6) DO NOT splash any chemistry substance or liquid in the equipment or around.

### 10. Troubleshooting & Maintenance

- 1) When the output image in the destination device connected to the HDMI Matrix (MHD) has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.
- 2) When there is a color losing or no video signal output, maybe the HDMI cables haven't been connected as HDMI criterion.
- 3) When user cannot control the switcher by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.
- 4) When switching , there is no output image:
  - Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
  - Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
  - Make sure the destination device is exactly on the controlled output channel.
  - If it is still the same after the above checking, maybe there is something wrong in the switcher. Please send it to the dealer for fixing.
- 5) If the **POWER** indicator doesn't work or no respond to any operation, please make sure the power cord connection is good.
- 6) If the output image is interfered, please make sure the system is earthed well.
- 7) If the static becomes stronger when connecting the HDMI connectors, it may be due to the incorrect earthling of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher.
- 8) If the Matrix cannot be controlled by the keys on the front panel, RS232 port or IR remote, the unit may has already been broken. Please send it to the dealer for fixing.

### 11. After-sales Service

- 1) If there appear some problems when running the switcher, please check and deal with the problems reference to this user manual. Any transport costs are borne by the users during the warranty.
- 2) You can email to our after-sales department or make a call, please tell us the following information about your cases.
  - Product version and name.
  - Detailed failure situations.
  - The system connections.
- 3) We offer products for all three-year warranty, which starts from the first day you buy this product (The purchase invoice shall prevail).
- 4) Any problem is same with one of the following cases listed, we will not offer warranty service but offer for charge.
  - Beyond the warranty.
  - Damage due to incorrectly usage, keeping or repairing.
  - Damage due to device assembly operations by the maintenance company non-assigned.
  - 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.

**Remarks:** For any more questions or problems, please try to get help from your local distributor, or email PTN at [support@PTN-electronics.com](mailto:support@PTN-electronics.com).