

# USER MANUAL

## TPHD402

PTN HDMI/IR/RS232 Twisted Pair over Single Cable



Version: TPHD4022013V1.1

**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     | 2012.12.26 | First version.               |
| 1.1     | 2013.05.24 | Modified the system diagram. |

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## 1. Introduction

### 1.1. Introduction to TPHD402

TPHD402 is an HDMI/IR/RS232 twisted pair including transmitter (TPHD402T) and receiver (TPHD402R). The TPHD402 uses HDBaseT technology to deliver HDMI signal and control signal (IR & RS232), over a single STP cable, max transmission distance up to 70 meters with CAT5e/CAT6 cable.

### 1.2. Package Contents

- 1 x TPHD402T
- 1 x TPHD402R (Packed separately from TPHD402T)
- 4 x Mounting ears (Separated from TPHD402)
- 8 x Screws
- 2 x Power adapter (DC 5V)
- 2 x Captive screw connectors
- 1 x User manual

**Notes:** Please confirm if the product and the accessories are all included, if not, please contact with the dealers.

### 1.3. Installation Procedure

**Step1.** Connect HDMI source (such as Blue-ray DVD) to HDMI IN port of transmitter TPHD402T with HDMI cable.

**Step2.** Connect TP OUT port of TPHD401T and TP IN port of TPHD401R, with single CAT5e/CAT6 cable.

**Step3.** Connect HDMI displayer (such as HDTV) to HDMI OUT port of TPHD402R with HDMI cable.

**Step4.** Connect DC5V power adaptors to both TPHD402T and TPHD402R.

**Step5.** Both TPHD402T and TPHD402R have IR IN and OUT. When one model use for IR signal receiver, the IR signal must be sent out by the other model.

For example: When “IR IN” of TPHD402T connects with an IR receiver, the IR sender must connect to “IR OUT” of TPHD402R.

## 2. Features

- Support Full HD: Delivers high resolution image (1080p@60Hz@48 b/pixels/3D/4Kx2K).
- Max transmission distance is up to 70 meters over single CAT5e/CAT6 cable.
- High Bandwidth: 10.2Gps.
- HDTV Compatible, use HDMI 1.4 and HDCP compliant.
- Connect with a displayer to transmit EDID and HPD signals constantly by using a CAT5e twist pair.
- Bi-directional RS232 control.
- Bi-directional IR control.
- Use HDBaseT technology.
- LED indicators show work status.
- Wall/table-mountable aluminium enclosure, PT case design.
- External international power supply (100Volt~240Volt AC, 50/60Hz).

## 3. Specification

| Spec \ Model      | TPHD402T                                   | TPHD402R                                   |
|-------------------|--------------------------------------------|--------------------------------------------|
| <b>Input</b>      |                                            |                                            |
| Input Signal      | 1 HDMI, 1 IR & 1 RS232                     | 1 IR, 1 RJ-45 & 1 RS232                    |
| Input Connector   | HDMI female, 3.5mm mini jack               | 3.5mm mini jack, RJ-45                     |
| Video Signal      | HDMI1.4                                    | HDMI1.4                                    |
| Audio             | Digital audio, transmit through HDMI audio | Digital audio, transmit through HDMI audio |
| <b>Output</b>     |                                            |                                            |
| Output            | 1 RJ-45, 1 IR                              | 1 HDMI, 1 IR                               |
| Output Connector  | RJ-45, 3.5mm mini jack                     | HDMI female, 3.5mm mini jack               |
| Video signal      | HDMI1.4                                    | HDMI1.4                                    |
| Transmission Mode | HD Base T                                  |                                            |
| <b>General</b>    |                                            |                                            |
| Resolution Range  | 800x600 ~ 1920x1200                        |                                            |

## HDMI/IR/RS232 Twisted Pair over Single Cable

|                          |                          |                  |
|--------------------------|--------------------------|------------------|
| Transmission Distance    | Max distance 70M         |                  |
| Gain                     | 0dB ~ 10dB@100MHz        |                  |
| Differential Phase Error | ±10° @ 135MHz_100M       |                  |
| SNR                      | >70dB@ 100MHz-100M       |                  |
| Bandwidth                | 10.2Gbps                 |                  |
| Return Lost              | <-30dB@5KHz              |                  |
| THD                      | <0.005%@1KHz             |                  |
| HDMI Standard            | Support HDMI1.4 and HDCP |                  |
| Min. ~Max. Level         | <0.3V ~ 1.45Vp-p         |                  |
| Impedance                | 75Ω                      |                  |
| Temperature              | -20 ~ +60℃               |                  |
| Humidity                 | 10% ~ 90%                |                  |
| Power Supply             | DC 5V,                   |                  |
| Power Consumption        | 6.5W                     |                  |
| Case Dimension           | W77xH30x D134 mm         | W77xH30x D134 mm |
| Net Weight               | 0.5Kg                    | 0.5Kg            |

**NOTE:** All nominal levels are at ±10%.

## 4. System Connection

### 4.1. Interface Connection Introduction

#### 4.1.1. Interface Introduction to TPHD402T



1) IR: IR receiver.

2) ON/LINK/IN LED Indicators: All are green LED.

ON: Working status indicator of this device. When the device works fine, the LED will keep blinking. And it will get off when the device stops work.

LINK: Twisted Pair Link status indicator. It will keep on when connection is

successful.

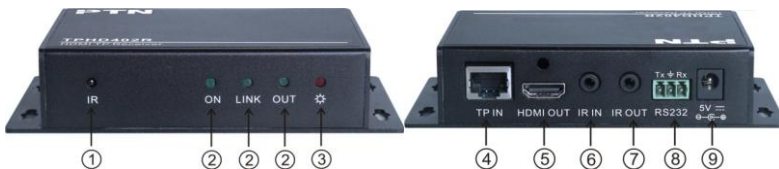
IN: When connected with devices support HDCP and work normally this LED will keep on. If devices not support HDCP, the LED will blink.

- 3) POWER LED: LED indicator of power. When connect with power, red LED will keep on.
- 4) TP OUT: Single TP cable connects to TP IN port in TPHD402R.
- 5) HDMI IN: Connect to HDMI source.
- 6) IR IN: Connect with IR receiver, the IR signal received from this port can only send out in TPHD402R.

**NOTICE: When there is IR receiver connected to this port, the port (1) will be unavailable.**

- 7) IR OUT: Connect with IR sender, the sending IR signal are received from TPHD402R.
- 8) RS232: RS232 connector.
- 9) 5V DC: Connect with power supply.

**4.1.2. Interface Introduction to TPHD402R**



- 1) IR: IR receiver.
- 2) ON/LINK/OUT LED Indicators: All are green LED.
  - ON: Working status indicator of this device. When the device works fine, the LED will keep blinking. And it will get off when the device stops work.
  - LINK: Twisted Pair Link status indicator. It will keep on when connection is successful.
  - OUT: When connected with devices support HDCP and work normally this LED will keep on. If devices not support HDCP, the LED will blink.
- 3) POWER LED: LED indicator of power. When connect with power, red LED will keep on.
- 4) TP IN: Single TP cable connects to TP OUT port in TPHD402T.
- 5) HDMI OUT: Connect to HDMI display, HDMI signal output.

## HDMI/IR/RS232 Twisted Pair over Single Cable

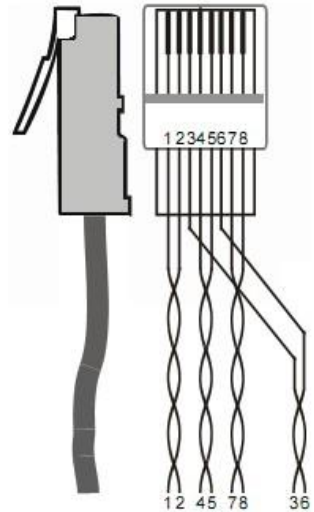
- 6) IR IN: Connect with IR receiver, the IR signal received from this port can only send out in TPHD402T.

**NOTICE: When there is IR receiver connected to this port, the port (1) will be unavailable.**

- 7) IR OUT: Connect with IR sender, the sending IR signal are received from TPHD402R.
- 8) RS232: RS232 connector.
- 9) 5V DC: Connect with power supply.

### 4.2. Twisted Pair Cable Connection

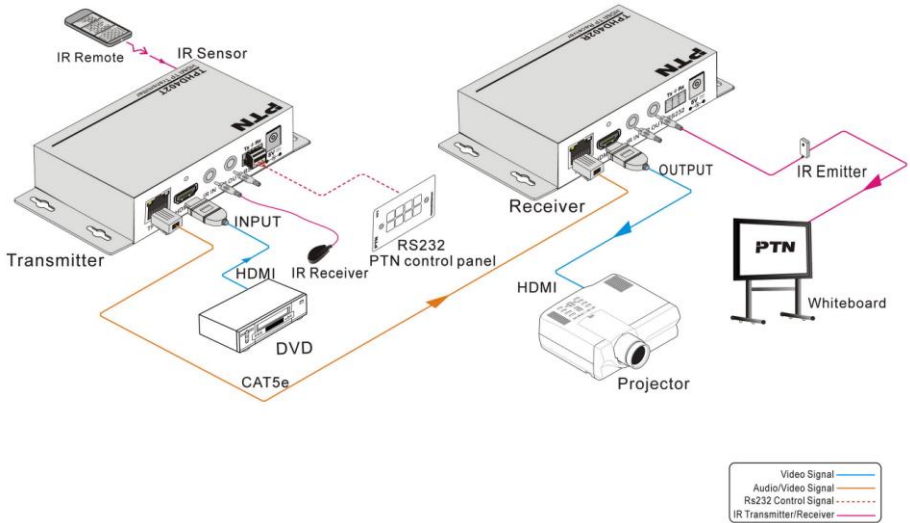
| TIA/EIA T568A |              | TIA/EIA T568B |              |
|---------------|--------------|---------------|--------------|
| Pin           | Cable color  | Pin           | Cable color  |
| 1             | green white  | 1             | orange white |
| 2             | green        | 2             | orange       |
| 3             | orange white | 3             | green white  |
| 4             | blue         | 4             | blue         |
| 5             | blue white   | 5             | blue white   |
| 6             | orange       | 6             | green        |
| 7             | brown white  | 7             | brown white  |
| 8             | brown        | 8             | brown        |
|               |              |               |              |
| 1st Ground    | 4--5         | 1st Ground    | 4--5         |
| 2nd Ground    | 3--6         | 2nd Ground    | 1--2         |
| 3rd Group     | 1--2         | 3rd Group     | 3--6         |
| 4th Group     | 7--8         | 4th Group     | 7--8         |



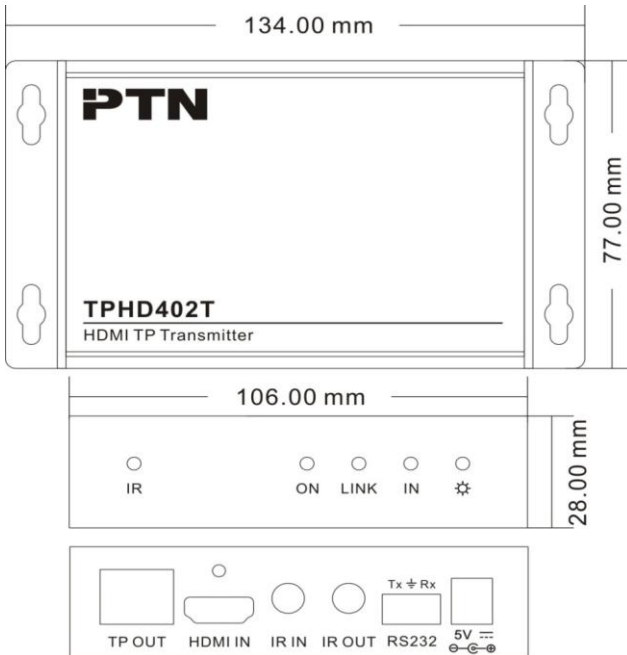
**Notice:** Cable connectors MUST be metal one, the shielded layer of cable MUST be connected to the connector's metal shell, to make a better transmission.

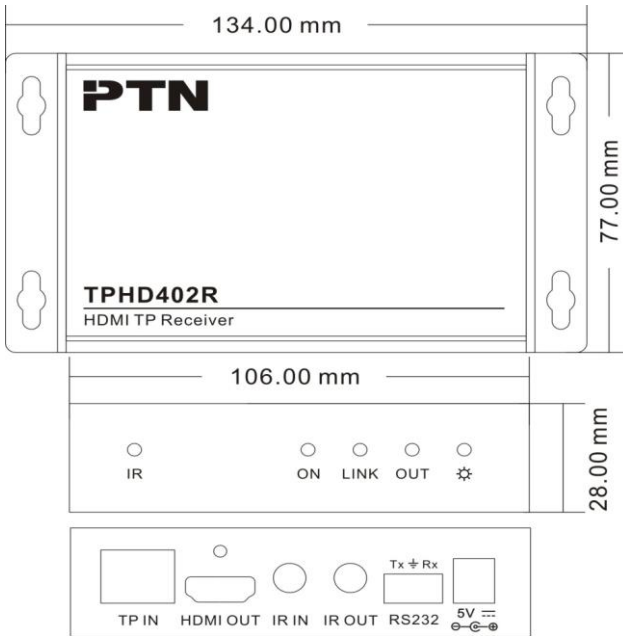


## 5. System Diagram



## 6. Panel Drawing





## 7. Troubleshooting & Maintenance

- 1) When images of terminal unit output with ghost, such as the projector output with ghost. Generally this is not a unit faulty, this may be caused by an incorrect setting on the projector or a bad quality of cable. Please check the projector's setting or try another high quality connection cable.
- 2) When there is a color losing or no video signal output, please check the input and output end connections of the cables.
- 3) When user cannot control the extender 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.

- If it is still the same after the above checking, maybe there is something wrong in the extender. Please send it to the dealer for fixing.
- 5) If the static becomes stronger when connecting the video connectors, it probably due to bad grounding, please check the grounding and make sure it connected well, otherwise it would damage the extender.
- 6) If the extender cannot be controlled by the RS232 port or remote controller, the unit may have already been broken. Please send it to the dealer for repairing.

## **8. 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:

- 1) The system must be earthed properly. Do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.
- 2) Do not put the switcher in a place of too hot or too cold.
- 3) As the power generating heat when running, the working environment should be maintained fine ventilation, in case of damage caused by overheat.
- 4) Cut off the general power switch in humid weather or left unused for long time.
- 5) 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.
- 6) 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.
- 7) DO NOT splash any chemistry substance or liquid in the equipment or around.

## 9. After-sales Service

- 1) If there appear some problems when running TPHD402, 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 formation of the cases.
- 3) We offer products for all one-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.
- 5) This document is just a user manual released with the product, not a quality guarantee. Any corrections or new function introductions added, we will update this document without further notice.

**Remarks:** For any 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).