EXT.HDMI70IRSE
HDMI/IR/RS232 Twisted Pair Extender

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Version: EXT.HDMI70IRSE_2016V1.1
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.
HDMI/IR/RS232 Twisted Pair Extender

NOTICE: Please read this user manual carefully before using this product. Pictures shown in this manual are for reference only, different model and specifications are subject to real product.

This manual is for operation instruction only, not for any maintenance usage. The functions described in this version are updated till December 2016. 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 2016-12-5.
HDMI/IR/RS232 Twisted Pair Extender

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1. Introduction

1.1. Introduction to the EXT.HDMI70IRSE

The EXT.HDMI70IRSE is an HDMI/IR/RS232 twisted pair including a transmitter and a receiver. The extender uses HDBaseT technology to deliver HDMI signal and control signal (IR & RS232), and supports max transmission distance up to 60 meters with CAT5e/CAT6 cable.

1.2. Features

- Support Full HD: Delivers high resolution image (1080p@60Hz@48 b/pixels/3D/4Kx2K).
- Max transmission distance is up to 60 meters over single CAT5e/CAT6 cable.
- High Bandwidth: 10.2Gps.
- HDTV Compatible, 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.

1.3. Package Contents

- 1 x EXT.HDMI70IRSET
- 1 x EXT.HDMI70IRSER (Packed separately from EXT.HDMI70IRSET)
- 8 x Plastic cushions
- 4 x Mounting ears (Separated from the EXT.HDMI70IRSET and EXT.HDMI70IRSER)
- 2 x RS232 cables
- 8 x Screws
- 2 x Power adapters (DC 5V)
- 1 x User manual

Note: Please confirm if the product and the accessories are all included, if not, please contact with the dealers.
2. Product Appearance

2.1. Appearance of EXT.HDMI70IRSET

1) 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 turn off when the device stops working.
   - LINK: Twisted Pair Link status indicator, green LED. It will keep on when connection is successful.
   - IN: When connected with devices support HDCP and work normally this green LED will keep on. If devices not support HDCP, the LED will blink.

2) POWER LED: Red LED indicator of power. It will keep on when power on.

3) HDBT OUT: Connects to HDBT IN port in the EXT.HDMI70IRSER via single CAT5e/CAT6 cable.

4) HDMI IN: Connect to HDMI source device.

5) IR IN: Connect with IR receiver, receive IR signals sent from the EXT.HDMI70IRSER only.

6) IR OUT: Connect with IR emitter, the sending IR signal are received by the EXT.HDMI70IRSER.

7) RS232: Serial port, 3-pin captive screw connector, connects with the control terminal to control the controlled terminal, supports bi-directional RS232 control between the EXT.HDMI70IRSER and the EXT.HDMI70IRSER.

8) 5V DC: Connect with DC 5V power adapter.

Note: Pictures shown in this manual are for reference only, different model and specifications are subject to real product.
2.2. Appearance of EXT.HDMI70IRSER

1) 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 turn off when the device stops working.
   - LINK: Twisted Pair Link status indicator. It will keep on when connection is successful.
   - OUT: When connected with devices which support HDCP and work normally, it will keep on. If the connected devices don’t support HDCP, the LED will blink.

2) POWER LED: Red LED indicator of power. It will keep on when power on.

3) HDBT IN: Connects to HDBT OUT port in EXT.HDMI70IRSET via single CAT5e/CAT6 cable.

4) HDMI OUT: Connect to HDMI display, HDMI signal output.

5) IR IN: Connect with IR receiver, receive IR signals sent from EXT.HDMI70IRSET only.

6) IR OUT: Connect with IR emitter, the sending IR signal are received by EXT.HDMI70IRSET.

7) RS232: Serial port, 3-pin captive screw connector, connects with the control terminal to control the controlled terminal, supports bi-directional RS232 control between the EXT.HDMI70IRSET and the EXT.HDMI70IRSER.

8) 5V DC: Connect with DC 5V power adapter.

**Note:** Pictures shown in this manual are for reference only, different model and specifications are subject to real product.
3. System Connection

3.1. Usage Precautions

1) System should be installed in a clean environment and has a 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

3.3. Connection Procedures

**Step 1.** Connect HDMI source (such as Blue-ray DVD) to **HDMI IN** port of the EXT.HDMI70IRSET with HDMI cable.

**Step 2.** Connect **HDBT OUT** port of the EXT.HDMI70IRSET to **HDBT IN** port of the EXT.HDMI70IRSER, with single CAT5e/CAT6 cable.

**Step 3.** Connect HDMI display (such as a HDTV) to **HDMI OUT** port of the EXT.HDMI70IRSER with HDMI cable.

**Step 4.** Both the EXT.HDMI70IRSET and the EXT.HDMI70IRSER have IR IN and OUT. When one model is used as IR signal receiver, the IR signal must be sent out by the other model.

For example: When **IR IN** port of the EXT.HDMI70IRSET connects with an IR
receiver, the IR emitter must be connected to IR OUT port of EXT.HDMI70IRSER.

**Step5.** Both the EXT.HDMI70IRSET and EXT.HDMI70IRSER have an RS232 port. Connect the RS232 port of one device to a computer, and connect the RS232 port of the other one to the device to be controlled.

**Note:** RS232 signal can be transmitted bi-directionally between the EXT.HDMI70IRSET and the EXT.HDMI70IRSER.

**Step6.** Connect DC 5V power adaptors to both the EXT.HDMI70IRSET and the EXT.HDMI70IRSER.

### 3.4. Twisted Pair and RS232 Cable Connection

#### Twisted Pair

The twisted pair used in the EXT.HDMI70IRSE MUST be a straight-through cable. The connectors can be T568A or T568B, but both sides must be the same.

<table>
<thead>
<tr>
<th>TIA/EIA T568A</th>
<th>TIA/EIA T568B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin</td>
<td>Cable color</td>
</tr>
<tr>
<td>1</td>
<td>green white</td>
</tr>
<tr>
<td>2</td>
<td>green</td>
</tr>
<tr>
<td>3</td>
<td>orange white</td>
</tr>
<tr>
<td>4</td>
<td>blue</td>
</tr>
<tr>
<td>5</td>
<td>blue white</td>
</tr>
<tr>
<td>6</td>
<td>orange</td>
</tr>
<tr>
<td>7</td>
<td>brown white</td>
</tr>
<tr>
<td>8</td>
<td>brown</td>
</tr>
</tbody>
</table>

1st Group | 4--5  1st Ground | 4--5
2nd Group | 3--6  2nd Ground | 1--2
3rd Group | 1--2  3rd Group | 3--6
4th Group | 7--8  4th Group | 7--8

**Note:** Please use a CAT5e cable with low impedance (Shielded twisted pair will be better and should be well grounded) for good transmission effect.

**RS232**

With the RS232 port, the HDMI twisted pair extender can be control by several kinds of control systems. The RS232 cable is a female 9-pin D to 3p captive screw connector. The definition of its pins is listed in the table below.
### 3.5. Application

The EXT.HDMI70IRSE has a good application in computer realm, monitoring, big-screen displaying, meeting room, education and bank & security institution etc.

### 4. Application Solution

#### 4.1. System Diagram
4.2. Product Assortment Description

1) **Mini scaler switcher**
   - 6 video Inputs: 2 x HDMI, 1 x VGA, 1 x YPbPr, 1 x C-video & 1 x S-video, and upscale to HDMI output at 1080P.
   - Support VGA resolutions: 640x480, 800x600, 1024x768, 1280x1024, 1280x768, 1360x768@60Hz, 1920x1080.
   - Built-in PAL/NTSC and audio format automatic identification technologies, with good video and audio processing technology for high performance.
   - 3 audio outputs: HDMI embedded audio, 3.5mm stereo audio and Coaxial (SPDIF).
   - Output display H/V size, position, image color adjustable and output image freezable.
   - Built-in breakpoint memory and power-off protection function.

2) **Mini digital amplifier**
   - 2x20Watt@4Ω as the default amplifier output.
   - Bridge connection function. User can switch the amplifier to be 1x40Watt@8Ω by bridge connection.
   - 48V phantom power to support condenser microphone.
   - MIC port supports balance/unbalance signal, with which it can suppress the external noise effectively.
### 5. Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>EXT.HDMI70IRSET</th>
<th>EXT.HDMI70IRSER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Signal</td>
<td>1 HDMI, 1 IR &amp; 1 RS232</td>
<td>1 IR, 1 RJ-45 &amp; 1 RS232</td>
</tr>
<tr>
<td>Input Connector</td>
<td>HDMI female, 3.5mm mini jack, 3p captive screw</td>
<td>3.5mm mini jack, RJ-45, 3p captive screw</td>
</tr>
<tr>
<td>Video Signal</td>
<td>HDMI1.4</td>
<td>HDMI1.4</td>
</tr>
<tr>
<td>Audio</td>
<td>Digital audio, can be transmitted through RGB or Y, Cr, Cb lines</td>
<td>Digital audio, can be transmitted through RGB or Y, Cr, Cb lines</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>1 RJ-45, 1 IR, 1 RS232 (through RJ-45)</td>
<td>1 HDMI, 1 IR, 1 RS232 (through RJ-45)</td>
</tr>
<tr>
<td>Output Connector</td>
<td>RJ-45, 3.5mm mini jack</td>
<td>HDMI female, 3.5mm mini jack</td>
</tr>
<tr>
<td>Video Signal</td>
<td>HDMI1.4</td>
<td>HDMI1.4</td>
</tr>
<tr>
<td>Transmission Mode</td>
<td>HDBaseT</td>
<td></td>
</tr>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution Range</td>
<td>800x600 ~ 1920x1200, 3D/4Kx2K</td>
<td></td>
</tr>
<tr>
<td>Transmission Distance</td>
<td>Max distance 60m</td>
<td></td>
</tr>
<tr>
<td>Gain</td>
<td>0dB ~ 10dB@100MHz</td>
<td></td>
</tr>
<tr>
<td>Differential Phase Error</td>
<td>±10° @ 135MHz_100M</td>
<td></td>
</tr>
<tr>
<td>SNR</td>
<td>&gt;70dB@ 100MHz-100M</td>
<td></td>
</tr>
<tr>
<td>Bandwidth</td>
<td>10.2Gbps</td>
<td></td>
</tr>
<tr>
<td>Return Lost</td>
<td>&lt;-30dB@5KHz</td>
<td></td>
</tr>
<tr>
<td>THD</td>
<td>&lt;0.005%@1KHz</td>
<td></td>
</tr>
<tr>
<td>HDMI Standard</td>
<td>Support HDMI1.4 and HDCP</td>
<td></td>
</tr>
<tr>
<td>Min.~Max. Level</td>
<td>&lt;0.3V ~ 1.45Vp-p</td>
<td></td>
</tr>
<tr>
<td>Impedance</td>
<td>75Ω</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>-20 ~ +70°C</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>10% ~ 90%</td>
<td></td>
</tr>
<tr>
<td>Power Supply</td>
<td>DC 5V</td>
<td></td>
</tr>
<tr>
<td>Power Consumption</td>
<td>6.5W</td>
<td></td>
</tr>
<tr>
<td>Dimension (W<em>H</em>D)</td>
<td>77 x 30 x 110 mm</td>
<td>77 x 30 x 110 mm</td>
</tr>
<tr>
<td>Net Weight</td>
<td>0.2Kg</td>
<td>0.2Kg</td>
</tr>
</tbody>
</table>
NOTE: All nominal levels are at ±10%.

6. Panel Drawing

6-1 EXT.HDMI70IRSET

6-2 EXT.HDMI70IR
### 7. Troubleshooting & Maintenance

<table>
<thead>
<tr>
<th>Problems</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output images in display show with ghost</td>
<td>Incorrect setting on the display</td>
<td>Check the display’s setting</td>
</tr>
<tr>
<td></td>
<td>A cable of bad quality</td>
<td>Try another high quality connection cable</td>
</tr>
<tr>
<td>No output image when switching</td>
<td>No signal at the input / output end</td>
<td>Check with oscilloscope or multimeter if there is any signal at the input / output end.</td>
</tr>
<tr>
<td></td>
<td>Fail or loose connection</td>
<td>Make sure the connection is good</td>
</tr>
<tr>
<td></td>
<td>The extender is broken</td>
<td>Send it to authorized dealer for repairing.</td>
</tr>
<tr>
<td>Cannot control the device by control device (e.g. a PC) through RS232 port</td>
<td>Wrong RS232 communication parameters</td>
<td>Make sure the RS232 communication parameters are correct.</td>
</tr>
<tr>
<td></td>
<td>The device has already been broken</td>
<td>Send it to authorized dealer for repairing.</td>
</tr>
<tr>
<td>Static becomes stronger when connecting the video connectors</td>
<td>Bad grounding</td>
<td>Check the grounding and make sure it is connected well.</td>
</tr>
<tr>
<td>Cannot control the device by RS232 / IR</td>
<td>The device has already been broken</td>
<td>Send it to authorized dealer for repairing.</td>
</tr>
</tbody>
</table>

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

If there appear some problems when running the device, please check and deal with the problems reference to this user manual. Any transport costs are borne by the users during the warranty.

1) **Product Limited Warranty:** We warrants that our products will be free from defects in materials and workmanship for **three years**, which starts from the first day you buy this product (The purchase invoice shall prevail).

   Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service.

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.
   - Servicing not authorized
   - Any 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.