



# 4K Ultra HD HDBaseT™

Multi-Format 2x1 Auto-Switching Wall-Plate Sender w/ Scaler  
Receiver w/ Audio De-Embedder and POH

EXT-UHDV-WP-HBTL5-TX  
EXT-UHDA-HBTL-RX



User Manual  
Version A1

# Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this product near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp. Do not expose this product to rain or moisture.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Batteries that may be included with this product and/or accessories should never be exposed to open flame or excessive heat. Always dispose of used batteries according to the instructions.

# Warranty Information

For the latest warranty coverage information, refer to the Warranty and Return Policy under the Connect section of the Gefen website at <http://www.gefen.com/connect/warranty-and-return-policy>

## Technical Support

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## Important

- While Unshielded (UTP) CAT-5e is usually adequate, shielded (STP) CAT-6A is recommended. Shielded (STP) CAT-5e or unshielded (UTP) CAT-5e or CAT-6A may be acceptable depending on cable quality. Care should always be given to keep these cables away from power lines and other sources of electromagnetic interference.
- Cable quality is critical when handling 4K HDMI signals. We highly recommend Gefen HDMI cables. They have been designed and tested to reliably transport the full throughput of HDMI standard.
- Power Over HDBaseT (POH) is a standard HDBaseT™ implementation of PoE that provides power from one device to the other over the link cable. While this Sender and Receiver units comply with the POH standard, the EXT-UHDA-HBTL-RX Receiver unit can power the Sender, but the EXT-UHDV-WP-HBTL-TX Sender can only receive power from the Receiver. In applications where the EXT-UHDV-WP-HBTL-TX is used with a non-POH receiver, the Sender will need to be powered locally by a 12V power supply, sold separately. Please see instructions on [page 18](#) of this manual regarding powering the Sender unit locally.
- The EXT-UHDV-WP-HBTL-TX is HDCP 1.4 compliant. Although the EXT-UHDA-HBTL-RX can pass both HDCP 2.2 and 1.4, when the two units are used together, only HDCP 1.4 will pass through.
- The information in this manual has been carefully checked and is believed to be accurate. However, Gefen and Core Brands, LLC assume no responsibility for any inaccuracies that may be contained in this manual. In no event will Gefen and Core Brands, LLC be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual.
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- jQuery

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## EXT-UHDV-WP-HBTL5-TX\*

- Supports 340 MHz TMDS Clock and data throughput of up to 10.2 Gbps
- Automatic switching of HDMI and VGA inputs
- Manual switching of HDMI and VGA inputs via front panel button or RS-232
- VGA scaling up to 1920 x 1200 with picture adjustments
- Extend HDMI, VGA with analog audio, and RS-232 over a single CAT-5e:
  - 4K Ultra HD (3840 x 2160 @ 60 Hz, 4:2:0), up to 130 ft/40 m, 8-bit color (HDMI only)
  - 4K Ultra HD (3840 x 2160 @ 30 Hz, 4:4:4), up to 130 ft/40 m, 8-bit color (HDMI only)
  - 4K Cinema (DCI) (4096 x 2160 @ 24 or 30 Hz 4:4:4), up to 130 ft/40 m, 8-bit color (HDMI only)
  - 1080p Full HD (60 Hz) or WUXGA (1920x1200 @ 60 Hz), up to 230 ft/70 m, up to 12-bit Deep Color
- HDMI Features Supported:
  - HDMI 2.0
  - HDCP 1.4
  - 12-bit Deep Color (at 1080p)
  - LPCM 7.1, Dolby Atmos®, Dolby® TrueHD, DTS:X™, and DTS-HD Master Audio™ pass-through
  - 3DTV pass-through
  - CEC pass-through
  - Lip Sync pass-through
- Analog L/R audio input for VGA
- RS-232 control of switching, scaler, and EDID management functions
- Bi-Directional RS-232 extension when used with EXT-UHDA-HBTL-RX
- Power over HDBaseT™ (POH) provides power to the Sender from a compatible Receiver over the link cable
- Sender can also be locally powered using the 2-pin Phoenix connector on back panel
- Uses Gefen's implementation of HDBaseT™ technology with enhanced features
- Advanced EDID Management for rapid integration of source and display
- Field-updateable firmware via USB Micro-B and RS-232 ports, using the Gefen Syner-C™ software
- North American standard 2-gang wall-plate form factor
- Works with most standard North American 2-gang Decora® wall-plates (white wall-plate is included)
- Works with most North American 2-gang table boxes and "open-back" low-voltage installation brackets

\*Features and specifications are subject to change without notice.

### EXT-UHDA-HBTL-RX\*

- Supports 340 MHz TMDS Clock and data throughput of up to 10.2 Gbps
- Extends HDMI, 2-way IR, and RS-232 over a single CAT-5e:
  - 4K Ultra HD (3840 x 2160 @ 60 Hz, 4:2:0), up to 130 ft/40 m, 8-bit color
  - 4K Ultra HD (3840 x 2160 @ 30 Hz, 4:4:4), up to 130 ft/40 m, 8-bit color
  - 4K Cinema-DCI (4096 x 2160 @ 24 or 30 Hz 4:4:4), up to 130 ft/40 m, 8-bit color
  - 1080p Full HD (60 Hz) or WUXGA (1920x1200 @ 60 Hz), up to 230 ft/70 m, up to 12-bit Deep Color
- HDMI Features Supported:
  - HDMI 2.0
  - HDCP 2.2 and 1.4
  - 12-bit Deep Color (at 1080p)
  - LPCM 7.1, Dolby Atmos®, Dolby® TrueHD, DTS:X™, and DTS-HD Master Audio™ pass-through
  - 3DTV pass-through
  - CEC pass-through
  - Lip Sync pass-through
- RS-232 control of switching, scaler, and EDID management functions of a compatible Sender (such as EXT-UHDV-WP-HBTL-TX and EXT-UHDV-HBTL-TX)
- Bi-Directional RS-232 extension when used with a compatible Sender (such as EXT-UHDV-WP-HBTL-TX and EXT-UHDV-HBTL-TX)
- 2-way IR extension when used with a compatible Sender (EXT-UHDV-HBTL-TX)
- Digital (optical and coaxial) and Analog audio breakout
- Bi-Directional Power over HDBase™ (POH) provides power to the Receiver or a compatible Sender unit (such as EXT-UHDV-HBTL-TX) over the link cable - only one side will need external power
- Provides Power over HDBase™ (POH) to a compatible Sender unit (such as EXT-UHDV-WP-HBTL-TX) over the link cable
- Uses Gefen's implementation of HDBase™ technology with enhanced features
- Locking power connector
- Compact, ultra-low-profile enclosure is surface-mountable and can be hidden away

## **EXT-UHDV-WP-HBTL-TX\***

The following items are included in the EXT-UHDV-WP-HBTL-TX package. If any of these items are not present in the box when you first open it, please contact Gefen Technical Support as soon as possible.

- (1) 4K Ultra HD Multi-Format 2x1 HDBaseT™ Sender unit
- (1) White trim plate
- (4) Trim-plate screws
- (4) Mounting screws
- (1) 2-pin Phoenix plug (attached to unit)
- (1) 4-pin Phoenix plug (attached to unit)
- (1) Quick Start Guide

## **EXT-UHDA-HBTL-RX\***

The following items are included in the EXT-UHDA-HBTL-RX. If any of these items are not present in the box when you first open it, please contact Gefen Technical Support as soon as possible.

- (1) 4K Ultra HD HDBaseT™ Receiver unit
- (1) 12V DC power supply with locking connector
- (1) 3-pin Phoenix plug (attached to unit)
- (2) Mounting Brackets
- (4) Self-adhesive rubber feet
- (1) Quick-Start Guide

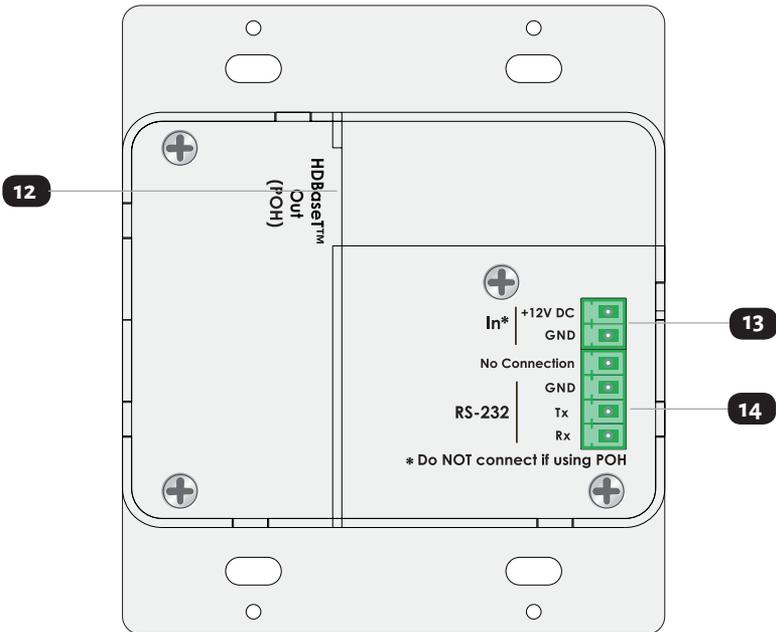
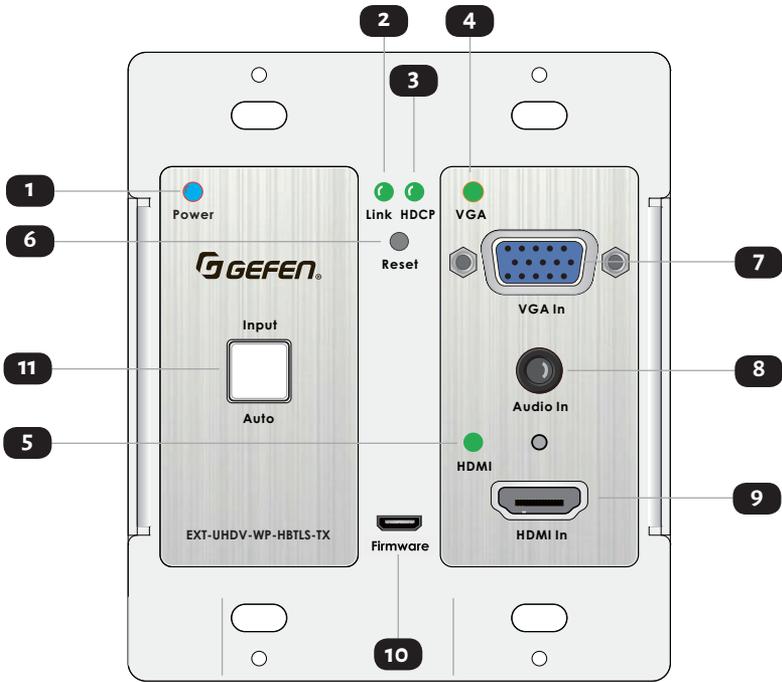
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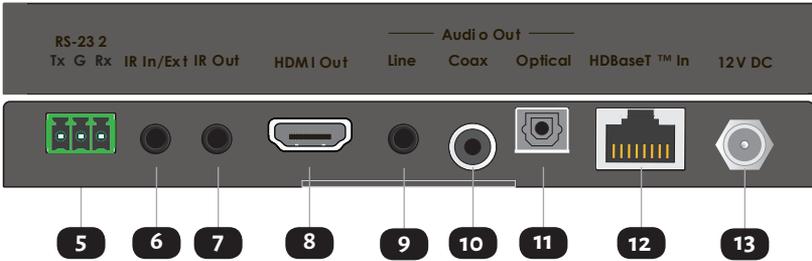
## EXT-UHDV-WP-HBTL5-TX



ID	Name	Description
1	Power Indicator	This LED indicator glows solid blue when the unit is powered. See <a href="#">LED Status (Page 20)</a> for more information.
2	Link Indicator	This LED glows solid green when a link is established between the Sender and Receiver. See <a href="#">LED Status (Page 20)</a> for more information.
3	HDCP Indicator	This LED indicator glows solid green when the active HDMI signal contains HDCP encryption. See <a href="#">LED Status (Page 20)</a> for more information.
4	VGA Indicator	This LED indicator glows solid green when the VGA input has been selected. See <a href="#">LED Status (Page 20)</a> for more information.
5	HDMI Indicator	This LED indicator glows solid green when the HDMI input has been selected. See <a href="#">LED Status (Page 20)</a> for more information.
6	Reset Button	Press and release this button with a thin blunt object to perform a “soft” reset.
7	VGA Video Input	Connect a VGA cable from your source to this input.
8	VGA Audio Input	Connect a 3.5mm stereo audio cable from the analog stereo audio output of your source to be used with the VGA input.
9	HDMI Input	Connect a Gefen HDMI cable from your source to this input.
10	Firmware Update Port	To do a firmware update, attach a USB thumb drive containing the new firmware to this port, using a USB Micro-B male to USB Type-A female cable or adaptor. The Gefen Syner-C™ software, running on a PC connected to the RS-232 port of the Sender unit ( <a href="#">Page 28</a> ) will administer the firmware update process.

ID	Name	Description
11	Input/Auto Switch	To switch between HDMI and VGA inputs, press and release this button. To activate or deactivate Auto-Switching, press and hold this button for 3 seconds or longer until the function engages or disengages. This button will be illuminated when Auto-Switching is active. See <a href="#">LED Status (Page 20)</a> for more information.
12	HDBaseT™ Link Connector	Connect a CAT-5e or better cable, up to the recommended length for a given resolution, from this port to the HDBaseT™ In port on the Receiver unit. <b>This Sender can receive power over the CAT-5 cable from a POH compatible Receiver such as the EXT-UHDA-HBTL-RX, but it cannot supply power to a Receiver.</b>
13	12V DC Input	While we highly recommend that the Sender unit is powered through the Receiver unit via POH, in cases where a non-POH Receiver is used, the Sender's 12V DC 2-pin Phoenix connector can be wired to a 12V power supply with a current capability of between 1 to 2A. Please see more details under <a href="#">+12V Wiring for the EXT-UHDV-WP-HBTL-TX (Page 18)</a>
14	RS-232 Port	<b>This port can be used for extending 2-way RS-232 communications between the Sender and the Receiver, for local control of the Sender, and for Gefen Syner-G™ interface using an Rs-232 connection with a computer.</b> Connect Tx, Rx, and Ground from an automation control device or an RS-232 device-to-be-controlled, using the removable 3-pin “Captive Screw” Phoenix connector. <b>Please note that The Sender and Receiver's Tx, Rx, and Ground pin-outs for their Phoenix connectors are different. To ensure proper operation, please follow the pin-out of each connector as printed on each unit's enclosure.</b>

### EXT-UHDA-HBTL-RX



ID	Name	Description
1	RS-232/Program Switch	This 3-position slide switch places the unit in RS-232 extension or factory service modes (Prog 1 and Prog 2). <b>During normal operation, this switch should be in RS-232 Pass-Thru position.</b>
2	Link Indicator	This LED glows solid green when a link is established between the Sender and Receiver. See <a href="#">LED Status (Page 20)</a> for more information.
3	HDCP Indicator	This LED indicator glows solid green when the active HDMI signal contains HDCP encryption. See <a href="#">LED Status (Page 20)</a> for more information.
4	Power Indicator	This LED indicator glows solid blue when the unit is powered. See <a href="#">LED Status (Page 20)</a> for more information.

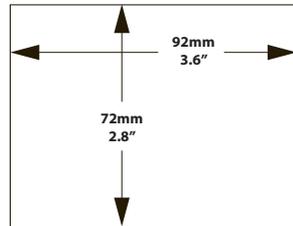
ID	Name	Description
5	RS-232 Port	<p><b>This port can be used for extending 2-way RS-232 communications between the Sender and the Receiver, for remote control of the Sender, for Gefen Syner-G™ interface using an Rs-232 connection with a computer.</b> Connect Tx, Rx, and Ground from an automation control device or an RS-232 device-to-be-controlled, using the removable 3-pin “Captive Screw” Phoenix connector. <b>Please note that The Sender and Receiver's Tx, Rx, and Ground pin-outs for their Phoenix connectors are different. To ensure proper operation, please follow the pin-out of each connector as printed on each unit's enclosure.</b></p>
6	IR In/Ext	<p><b>THIS FEATURE IS NOT ACTIVE WHEN CONNECTED TO EXT-UHDV-WP-HBTL5-TX:</b> 3.5mm mini-stereo jack. Connect an IR Extender (Gefen part no. EXT-RMT-EXTIRN) to this port. Alternatively, connect a 3.5mm mini-stereo connector from this port to the output of an automation system with an electrical IR output.</p>
7	IR Out	<p><b>THIS FEATURE IS NOT ACTIVE WHEN CONNECTED TO EXT-UHDV-WP-HBTL5-TX:</b> Connect an EXT-IREMIT IR Emitter (sold separately) from this port to the IR sensor of the device to be controlled.</p>
8	HDMI Out	<p>Use a Gefen HDMI cable to connect an HDMI display to this port.</p>
9	Line Out	<p>This port provides analog Left and Right channels of audio de-embedded from the HDMI signal, for use with outboard amplification. Connect a 3.5mm stereo audio cable from this port to the analog stereo input of your amplifier or processor.</p>

ID	Name	Description
10	Coaxial Digital Out	This port provides up to 5.1 channels of Bitstream (Dolby Digital or DTS), or Left and Right channels of PCM digital audio de-embedded from the HDMI signal, for use with outboard amplification. Connect a coaxial digital audio cable with RCA connectors from this port to the coaxial digital input of your amplifier or processor.
11	Optical Digital Out	This port provides up to 5.1 channels of Bitstream (Dolby Digital or DTS), or Left and Right channels of PCM digital audio de-embedded from the HDMI signal, for use with outboard amplification. Connect an optical digital audio cable with TOSLINK® connectors from this port to the optical digital input of your amplifier or processor.
12	HDBaseT™ In (Link) Connector	Connect a CAT-5e or better cable, up to the recommended length for a given resolution, from this port to the HDBaseT™ Out port on the Sender unit. <b>This Receiver can send power over the CAT-5 cable to a POH compliant Sender unit. It can also receive power over the CAT-5 cable from a POH compatible Sender such as the EXT-UHDV-HBTL5-TX, but NOT the EXT-UHDV-WP-HBTL5-TX.</b>
13	12V DC In	This power receptacle is used to connect the included 12V DC power supply. As long as the connected Sender is POH-compliant, it can get power from this Receiver. Only one power supply is required for the extender system to operate.

## Physical Installation

### EXT-UHDV-WP-HBTL5-TX:

1. While this wall-plate Sender is a low-voltage device and can usually be mounted in-wall without an electrical back-box, please check your local electrical code to ensure compliance.
2. As long as installation without a back-box is acceptable, the unit can be mounted either directly onto the drywall or other sturdy hollow wall panel, or by using a standard North American 2-gang low-voltage installation bracket, available from most hardware stores.
3. Regardless of mounting with or without an installation bracket, make sure that you have 2" or 50mm of clearance behind the outer surface of the wall.
4. If installing without a bracket, create a 3.6" x 2.8" or 92mm x 72mm (WxH) cutout in the wall.
5. Center the wall-plate Sender in the opening, and using it as a template, mark 4 hole locations on the wall as circled below. Use self-tapping drywall screws if there is wood bracing directly behind the wall panel for the screws to go through. Otherwise use wall-anchors to ensure a secure installation.



**Wall Cutout  
if not using installation frame**

6. If using a low-voltage installation frame, install the frame onto the wall using the instructions that came with the frame. Install the wall-plate sender to this frame, using the 4 long screws that came with your wall-plate sender.
7. Before attaching the wall-plate sender to the wall, make all wiring connections as per the instructions earlier in this manual for each port.
8. Once installation is complete and all functionality has been verified, install the supplied Decora® trim-plate with the 4 small white screws provided. You can also use a compatible Decora® trim-plate of your choice.

## Physical Installation

### EXT-UHDA-HBTL-RX:

1. The Receiver's ultra-low-profile enclosure can be hidden behind the display. It also features a pair of mounting brackets that can be attached to each side of the enclosure using the provided screws.
2. When surface-mounting the Receiver, please secure it to the mounting surface using screws appropriate for that specific surface (not included with the product).

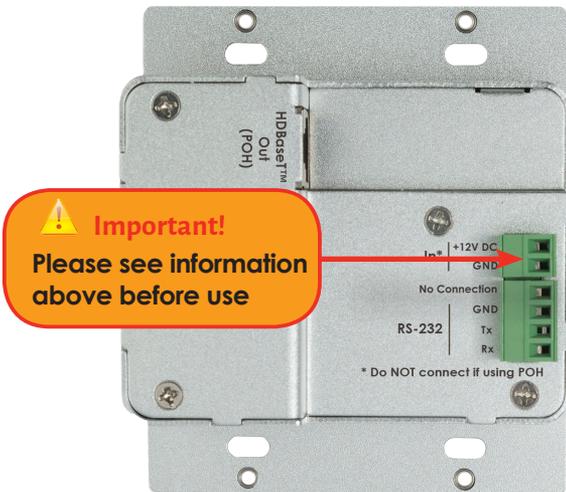
### +12V Wiring for the EXT-UHDV-WP-HBTL5-TX

While we highly recommend that the Sender unit is powered through the Receiver unit via POH (Power over HDBaseT), in cases where a non-POH Receiver is used, the Sender's **+12V DC** 2-pin Phoenix connector can be wired to a 12V power supply with a current capability between 1 to 2A.

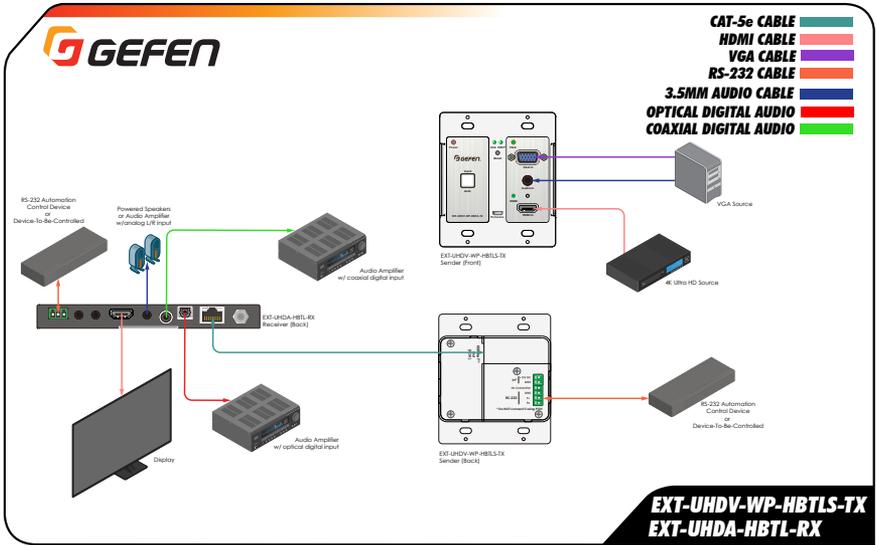
**This operation should only be performed by a professional and licensed low-voltage installer who has the proper tools and knowledge. Gefen will not assume any direct or indirect responsibility or liability for any damage or loss. When wiring a power supply to the Sender unit, please observe the polarity requirements.**

When using a Gefen power supply (EXT-PS121.5-3P-6 or EXT-PS121.5-LP-6), the DC plug needs to be removed. Please use the following guidelines, but always double-check polarity and voltage with a DC voltmeter. Furthermore, your warranty may be void in case of improper wiring or if a non-Gefen power supply is used.

- a. If a Gefen EXT-PS121.5-3P-6 is used, please note that the white wire goes to the positive (+) terminal of the Phoenix connector.
- b. If a Gefen EXT-PS121.5-LP-6 is used, the black wire with white stripe goes to the positive (+) terminal of the Phoenix connector.



## Sample Wiring Diagram



### Notes

1. The wiring diagram above shows cables and accessories that may not be included with the products. Select accessories (as identified by Gefen part numbers) are available for purchase from your Gefen distributor.
2. Power supply connections are not shown in the diagrams above. We highly recommend that the Power supply is connected to Receiver and the Sender is powered through the CAT-5 (HDBase™ Link) cable. To power the Sender directly please see information and instructions on previous page.

# LED Status

The **Power**, **Link**, **HDCP**, **HDMI**, **VGA** and **Auto/Input** indicators on the Sender, and **Power**, **Link**, and **HDCP** indicators on the Receiver unit provide basic information on the current status of each unit.

Power		Description
Solid blue		<ul style="list-style-type: none"><li>The unit is powered.</li></ul>
Off		<ul style="list-style-type: none"><li>The unit is not powered. Check the power supply and the Link connection between the Sender and the Receiver unit.</li></ul>

Link		Description
Solid green		<ul style="list-style-type: none"><li>Link integrity is good between the Sender and Receiver unit.</li></ul>
Off		<ul style="list-style-type: none"><li>Link is not detected. Check the power supply and the Link connection between the Sender and the Receiver unit.</li></ul>

HDCP		Description
Solid green		<ul style="list-style-type: none"><li>The HDMI signal being extended between Sender and Receiver has HDCP Encryption.</li></ul>
Off		<ul style="list-style-type: none"><li>Either the VGA or an unencrypted HDMI signal is being extended.</li></ul>

HDMI (Sender only)		Description
Solid green		<ul style="list-style-type: none"><li>HDMI Input is selected.</li></ul>
Off		<ul style="list-style-type: none"><li>VGA input is selected.</li></ul>

VGA (Sender only)		Description
Solid green		<ul style="list-style-type: none"><li>VGA Input is selected.</li></ul>
Off		<ul style="list-style-type: none"><li>HDMI input is selected.</li></ul>

Input/Auto* (Sender only)		Description
Solid green		<ul style="list-style-type: none"><li>Automatic Input Switching is active.</li></ul>
Off		<ul style="list-style-type: none"><li>Automatic Input Switching is off.</li></ul>

\* To Enable/Disable Auto-Switching, press and hold the Input/Auto Button for 3 seconds or longer until the backlight turns on or off.

# Scaler Functions and Picture Adjustments

The EXT-UHDV-WP-HBTL5-TX features a powerful Scaler for its VGA input. The VGA signal can be scaled to an array of resolutions, timing, and aspect ratio up to WUXGA (1920 x 1200) at 60 Hz.

Aspect ratio optimization is set to automatic as the default; it will maintain the aspect ratio of the source. Aspect ratio can also be configured manually via RS-232 commands or Gefen Syner-G™ software with 4:3 and 16:9 options.

Scaler Output can be set to one of the following:

- 1 - 1360x768 60 Hz
- 2 - 1024x768 60 Hz
- 3 - 1280x720 50 Hz
- 4 - 1280x720 60 Hz
- 5 - 1280x800 60 Hz
- 6 - 1920x1080 50 Hz
- 7 - 1920x1080 60 Hz
- 8 - 1920x1200 60 Hz
- 9 - 1600x1200 60 Hz

The EXT-UHDV-WP-HBTL5-TX also features VGA picture adjustments for the following parameters:

- Color Balance
- Color Temperature
- Sharpness
- Saturation
- Brightness
- Contrast
- Clock
- Phase

All of the above scaler and picture adjustment parameters can be configured via RS-232 commands ([Page 26](#)) or Gefen Syner-G™ software.

The HDMI input of the EXT-UHDV-WP-HBTL5-TX does not go through the scaler and is passed through directly to the Receiver via the HDBaseT™ link.

# EDID Management

The EXT-UHDV-WP-HBTL5-TX features advanced EDID Management capabilities for quick optimization of a source's output to best match the display's capabilities.

EDID Management can be done via RS-232 commands ([Page 26](#)) or using the Gefen Syner-G™ software.

When using Gefen Syner-G™, Internal, External, and Custom EDIDs can be downloaded from the EXT-UHDV-WP-HBTL5-TX, modified via the advanced EDID Editor that is built into the Gefen Syner-G™ software, and uploaded back into the Sender.

## RS-232 Features

The EXT-UHDV-WP-HBTL-TX & EXT-UHDA-HBTL-RX, when used together, support the following RS-232-related functions:

- a. Bi-directional RS-232 extension between Sender and Receiver.
- b. Control of Sender's input switching, scaler functions, and EDID management from the viewing side, via the Receiver's RS-232 port. This can be done via an automation control device or the Gefen Syner-G™ software.
- c. Gefen Syner-G™ interface via RS-232 ports of Sender and Receiver. Gefen Syner-G™ software is used for firmware updates and EDID management of the Sender.

Please see the RS-232 commands section ([Page 26](#)) on how to configure the Sender and Receiver to perform the above functions.

### a. Bi-directional RS-232 extension between Sender and Receiver:

1. Connect RS-232 Tx, Rx, and Ground from an automation control device to the removable 4-pin "Captive Screw" Phoenix connector that is attached to the **RS-232** port of the Sender unit. Please note that the upper pin is not used (marked as **No Connection**). Each of the remaining 3 pins is identified on the connector panel.
2. Make sure that the 3 position slide switch on the front panel of the Receiver is set to **RS-232 Pass-Thru** mode. Connect RS-232 Tx, Rx, and Ground from the device-to-be-controlled, to the removable 3-pin "Captive Screw" Phoenix connector that is attached to the **RS-232** port of the Receiver unit. Each of the 3 pins is identified on the top panel, near the connector.
3. Since RS-232 is a bi-directional communications protocol, you can also connect the automation controller to the receiver and the device-to-be-controlled to the sender, depending on your application.

**Please note that The Sender and Receiver's Tx, Rx, and Ground pin-outs for their Phoenix connectors are different. To ensure proper operation, please follow the pin-out of each connector as printed on each unit's enclosure.**

**b. Control of Sender's input switching, scaler functions, and EDID mangement from the viewing side, via the Receiver's RS-232 port:**

1. Connect RS-232 Tx, Rx, and Ground from a computer with a Serial (RS-232) port, or using a USB-to-RS-232 adaptor, to the removable 4-pin "Captive Screw" Phoenix connector that is attached to the **RS-232** port of the Sender unit. Please note that the upper pin is not used (marked as **No Connection**). Each of the remaining 3 pins is identified on the connector panel.
2. Establish Serial (RS-232) communications between the computer and the Sender unit. Send the **#SET\_RS232\_MODE 2** command to the Sender to place it in "Remote-End-Control" mode. To revert the Sender to its default RS-232 extension mode, the RS-232 command **#SET\_RS232\_MODE 1** needs to be sent from the Receiver.
3. Disconnect the PC from the Sender unit. Wire the Sender unit as needed and install it in its location.
4. Make sure that the 3 position slide switch on the front panel of the Receiver is set to **RS-232 Pass-Thru** mode. Connect RS-232 Tx, Rx, and Ground from an automation control device to the removable 3-pin "Captive Screw" Phoenix connector that is attached to the **RS-232** port of the Receiver unit. Each of the 3 pins is identified on the top panel, near the connector.
5. Program your automation control device with the RS-232 control commands (Page 26) for the EXT-UHDV-WP-HBTL5-TX. All commands sent to the RS-232 port of the Receiver unit will be extended to the Sender unit via the HDBaseT™ Link cable.

**Please note that The Sender and Receiver's Tx, Rx, and Ground pin-outs for their Phoenix connectors are different. To ensure proper operation, please follow the pin-out of each connector as printed on each unit's enclosure.**

**c. Interface with Gefen Syner-G™ via RS-232 ports of Sender and Receiver.:**

1. **Direct interface with the Sender:** Connect RS-232 Tx, Rx, and Ground from a computer with a Serial (RS-232 port), or using a USB-to-RS-232 adaptor, to the removable 4-pin “Captive Screw” Phoenix connector that is attached to the **RS-232** port of the Sender unit. Please note that the upper pin is not used (marked as **No Connection**). Each of the remaining 3 pins is identified on the connector panel. **If the Sender was configured to be in “Remote-End-Control” mode (see section (b) on previous page), return it to its default mode by following step (2) of section (b).**
2. **Direct interface with the Receiver:** Since the Receiver does not have any customizable features, it cannot be used with Gefen Syner-G™.
3. **Interface with the Sender by connecting through the Receiver:**
  - i. Place the Sender unit in “Remote-End-Control” mode (see section (b) on previous page for details). Wire the Sender unit as needed and install it in its location.
  - ii. Make sure that the 3 position slide switch on the front panel of the Receiver is set to **RS-232 Pass-Thru** mode.
  - iii. Connect RS-232 Tx, Rx, and Ground from a computer with a Serial (RS-232 port), or using a USB-to-RS-232 adaptor, to the removable 3-pin “Captive Screw” Phoenix connector that is attached to the **RS-232** port of the Receiver unit.

**Please note that The Sender and Receiver's Tx, Rx, and Ground pin-outs for their Phoenix connectors are different. To ensure proper operation, please follow the pin-out of each connector as printed on each unit's enclosure.**

## RS-232 Commands (EXT-UHDV-WP-HBTL5-TX)

Command	Description
<b>Help</b>	
#HELP	LISTS ALL AVAILABLE TCP/UDP COMMANDS. IF A COMMAND IS SPECIFIED THEN BOTH THE DESCRIPTION AND SYNTAX WILL BE LISTED FOR THE COMMAND
<b>Routing</b>	
V	CHANGE VIDEO INPUT BETWEEN HDMI AND VGA
S	GET SELECTED INPUT STATUS
#SET_AUTO_SWITCH	ENABLE/DISABLE AUTO-SWITCHING FEATURE
#GET_AUTO_SWITCH	GET THE ENABLE/DISABLE STATUS OF THE AUTO-SWITCHING FEATURE
<b>Setup</b>	
#SET_RS232_MODE	SET THE RS-232 OPERATING MODE BETWEEN PASS-THROUGH AND REMOTE CONTROL
#GET_RS232_MODE	GET THE RS-232 OPERATING MODE BETWEEN PASS-THROUGH AND EXTENDED CONTROL
#SET_OUTPUT_RES	SET OUTPUT RESOLUTION FOR VGA INPUT
#GET_OUTPUT_RES	GET THE OUTPUT RESOLUTION STATUS (VGA INPUT ONLY)
#SET_INPUT_HDCP	SET HDMI INPUT HDCP OPERATING MODE
#GET_INPUT_HDCP	GET HDMI INPUT HDCP OPERATING MODE
#SET_PICTURE_MODE	SET VGA PICTURE MODE
#GET_PICTURE_MODE	GET VGA PICTURE MODE
#SET_CONTRAST	SET VGA CONTRAST ADJUSTMENT (APPLICABLE ONLY WHEN PICTURE MODE IS SET TO USER)
#GET_CONTRAST	GET VGA CONTRAST ADJUSTMENT VALUE
#SET_BRIGHTNESS	SET VGA BRIGHTNESS ADJUSTMENT (APPLICABLE ONLY WHEN PICTURE MODE IS SET TO USER)
#GET_BRIGHTNESS	GET VGA BRIGHTNESS ADJUSTMENT VALUE
#SET_SATURATION	SET VGA SATURATION ADJUSTMENT (APPLICABLE ONLY WHEN PICTURE MODE IS SET TO USER)
#GET_SATURATION	GET VGA SATURATION ADJUSTMENT VALUE
#SET_SHARPNESS	SET VGA SHARPNESS ADJUSTMENT (APPLICABLE ONLY WHEN PICTURE MODE IS SET TO USER)
#GET_SHARPNESS	GET VGA SHARPNESS ADJUSTMENT VALUE
#AUTO_SYNC	INITIATE VGA AUTO-SYNC FEATURE
#SET_AUTO_SYNC	ENABLE/DISABLE VGA AUTO-SYNC FEATURE
#GET_AUTO_SYNC	GET VGA AUTO-SYNC ADJUSTMENT VALUE
#SET_PHASE	SET VGA PHASE ADJUSTMENT
#GET_PHASE	GET VGA PHASE ADJUSTMENT VALUE
#SET_CLOCK	SET VGA CLOCK ADJUSTMENT
#GET_CLOCK	GET VGA CLOCK ADJUSTMENT VALUE
#SET_COLOR_TEMP	SET VGA COLOR TEMPERATURE ADJUSTMENT
#GET_COLOR_TEMP	GET VGA COLOR TEMPERATURE ADJUSTMENT VALUE
#SET_COLOR_BALANCE	SET VGA COLOR BALANCE ADJUSTMENT (APPLICABLE ONLY WHEN COLOR TEMPERATURE IS SET TO USER)
#GET_COLOR_BALANCE	GET VGA COLOR BALANCE ADJUSTMENT VALUE(S)
#SET_ASPECT	SET VGA ASPECT RATIO ADJUSTMENT
#GET_ASPECT	GET VGA ASPECT RATIO ADJUSTMENT VALUE
#SET_POLARITY	SET VGA POLARITY
#GET_POLARITY	GET VGA POLARITY VALUE
#SET_IMAGE_ADJ	SET VGA IMAGE ADJUSTMENT (AUTO-SYNC MUST BE SET TO DISABLED FOR THIS FEATURE TO FUNCTION)
#GET_IMAGE_ADJ	GET VGA IMAGE ADJUSTMENT VALUE(S) (AUTO-SYNC MUST BE SET TO DISABLED FOR THIS FEATURE TO FUNCTION)
#SET_IMAGE_STRETCH	SET VGA IMAGE STRETCH (AUTO-SYNC MUST BE SET TO DISABLED FOR THIS FEATURE TO FUNCTION)
#GET_IMAGE_STRETCH	GET VGA IMAGE STRETCH VALUE(S) (AUTO-SYNC MUST BE SET TO DISABLED FOR THIS FEATURE TO FUNCTION)
<b>MANAGE EDID</b>	
#SET_EDID_MODE	SET INPUT EDID MODE
#GET_EDID_MODE	GET INPUT EDID MODE
#GET_INTERNAL_EDID	DOWNLOAD A PRESET INTERNAL EDID
#GET_EXTERNAL_EDID	DOWNLOAD EXTERNAL (BYPASS) EDID
#GET_CUSTOM_EDID	DOWNLOAD THE CUSTOM USER EDID
#SEND_CUSTOM_EDID	UPLOAD A CUSTOM USER EDID FOR USE WITH CUSTOM MODE.
#SET_EDID_LOCK	SET INPUT EDID LOCK (PREVENTS ACCIDENTAL CUSTOM EDID OVERWRITE AND VALID ONLY WHEN EDID MODE IS SET TO CUSTOM MODE)
#GET_EDID_LOCK	GET INPUT EDID LOCK STATUS

Command	Description
<b>SYSTEM SETTINGS</b>	
#FIRMWARE_UPDATE	PERFORM FIRMWARE UPDATE
#GET_FIRMWARE_VERSION	GET FIRMWARE VERSION
#FACTORY_RESET	RESET TO FACTORY DEFAULTS
#REBOOT	REBOOT THE UNIT

## Firmware Update

1. Over time, the Sender unit may require a firmware update to add functionality or fix issues.
2. To perform a firmware update, a Windows PC that is running the Gefen Syner-G™ software needs to be connected to the **RS-232** port of the Sender. Use direct RS-232 connection if your PC has a serial port. If not, use a USB-to-RS-232 adaptor.
3. To update the Sender unit, the Gefen Syner-G™ software will send the necessary commands to place the product into firmware update mode. The firmware will be loaded into the Sender from a USB thumb drive, connected to the Micro-USB **Firmware** port on the Sender's front panel via a USB-Micro-B-male-to-USB-Type-A-female cable or adaptor (available from major electronics stores).
4. Follow on-screen instructions in Gefen Syner-G™ to perform the firmware update.
5. Once a unit has successfully been updated, cycle the power by removing power from the Sender unit, wait for the Power LED to deactivate, and then reconnect the power supply.

## EXT-UHDV-WP-HBTLS-TX

Supported Formats	
Maximum Video Resolution/Timing	HDMI: <ul style="list-style-type: none"> <li>· 4K Cinema - DCI (4096 x 2160 to 60Hz, 4:2:0)</li> <li>· 4K Ultra HD (3840 x 2160 to 60Hz, 4:2:0)</li> </ul> VGA: <ul style="list-style-type: none"> <li>· WUXGA (1920x1200 to 60 Hz 4:4:4)</li> </ul>
Audio (HDMI Pass-Thru)	<ul style="list-style-type: none"> <li>· Up to 8 channels of HBR, Bitstream, &amp; LPCM</li> </ul>
HDCP	<ul style="list-style-type: none"> <li>· 1.4</li> </ul>
Connectors & Indicators	
Video Input Connectors	<ul style="list-style-type: none"> <li>· 1 x HDMI Type A 19-pin, locking, female</li> <li>· 1 x VGA HD-15, female</li> </ul>
L/R Analog VGA Audio Input Connector	<ul style="list-style-type: none"> <li>· 1 x 3.5mm mini-stereo jack</li> </ul>
HDBaseT™ Link Connector	<ul style="list-style-type: none"> <li>· 1 x RJ-45, shielded</li> </ul>
Firmware Update Connector	<ul style="list-style-type: none"> <li>· 1 x USB Micro-B, female</li> </ul>
RS-232 Connector	<ul style="list-style-type: none"> <li>· 1 x 4-pin Phoenix</li> </ul>
Power Connector	<ul style="list-style-type: none"> <li>· 1 x 2-pin Phoenix (see <a href="#">Page 18</a> before use)</li> </ul>
Recommended Power Supply (sold separately - DC plug needs to be removed)	<ul style="list-style-type: none"> <li>· EXT-PS121.5AIP-3P-6 or EXT-PS121.5AIP-LP-6</li> </ul>
Auto-Manual Switch	<ul style="list-style-type: none"> <li>· 1 x tact-type, green backlight</li> </ul>
Power Indicator	<ul style="list-style-type: none"> <li>· 1 x LED, blue</li> </ul>
Link Indicator	<ul style="list-style-type: none"> <li>· 1 x LED, green</li> </ul>
HDCP Indicator	<ul style="list-style-type: none"> <li>· 1 x LED, green</li> </ul>
HDMI Indicator	<ul style="list-style-type: none"> <li>· 1 x LED, green</li> </ul>
VGA Indicator	<ul style="list-style-type: none"> <li>· 1 x LED, green</li> </ul>
Operational	
TMDS Clock	<ul style="list-style-type: none"> <li>· 340 MHz</li> </ul>
Video Bandwidth	<ul style="list-style-type: none"> <li>· 10.2 Gbps</li> </ul>
Power Consumption	<ul style="list-style-type: none"> <li>· 6W maximum</li> </ul>
Operating Temperature	<ul style="list-style-type: none"> <li>· +32 to +122 °F (0 to +50 °C)</li> </ul>
Operating Humidity	<ul style="list-style-type: none"> <li>· 5% to 90% RH, non-condensing</li> </ul>
Storage Temperature	<ul style="list-style-type: none"> <li>· -4 to +185 °F (-20 to +85 °C)</li> </ul>
Storage Humidity (RH)	<ul style="list-style-type: none"> <li>· 0% to 95% RH, non-condensing</li> </ul>
MTBF	<ul style="list-style-type: none"> <li>· 50000 hours</li> </ul>

Physical	
Dimensions (W x H x D, not including connectors)	· 3.5" x 4.2" x 1.74" (89mm x 104.5mm x 44mm)
Mounting Cavity Dimensions (W x H x D, behind the mounting plate)	· 3.6" x 2.8" x 2" (92mm x 72mm x 50mm)
Net Weight	· 0.6 lbs (0.27 kg)

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## EXT-UHDA-HBTL-RX

<b>Supported Formats</b>	
Maximum Video Resolution/Timing	HDMI: <ul style="list-style-type: none"> <li>4K Cinema - DCI (4096 x 2160 to 60Hz, 4:2:0)</li> <li>4K Ultra HD (3840 x 2160 to 60Hz, 4:2:0)</li> </ul> VGA: <ul style="list-style-type: none"> <li>WUXGA (1920x1200 to 60 Hz 4:4:4)</li> </ul>
Audio (HDMI Pass-Thru)	<ul style="list-style-type: none"> <li>Up to 8 channels of HBR, Bitstream, &amp; LPCM</li> </ul>
Audio (De-Embedded)	<ul style="list-style-type: none"> <li>Up to 6 channels of Bitstream, or 2 ch of LPCM</li> </ul>
HDCP	<ul style="list-style-type: none"> <li>2.2 and 1.4</li> </ul>
<b>Connectors &amp; Indicators</b>	
Video Output Connector	<ul style="list-style-type: none"> <li>1 x HDMI Type A 19-pin, female</li> </ul>
De-Embedded Audio Output Ports	<ul style="list-style-type: none"> <li>L/R Analog: 1 x 3.5mm mini-stereo jack</li> <li>Coaxial Digital: 1 x RCA, female</li> <li>Optical Digital: 1 x TOSLINK®</li> </ul>
HDBaseT™ Link Connector	<ul style="list-style-type: none"> <li>1 x RJ-45, shielded</li> </ul>
RS-232 Connector	<ul style="list-style-type: none"> <li>1 x 3-pin Phoenix</li> </ul>
Firmware Update Port	<ul style="list-style-type: none"> <li>1 x USB Micro-B, female</li> </ul>
IR Extender Type**	<ul style="list-style-type: none"> <li>EXT-RMT-EXTIRN</li> </ul>
IR In/Ext Connector**	<ul style="list-style-type: none"> <li>1 x 3.5mm mini-stereo, female</li> </ul>
IR Out Connector**	<ul style="list-style-type: none"> <li>1 x 3.5mm mini-stereo, female</li> </ul>
Power Connector	<ul style="list-style-type: none"> <li>1 x 12V DC, locking, 5.5mm barrel/2.1mm pin</li> </ul>
RS-232/Program Switch	<ul style="list-style-type: none"> <li>1 x 3-position, slide-type</li> </ul>
Power Indicator	<ul style="list-style-type: none"> <li>1 x LED, blue</li> </ul>
Link Indicator	<ul style="list-style-type: none"> <li>1 x LED, green</li> </ul>
HDCP Indicator	<ul style="list-style-type: none"> <li>1 x LED, green</li> </ul>
<b>Operational</b>	
TMDS Clock	<ul style="list-style-type: none"> <li>340 MHz</li> </ul>
Video Bandwidth	<ul style="list-style-type: none"> <li>10.2 Gbps</li> </ul>
Power Consumption	<ul style="list-style-type: none"> <li>Not powering a Sender: 9W maximum</li> <li>Powering a Sender: 22W maximum</li> </ul>
Operating Temperature	<ul style="list-style-type: none"> <li>+32 to +122 °F (0 to +50 °C)</li> </ul>
Operating Humidity	<ul style="list-style-type: none"> <li>5% to 90% RH, non-condensing</li> </ul>
Storage Temperature	<ul style="list-style-type: none"> <li>-4 to +185 °F (-20 to +85 °C)</li> </ul>
Storage Humidity (RH)	<ul style="list-style-type: none"> <li>0% to 95% RH, non-condensing</li> </ul>
MTBF	<ul style="list-style-type: none"> <li>50000 hours</li> </ul>

Physical	
Dimensions (W x H x D, not including connectors)	Not including mounting brackets: · 6" x 0.65" x 4" (152mm x 17 x 100mm) Including mounting brackets: · 7" x 0.65" x 4" (178mm x 17 x 100mm)
Net Weight	· 0.6 lbs. (0.27 kg)

\* Features and specifications are subject to change without notice.

\*\* IR Extension feature is NOT active when used with EXT-UHDV-WP-HBTL5-TX

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