GEFEN
TOOLBOX

4K ULTRA HD
HDBaseT™ Extender
w/ RS-232, 2-way IR, and POH

GTB-UHD-HBT2

User Manual

Release A3

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 Web site at

http://www.gefen.com/connect/warranty-and return-policy

Technical Support

(707) 283-5900   (800) 472-5555
8:00 AM to 5:00 PM Monday - Friday, Pacific Time

Email

support@gefen.com

Web

http://www.gefen.com

Mailing Address

Gefen
Core Brands, LLC
c/o Customer Service
1800 S McDowell Blvd
Petaluma, CA 94954 USA

- The information in this manual has been carefully checked and is believed to be accurate. However, Gefen assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will Gefen be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this

  manual, even if advised of the possibility of such damages.

- The technical information contained herein regarding the features and specifications is subject to change without notice.

- The Gefen Syner-G Software Suite is a free downloadable application from Gefen that provides automatic download and installation of firmware upgrades as well as EDID management.

  Download the application here: http://www.gefen.com/synerg

This product uses UL-Listed power supplies

Features

- Extends HDMI, RS-232, and 2-way IR over a single CAT-5e
  - ► 4K Ultra HD (3840 x 2160 @ 60Hz, 4:2:0, 8-bit), up to 330 feet/100 meters
  - ► 4K Ultra HD (3840 x 2160 @ 30Hz, 4:4:4, 8-bit), up to 330 feet/100 meters
  - ► 4K DCI-Cinema (4096 x 2160 @ 30Hz 4:4:4, 8-bit), up to 330 feet/100 meters
  - ► 1080p Full HD (1920 x 1080 @ 60Hz, 4:4:4, 12-bit), up to 330 feet/100 meters
  - ► 1080p Full HD (1920 x 1080 @ 60Hz, 4:4:4, 8-bit), up to 495 feet/150 meters
  - ► WUXGA (1920 x 1200 @ 60Hz, 8-bit), up to 495 feet/150 meters
- HDMI Features Supported:
  - ► HDMI 2.0 up to 4K 60Hz, 4:2:0, 8-bit color
  - ► HDCP 2.2 and 1.4
  - ► 12-bit Deep Color
  - ► LPCM 7.1 audio, Dolby Atmos®, Dolby® TrueHD, DTS:X™, and DTS-HD Master Audio™ pass-through
  - ► 3DTV pass-through
  - ► CEC pass-through
  - ► Lip Sync pass-through
- IR extension from Sender to Receiver and from Receiver to Sender
- POH (Power Over HDBaseT™) feature provides power to the Receiver unit over the link cable - only the Sender unit needs external power
- Advanced EDID Management via Gefen Syner-G™ software
- Link Quality Monitoring via Gefen Syner-G™ software
- In-field firmware update via USB, using Gefen Syner-G™ software
- Locking power connector
- Low profile, surface-mountable enclosures

Packing List

The 4K Ultra HD HDBaseT Extender w/ RS-232, 2-way IR, and POH ships with the items listed below. The packing contents of the Sender and Receiver unit are listed below. If any of these items are not present in the box when you first open it, immediately contact your dealer or Gefen.

- 1 x 4K Ultra HD HDBaseT™ Extender w/ RS-232, 2-way IR, and POH (Sender)
- 1 x 4K Ultra HD HDBaseT™ Extender w/ RS-232, 2-way IR, and POH (Receiver)
- 1 x IR emitter (EXT-IREMIT)
- 1 x IR extender (EXT-RMT-EXTIRN)
- 1 x DB-9 cable, Male-to-Female
- 1 x 48V DC locking power supply (EXT-PS48U1A-LP-6)
- 1 x Quick-Start Guide (QSG-GTB-UHD-HBT2)

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4K ULTRA HD

HDBaseT™ Extender
w/ RS-232, 2-way IR, and POH

1   **Getting Started**

Sender Unit

GTB-UHD-HBT2-S

1

3

USB

2   4   5

Link
Video
Power

GEFEN.
TOOLBOX ®

**4K Ultra HD
HDBaseT™ Extender S
w/ RS-232, 2-way IR, and POH**

POH

7   8   9   10

48V DC   RS-232   IR In/Ext   IR Out   Link   HDMI In

6   11

ID	Name	Description
1	DIP switches	See DIP Switch Configuration (page 10) for more information.
2	USB	For use with the Syner-G Software Suite. See Using Syner-G™ (page 24) for more information.
3	Link (LED)	This LED indicator glows solid green when the Sender and Receiver unit are connected by a CAT-5 (or better) cable.
4	Power	This LED indicator glows solid blue when the Sender unit is powered.
5	Video	This LED indicator glows solid amber when HDCP content is detected. If Non-HDCP content is detected, then this LED indicator will flash amber.
6	POH 48V DC	Connect the included 48V DC power supply to this connector.
7	RS-232	Connect the included RS-232 cable from this port to an automation device. See RS-232 Interface (page 19) for more information.
8	IR In / Ext	Connect an IR extender (Gefen part no. EXT-RMT-EXTIRN) to this port.
9	IR Out	Connect an IR emitter (Gefen part no. EXT-IREMIT) to this port.
10	Link	Connect a CAT-5 (or better) cable from this port to the **Link** port on the Receiver unit.
11	HDMI In	Connect a 4K Ultra HD source to this HDMI port using an HDMI cable.

Receiver Unit

1 **3**

GTB-UHD-HBT2-R

🟢 Link
🟡 Video
🔵 Power

USB

2 **4** **5**

*G*GEFEN®
TOOLBOX

**4K Ultra HD
HDBaseT™ Extender R
w/ RS-232, 2-way IR, and POH**

7 **8** **9** **10**

Non-POH

48V DC   RS-232   IR In/Ext IR Out   Link   HDMI Out

6 **11**

ID	Name	Description
1	DIP switches	See DIP Switch Configuration (page 10) for more information.
2	USB	For use with the Syner-G Software Suite. See Using Syner-G™ (page 24) for more information.
3	Link (LED)	This LED indicator glows solid green when the Sender and Receiver unit are connected by a CAT-5 (or better) cable.
4	Power	This LED indicator glows solid blue when the Sender unit is powered.
5	Video	This LED indicator glows solid amber when HDCP content is detected. If Non-HDCP content is detected, then this LED indicator will flash amber.
6	Non-POH 48V DC	Use this port only when using a HDBaseT-compatible device as the Sender, or when receiving power from the Sender is not practical.
7	RS-232	Connect the included RS-232 cable from this port to an automation device. See RS-232 Interface (page 19) for more information.
8	IR In / Ext	Connect an IR extender (Gefen part no. EXT-RMT-EXTIRN) to this port.
9	IR Out	Connect an IR emitter (Gefen part no. EXT-IREMIT) to this port.
10	Link	Connect a CAT-5 (or better) cable from this port to the **Link** port on the Receiver unit.
11	HDMI In	Connect a 4K Ultra HD source to this HDMI port using an HDMI cable.

Connection Instructions

► **Video**

1. Connect the included HDMI cable from the 4K Ultra HD source to the **HDMI In** port on the Sender unit.

2. Connect an HDMI cable from the **HDMI Out** port on the Receiver unit to the 4K Ultra HD display.

► **Link**

3. Connect a shielded CAT-5e (or better) cable from the **Link** port on the Sender unit to the **Link** port on the Receiver unit.

Maximum Resolution	Mode	Distance
1920 x 1080p 60 Hz @ 8-bit	Long Reach mode	495 feet (150 meters)
3840 x 2160p 60 Hz @ 4:2:0	Normal mode	330 feet (100 meters)

See DIP Switch Configuration (page 10) for more information on setting the extension distance.

► **IR Control** - see Bidirectional IR Control (page 16) for more information

4. Connect the included IR emitter to the **IR Out** port on the Sender unit.

5. Connect the included IR extender to the **IR In/Ext** port on the Receiver unit.

► **RS-232** - see RS-232 Interface (page 19) for more information

6. Connect the included DB-9 cable from the automation device to the **RS-232** port on the Sender unit

7. Connect a DB-9 cable from the **RS-232** port on the Receiver unit to the RS-232 device to be controlled.

► **Power**

8. Connect the included power supply to the **POH 48V DC** connector on the Sender unit.

Getting Started

Application Diagram
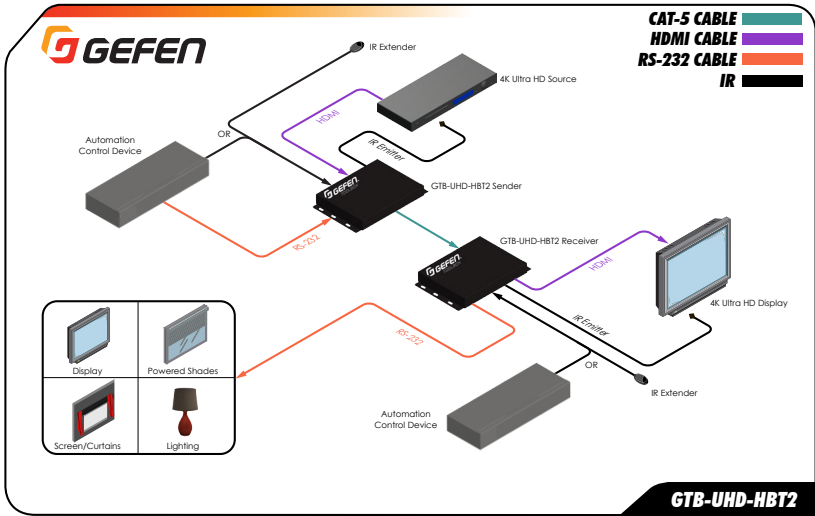
CAT-5 CABLE
HDMI CABLE
RS-232 CABLE
IR

IR Extender

4K Ultra HD Source

Automation
Control Device

HDMI

IR Emitter

GTB-UHD-HBT2 Sender

RS-232

GTB-UHD-HBT2 Receiver

HDMI

IR Emitter

4K Ultra HD Display

Display

Powered Shades

Screen/Curtains

Lighting

RS-232

Automation
Control Device

OR

IR Extender

GTB-UHD-HBT2

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4K ULTRA HD

HDBaseT™ Extender
w/ RS-232, 2-way IR, and POH

| 2 | Basic Operation |

Sender unit

The back panel of the Sender unit contains three banks of DIP switches. Each bank contains four DIP switches. These DIP switches control EDID, HPD, HDCP, IR, and HDBT mode. The *default* setting, for each DIP switch, is in the "down" (OFF) position.

Each DIP switch (1 - 12) is arranged from left to right. DIP switches 11 and 12 are not used. Although the DIP switch numbers do not appear on the unit, we have included them for easy reference.

If a DIP switch is in the "up" position, then it is ON. If a DIP switch is in the "down" position, then it is OFF.

DIP	Feature	Description
1	Local / pass-through EDID	► **ON** Allows all video and audio features of the connected device to be passed to the source device. ► **OFF** (default) Copies the downstream EDID locally in HDBT mode; modifies downstream EDID to support only up to 1080p60 8-bit in Long Reach mode.
2	Hot-Plug Detect	► **ON** HPD pass-through. HPD will toggle, depending on the HPD status of the display (sink) or source device. ► **OFF** (default) HPD is *always* high, even when the display is hot-plugged (disconnected from then reconnected to the source device).

Basic Operation

DIP	Feature	Description
3	EDID Lock	► **ON** EDID Lock *enabled*. The current EDID will be stored on the input even if the unit is power-cycled. ► **OFF** (default) EDID Lock *disabled*.
4	HDCP Control	► **ON** Prevents HDCP content from passing through to the display (sink) device. ► **OFF** (default) Allows HDCP content to pass through to the display (sink) device.
5	Sender unit IR carrier	► **ON** IR carrier signal is stripped at the Sender unit. ► **OFF** (default) IR carrier signal is passed-through.
6	Receiver unit IR carrier	► **ON** IR carrier signal is stripped at the Receiver unit. ► **OFF** (default) IR carrier signal is passed-through.
7	IR Polarity	► **ON** Set to work with third-party IR extenders. ► **OFF** (default) Operates with Gefen part no. EXT-RMT-EXTIRN.
8	Long-Reach Mode	► **ON** Resolutions up to 1080p 60 Hz can be extended to a maximum distance of 495 feet (150 meters). Color depth is limited to 8-bit. ► **OFF** (default) HDBT mode. Resolutions up to 3840 x 2160p 60 Hz @ 4:2:0, can be extended up to 330 feet (100 meters).

Basic Operation

DIP	Feature	Description
9	IR Carrier Frequency	► **ON** 56 kHz. ► **OFF** (default) 38 kHz.
10	IR Carrier Frequency	► **ON** 47 kHz. ► **OFF** (default) Depends upon setting of DIP 9.
11	N/A	--
12	N/A	--

Receiver unit

The back panel of the Receiver unit contains three banks of DIP switches. Each bank contains four DIP switches. The *default* setting, for each DIP switch, is in the "down" (OFF) position.

Each DIP switch (1 - 12) is arranged from left to right. DIP switch 7 and 8 are not used. Although the DIP switch numbers do not appear on the unit, we have included them for easy reference.

If a DIP switch is in the "up" position, then it is ON. If a DIP switch is in the "down" position, then it is OFF.
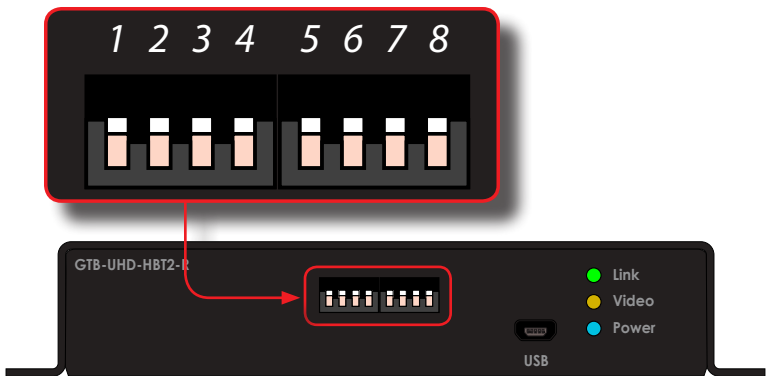
DIP	Feature	Description
1	IR Carrier Frequency	► **ON** IR carrier signal is stripped at the Sender unit. ► **OFF** (default) IR carrier signal is passed-through.
2	IR Carrier Frequency	► **ON** IR carrier signal is stripped at the Receiver unit. ► **OFF** (default) IR carrier signal is passed-through.
3	IR Polarity	► **ON** Set to work with third-party IR extenders. ► **OFF** (default) Operates with Gefen part no. EXT-RMT-EXTIRN.

DIP	Feature	Description
4	Long-Reach Mode	► **ON** Resolutions up to 1080p Full HD can be extended to a maximum distance of 495 feet (150 meters). Color depth is limited to 8-bit. ► **OFF** (default) HDBT mode. Resolutions up to 4K x 2K, can be extended up to 330 feet (100 meters) with deep color (4:2:0).
5	IR Carrier Frequency	► **ON** 56 kHz. ► **OFF** (default) 38 kHz.
6	IR Carrier Frequency	► **ON** 47 kHz. ► **OFF** (default) Depends upon setting of DIP 5.
7	N/A	--
8	N/A	--

Notes on IR Carrier Signals

When an IR carrier frequency is passed through from the Sender unit to the Receiver unit, or from the Receiver unit to the Sender unit, the carrier signal is not renewed. Any carrier frequency between 30 kHz and 60 kHz is natively passed through.

If the IR carrier signal is stripped at the Sender unit and added at the Receiver unit (or vice versa), then the carrier signal can be set to 38 kHz, 47 kHz, or 56 kHz.

To set the carrier signal frequency on the Sender unit, set DIP switch 5 on the Sender unit to the OFF position and use DIP switches 9 and 10 (Sender) to set the carrier frequency. To set the carrier signal frequency on the Receiver unit, set DIP switch 1 on the Receiver unit to the OFF position and use DIP switches 5 and 6 (Receiver) to set the carrier frequency.

Stripping the IR carrier signal is commonly used when directly connecting an IR cable from the output of one device to the input on another IR device.

The **Link, Video, and Power** LED indicators provides basic information on the current status of the this product.

The information, in the table below, applies to both the Sender and Receiver unit.

LED	Status		Description
Link	●	Solid green	• The Sender / Receiver unit is powered. • Link integrity between Sender and Receiver unit is good.
Video	●	Solid amber	• HDCP content is detected
	●	Flashing amber	• Non-HDCP content is detected.
Power	●	Solid blue	• The Sender / Receiver unit is powered.

Controlling the Source from the Viewing Location

1. Connect an IR extender (Gefen part no. EXT-RMT-EXTIRN) to the **IR In/Ext** port on the Receiver unit. If using an automation system, connect the 3.5mm mini-mono connector from the **IR In/Ext** port on the Receiver unit to the automation system. IR signals are transmitted over the CAT-5 cable.

2. Connect the IR emitter from the **IR Out** port, on the Sender unit, to the IR sensor window on the source device.

4K Ultra HD source

IR emitter

POH

48V DC   RS-232   IR In/Ext   IR Out   Link   HDMI In

Sender unit

CAT-5 cable

Non-POH

48V DC   RS-232   IR In/Ext   IR Out   Link   HDMI Out

Receiver unit

IR extender

Electrical IR cable

or

from Automation System

IR signals

Basic Operation
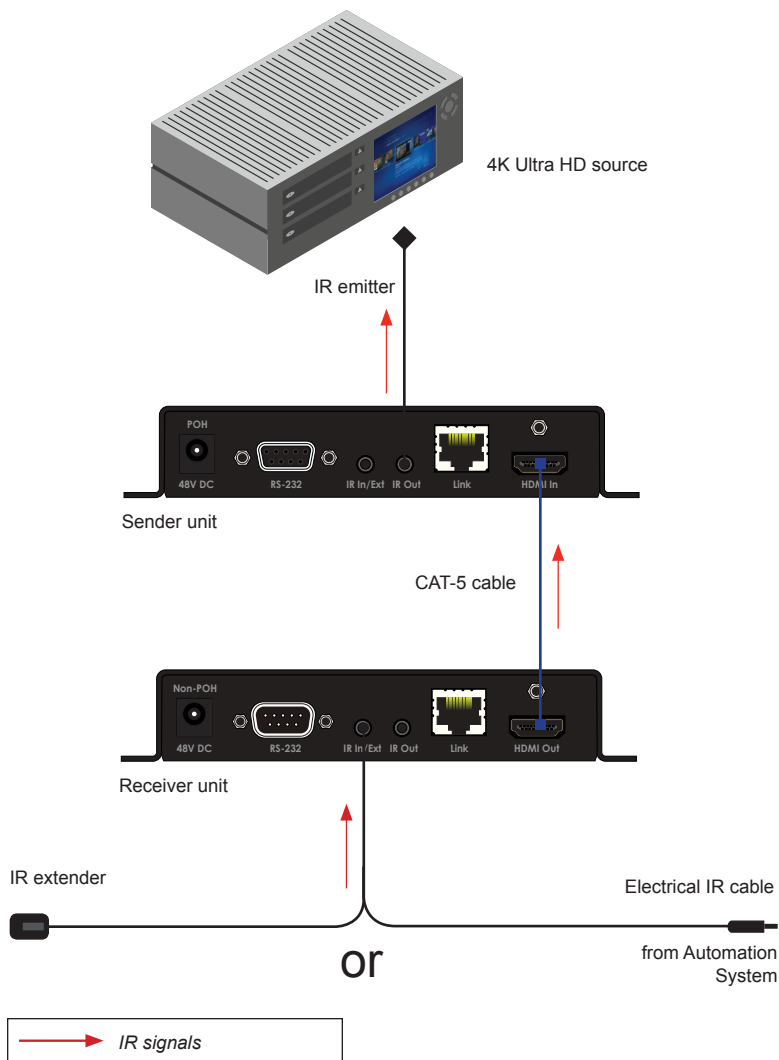
Controlling the Display from the Source Location

1. Connect an IR extender (Gefen part no. EXT-RMT-EXTIRN) to the **IR In/Ext** port on the Sender unit.   If using an automation system, connect the 3.5mm mini-mono connector from the **IR In/Ext** port on the Receiver unit to the automation system. IR signals are transmitted over the CAT-5 cable.

2. Connect an IR emitter (Gefen part no. EXT-IREMIT) from the **IR Out** port on the Receiver unit to the IR sensor on the display.

IR extender

or

Electrical IR cable

from Automation System

Sender unit

POH

48V DC   RS-232   IR In/Ext IR Out   Link   HDMI In

CAT-5 cable

Non-POH

48V DC   RS-232   IR In/Ext IR Out   Link   HDMI Out

Receiver unit

IR emitter

4K Ultra HD display
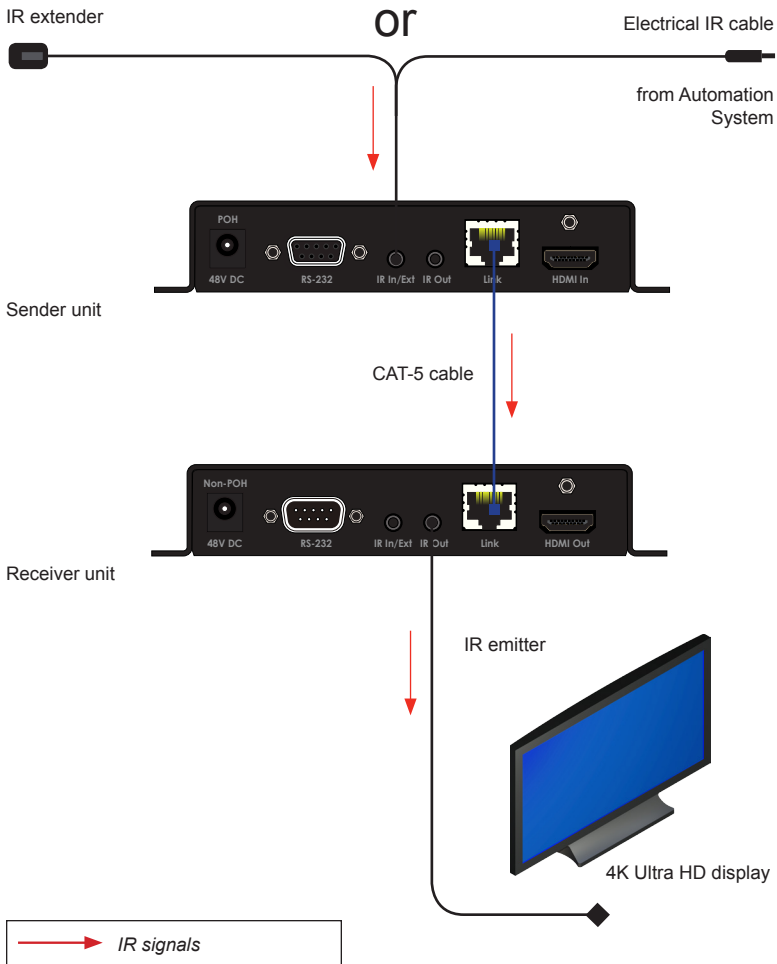
IR signals

Controlling the Source / Display from Different Locations

Bidirectional IR allows the source and/or display to be controlled from the Sender or Receiver unit. Refer to the diagram, below, for connection details. IR signals are transmitted over the CAT-5 cable.

IR extender   or   IR cable

from Automation
System

IR signals from
Receiver unit   IR emitter

POH

48V DC   RS-232   IR In/Ext IR Out   Link   HDMI In

Sender unit

CAT-5 cable

Non-POH

48V DC   RS-232   IR In /Ext IR Out   Link   HDMI Out

Receiver unit

IR emitter

IR signals from
Sender unit

IR cable

IR extender   or   from Automation
System

⎯⎯⎯⎯⟶ *IR signals*

RS-232 Interface

```
5   4   3   2   1


6   7   8   9
```
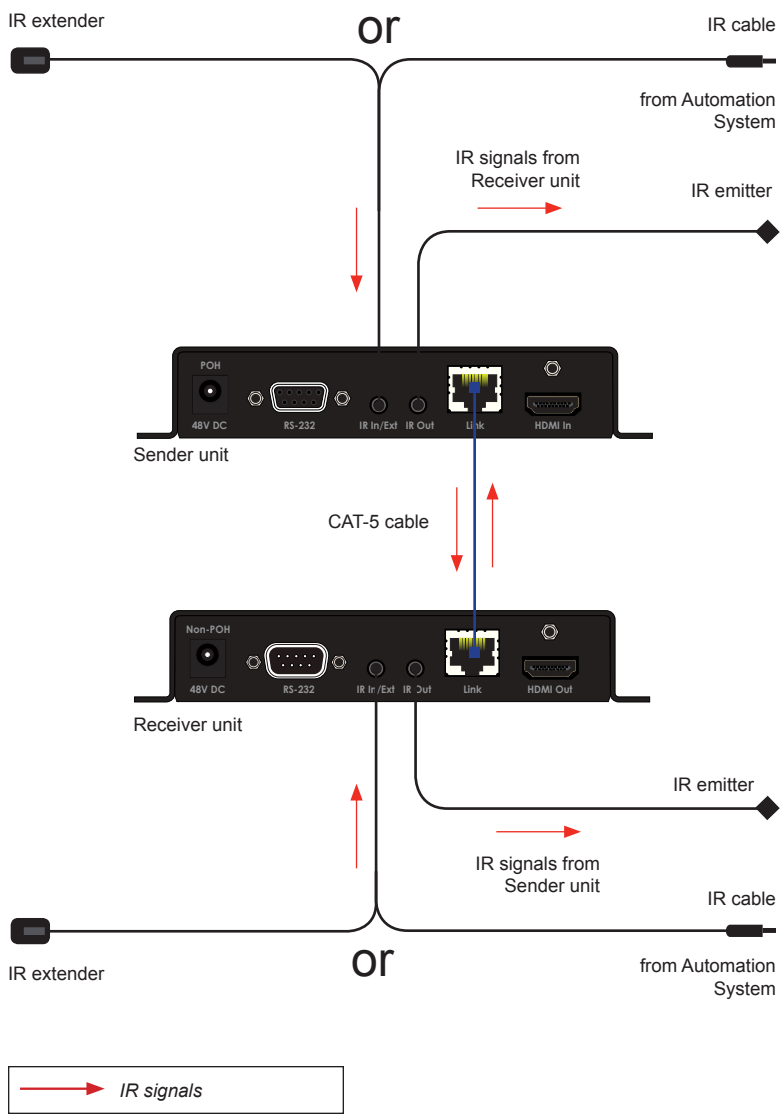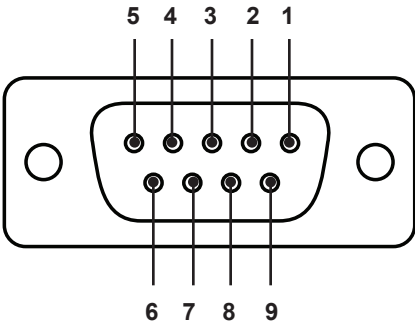
Automation Device   Extender

DCD	1	1	DCD
RXD	2	2	RXD
TXD	3	3	TXD
DTR	4	4	DTR
GND	5	5	GND
DSR	6	6	DSR
RTS	7	7	RTS
CTS	8	8	CTS
R1	9	9	R1

Only TXD, RXD, and GND pins are used.
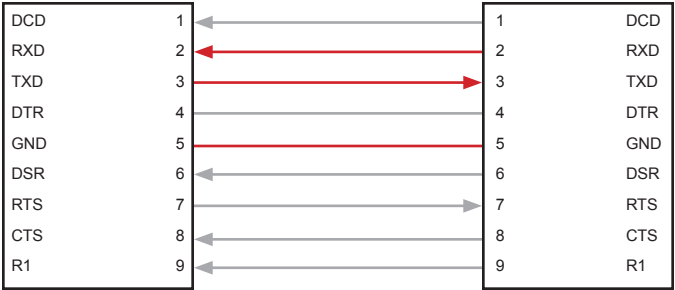
This product supports RS-232 pass-through, allowing the control of remote RS-232 devices.

In the example below, an RS-232 device has been connected to the Receiver unit. Connect the automation control device to the Sender unit.

Figure 2.1 - Basic RS-232 connection
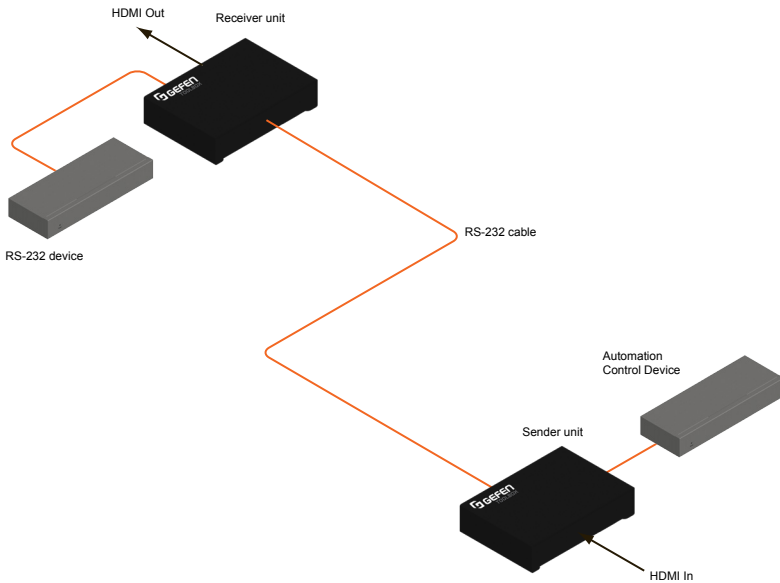
HDMI Out   Receiver unit

RS-232 cable

RS-232 device

Automation
Control Device

Sender unit

HDMI In

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4K ULTRA HD

HDBaseT™ Extender
w/ RS-232, 2-way IR, and POH

Verifying the USB Driver

In order to use this product with the Gefen Syner-G™ software, a USB driver must be installed on the computer that is running the Syner-G™ software. This driver is automatically installed when the Syner-G™ Software Suite is installed.

1. Download and install the Gefen Syner-G™ Software Suite. The Syner-G™ software can be downloaded here: http://www.gefen.com/synerg

2. Connect a mini-USB-to-USB cable (not included) from the **USB** port on the front of the Sender or Receiver unit to an available USB port on the computer.

3. From the Windows Desktop, click the **Start** button, select **Computer**, then right-click and select **Manage** from the context menu.
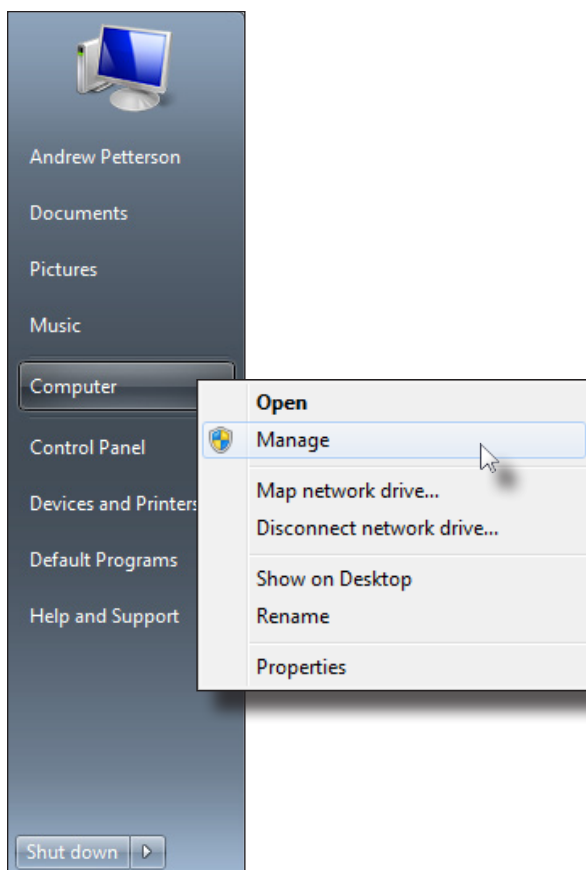
4.   The **Computer Management** window will open.

5.   In the left window pane, under **System Tools**, click **Device Manager**.

6.   In the right window pane, locate **Ports (COM & LPT)**.

The device driver will be displayed. In this case, `GTB-UHD-HBT2-S` will be displayed. If the USB cable is connected to the Receiver unit, then the device driver will be `GTB-UHD-HBT2-R`.
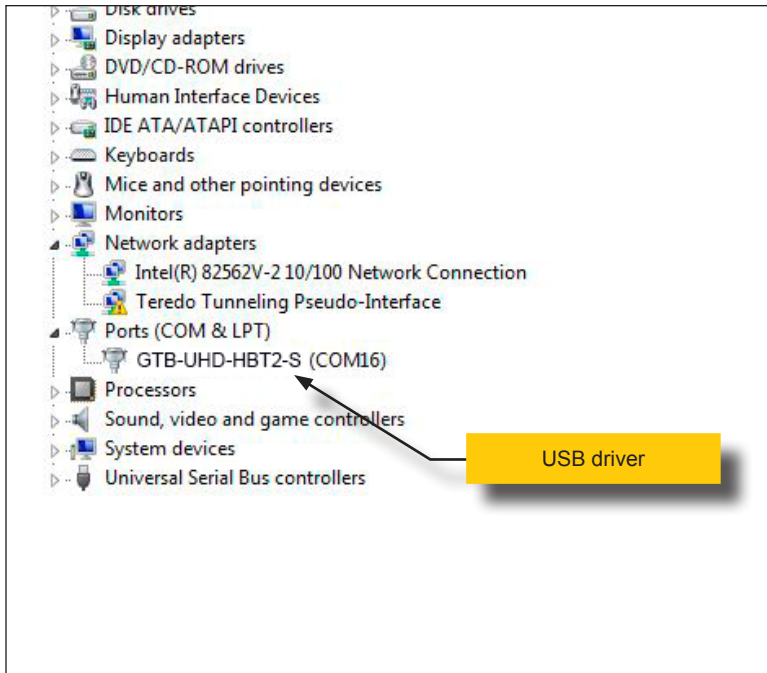
Downloading an EDID

EDID data can be downloaded from the connected Gefen Detective device to a local file. Note that the Downstream EDID or Bank EDID data cannot be downloaded to a file. To download this EDID data, it must first be copied to the Local EDID. See Copying an EDID (page 31) for more information on copying EDID data.

1.   Click the **Manage a Product** button and select the connected product from the drop-down list.

2.   Click the **Manage EDID** tab.

3. Information about the currently selected device will be displayed in the **Version Info** field.

Version Info field

4. Click the drop-down list next to the **Download** button, and select the desired EDID. In this example, we will select `Extender: Local EDID`.
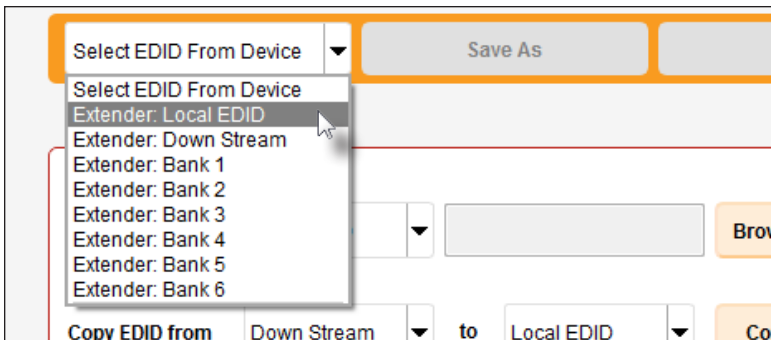
5. Click the **Save As** button.

6. The Windows **Save File** dialog will be displayed. Select the desired folder and specify the name of the file in the **File name** field, within the **Save File** dialog. Make sure to specify the `.bin` extension to the filename.

Advanced Operation
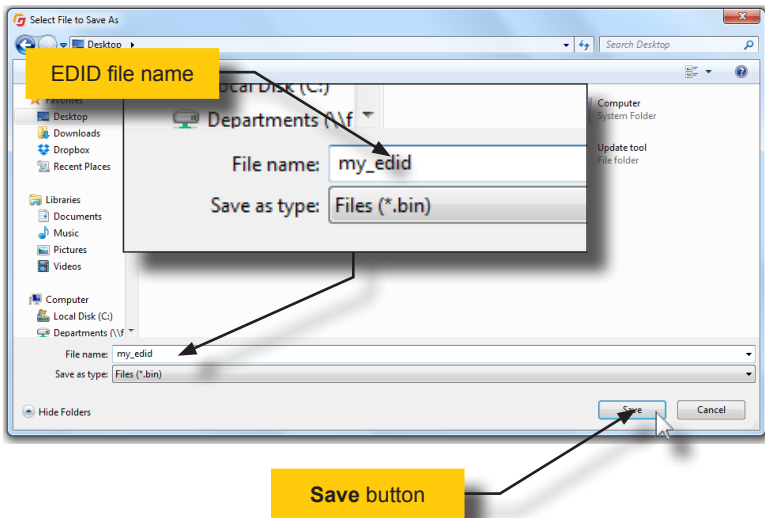
7.   Click the **Save** button.

Uploading an EDID

1. Click the **Manage a Product** button and select the connected product from the drop-down list.

2. Click the **Manage EDID** tab.

3. Click the **Upload EDID to** drop-down list to select the location where the EDID will be uploaded. The EDID can be uploaded to the Local EDID or an EDID bank.

    In the example below, we will select **Local EDID**.

4. Click the **Browse** button.

5.   The Windows **Select File** dialog will be displayed.

6.   Select the desired EDID file. The EDID file must be in `.bin` format.

7.   Click the **Open** button.
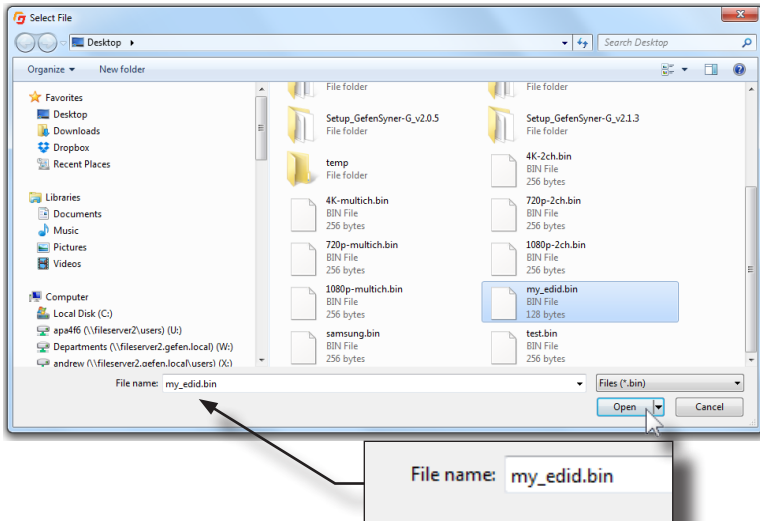
8.   Click the **Upload** button.
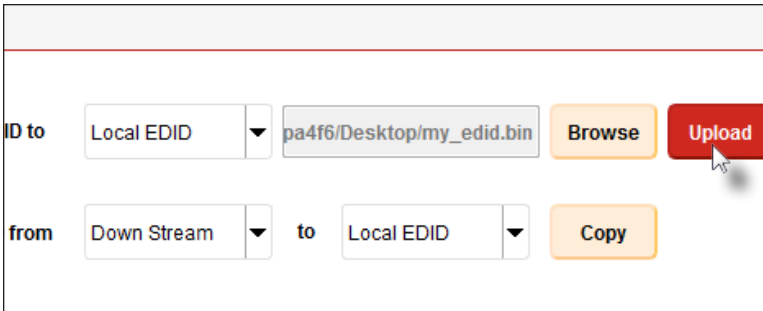
9.   In the lower-left corner of the interface, the "Uploading..." message will appear as the EDID is uploaded. Once the operation is complete, the "Upload Complete." message will be displayed.

Advanced Operation

Copying an EDID

1. Click the **Manage a Product** button and select the connected product from the drop-down list.

2. Click the **Manage EDID** tab.

3. Click the **Copy EDID from** drop-down list to select the location from where the EDID will be copied. The EDID can be copied from any of the following locations: The downstream EDID, an EDID bank, or a default EDID location

    In the example below, we will select **Down Stream**.

4. Click the **Copy EDID** to drop-down list to select the location to where the EDID will be copied. The EDID can by copied to the Local EDID or to an EDID bank.

5.   Click the **Copy** button.

Upload EDID to	Local EDID ▼		Browse
Copy EDID from	Down Stream ▼ to	Local EDID ▼	Copy

EDID Mode	Internal	Custom

6.   In the lower-left corner of the interface, the "Copying..." message will appear as the EDID is uploaded. The copy-result message will vary, depending upon the copy operation.
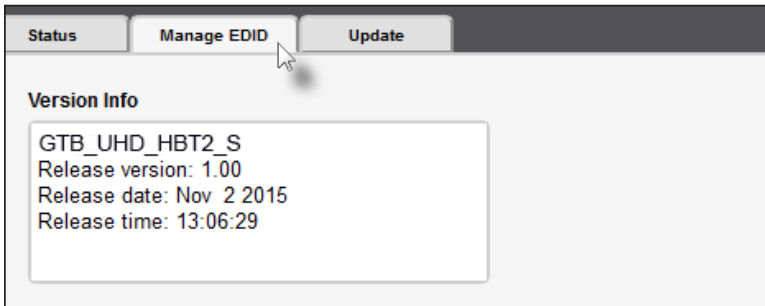
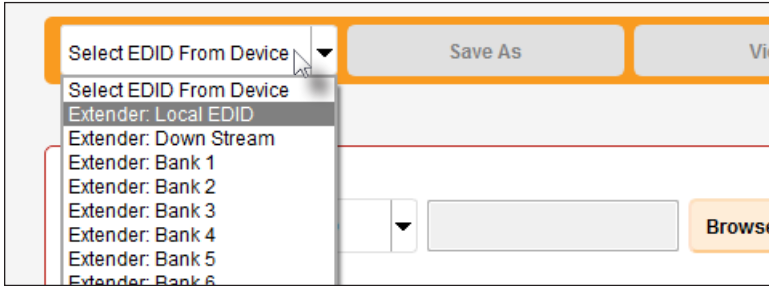Copying...   Copy result: Downstream EDID stored to local

In this example, since we copied the downstream EDID to the local EDID, the "Copy result: Downstream stored to local." message is displayed.

Viewing an EDID

1. Click the **Manage a Product** button and select the connected product from the drop-down list.

2. Click the **Manage EDID** tab.

Status	Manage EDID	Update

Version Info

GTB_UHD_HBT2_S
Release version: 1.00
Release date: Nov 2 2015
Release time: 13:06:29

3. Click the **Select EDID From Device / Display** drop-down list to select the desired EDID.

Select EDID From Device ▼	Save As	Vi

Select EDID From Device
Extender: Local EDID
Extender: Down Stream
Extender: Bank 1
Extender: Bank 2
Extender: Bank 3
Extender: Bank 4
Extender: Bank 5
Extender: Bank 6

Browse

Note that the display, which is connected to the computer, is also available in the drop-down list. In this way, we can download, view, and/or edit the EDID from the display (sink) device.

4. Click the **View** button.

cal EDID ▼	Save As	View

4.   After a few seconds, Syner-G will also switch to the **EDID Editor** screen.
     See the Gefen Syner-G™ User Manual for more information on using the EDID Editor.

5.   Click the desired EDID tab to view specified information on the EDID. Note that
     some sections within a tab use scroll bars to indicate that more information is
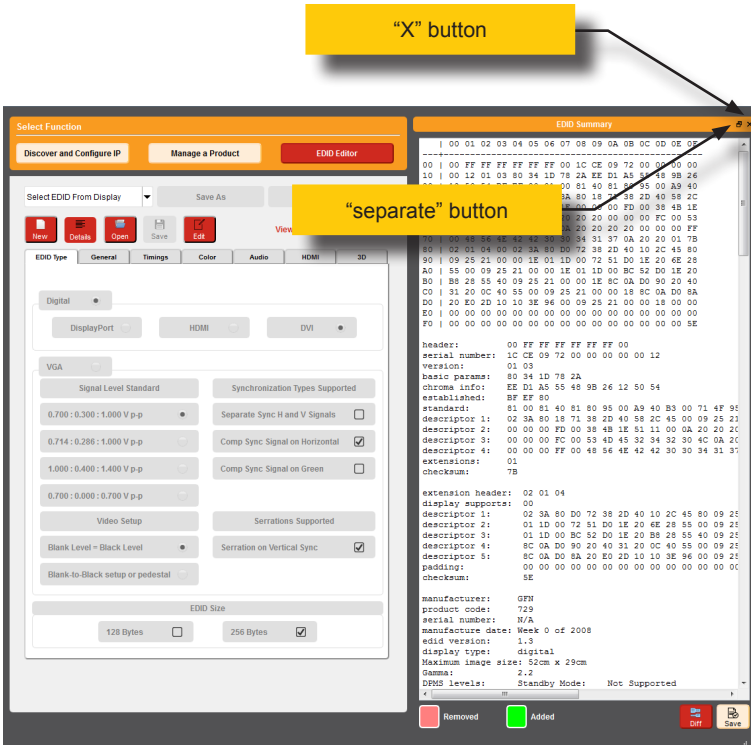   available.
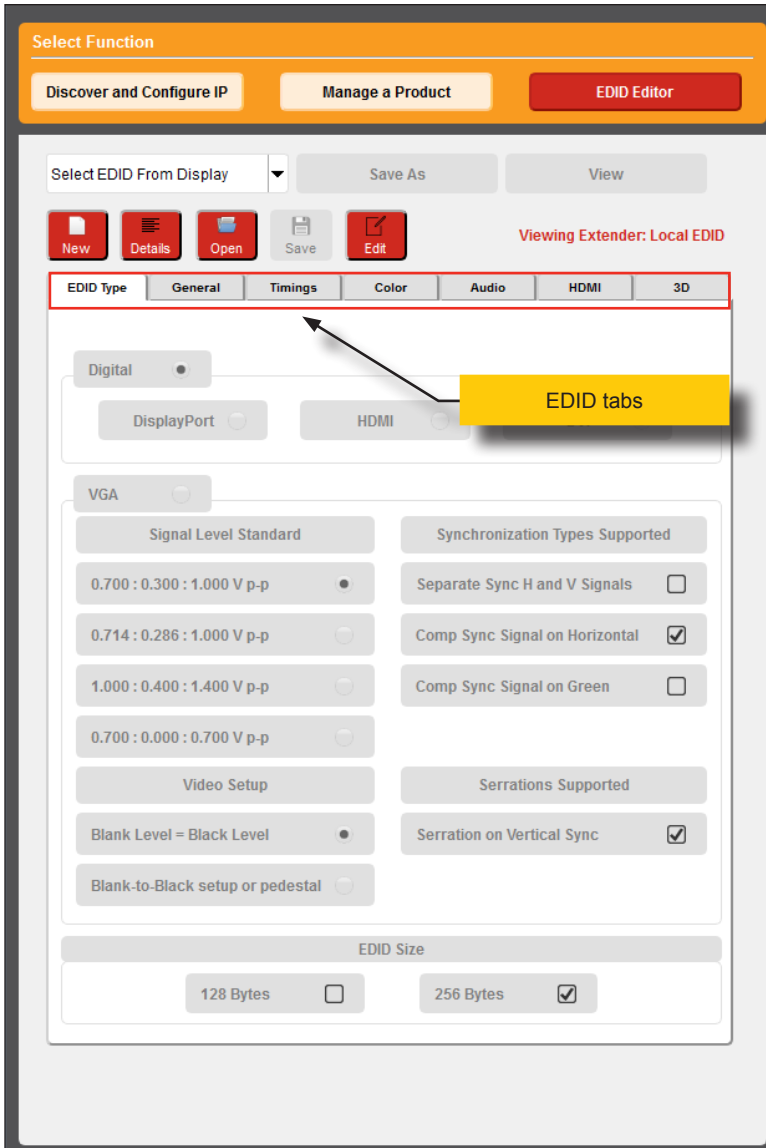
7.   Click the **Details** button.

Details button
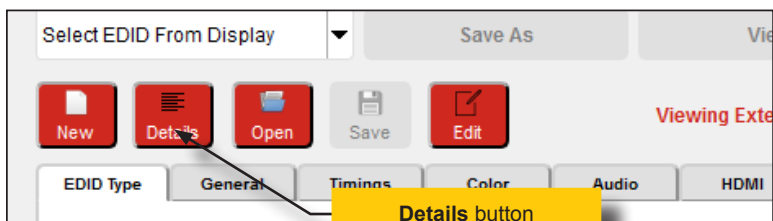
8.   The **EDID Summary** window will be displayed. Use the horizontal and vertical scroll bar, as needed, to view the EDID information.

Scroll bar

Scroll bar
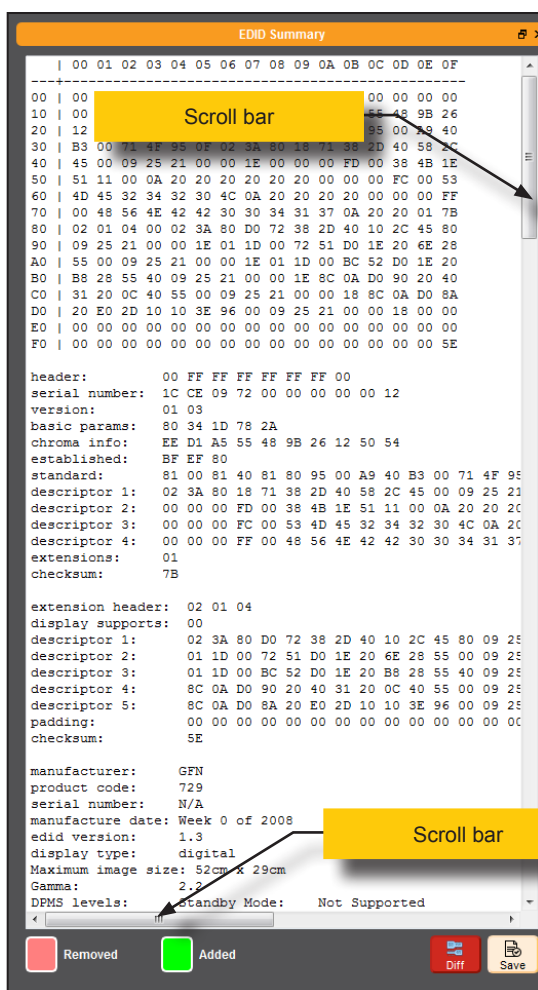
9.   Click the ⬚ button, in the upper-right corner of the **EDID Summary** window to separate the **EDID Summary** window from the main Syner-G window:


"X" button

"separate" button

10.   Double-click the window title bar of the detached EDID Summary to reattach it to the main window. it to the main Syner-G window.

11.   To close the **EDID Summary** window, either click the ✕ button, in the upper-right corner of the **EDID Summary** window or click the **Details** button in the main Syner-G window.

Link Quality Monitoring

The **Status** tab provides information about signal quality in HDBaseT installations. This page will only be available when connected to a Gefen product that uses HDBaseT technology.

1. Select an HDBaseT product from the **Select Product** drop-down list. In this example, the EXT-UHDA-HBT2 is selected. Make sure to select GTB-UHD-HBT2.
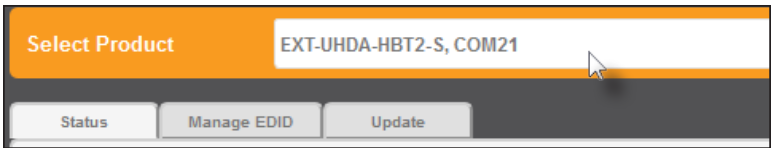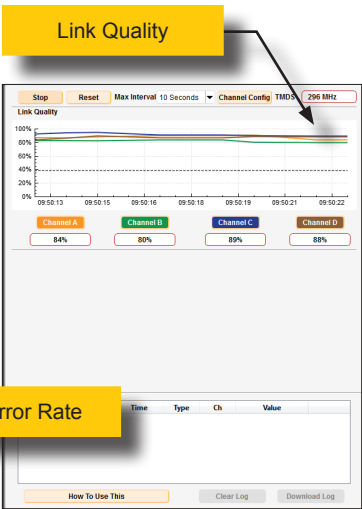

2. Under the **Status** tab will automatically be selected. If a Sender unit is selected, both the **Link Quality** and **Max Error Rate** graphs will be displayed. If a Receiver unit is selected, only the **Link Quality** graph will be displayed.
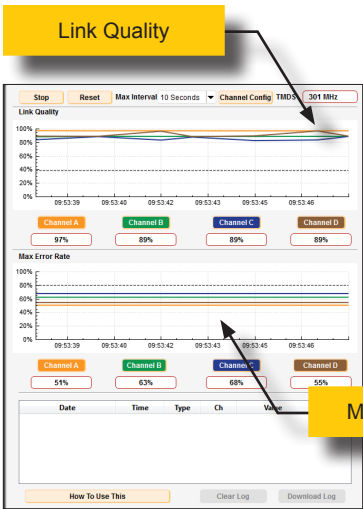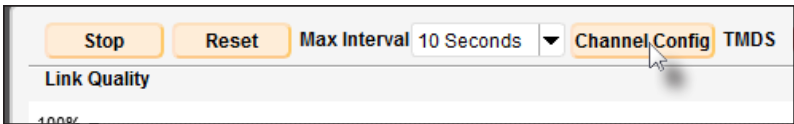
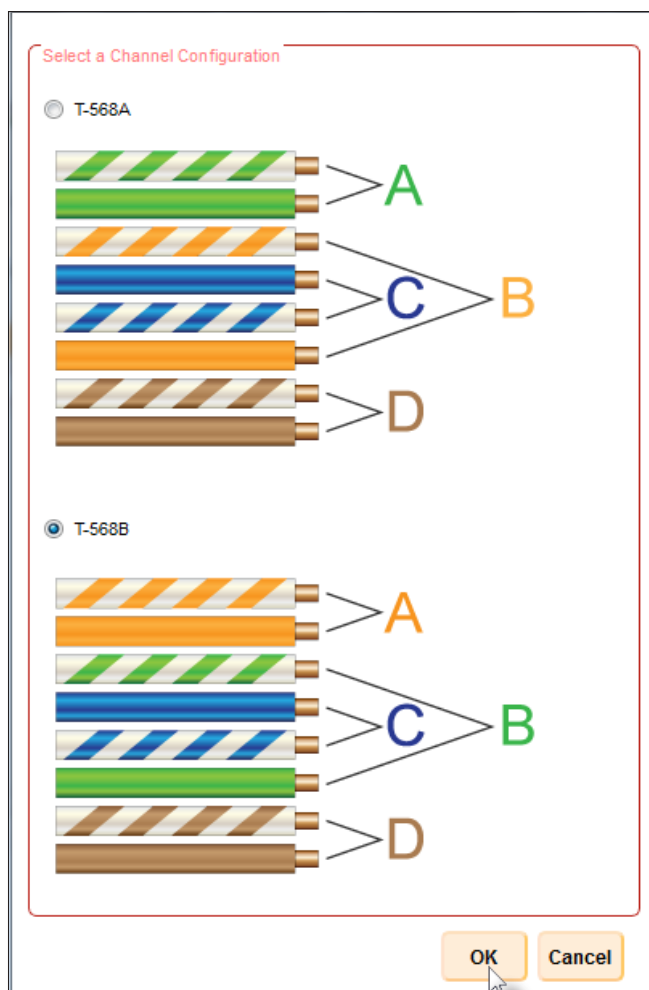Sender unit   Receiver unit

3. Click the **Channel Config** button, above the **Link Quality** graph.
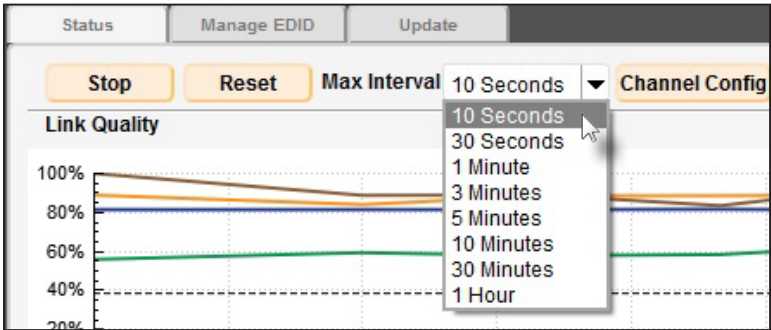
4.   The **Select a Channel Configuration** dialog box will be displayed.

5.   Click the radio button for the cable termination type. In the example, below, **T-568B** is selected.


6.   Click the **OK** button to save the selection.

7. Click the **Max Interval** drop-down list to select the desired time interval. This interval represent the maximum length of time before the graphs are updated.

8. To clear the channel data from both graphs, click the **Reset** button. Click the **Stop** button to halt the link monitoring process.

When the **Stop** button is clicked, the monitoring process will stop and the button will read **Start.** In addition, Syner-G will ask if the log file should be saved. To continue the monitoring process, click the **Start** button.
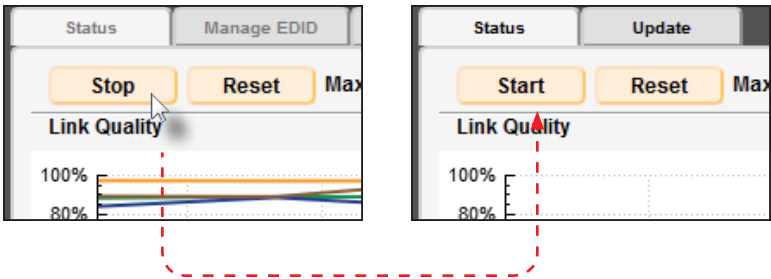

9. Errors are automatically recorded and placed in the list box at the bottom of the Syner-G application, as shown.

In the example, below, the **Max Error Rate** for **Channel B** is 100%. Note the horizontal dashed-line at the 80% mark. This line represents the error rate threshold for each channel.

Since **Channel B** has exceed the threshold, the channel's current value is highlighted in red, as shown below.
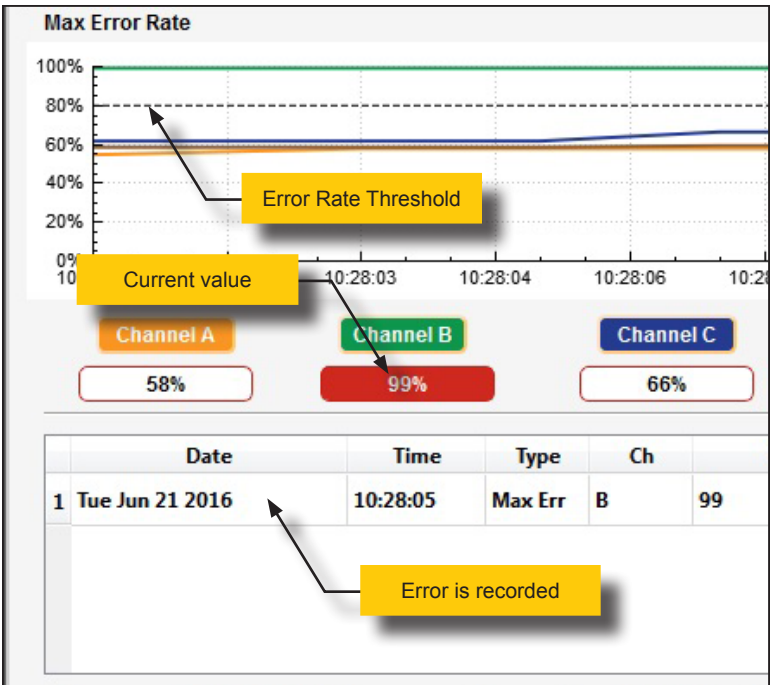
The following table provides a summary of the error type and the values that will trigger an error report. Note that a threshold value will also trigger a report.

| Report Type	Range when value is recorded
Link Quality	40% or below
Max Error Rate	80% or above

10. Press the **Clear Log** button, at any time, to clear all log entries.


page | 40

Once the **Clear Log** button is pressed, the following dialog will be displayed, confirming the operation.

Click the **No** button to clear all reports in the list box. Note that once cleared, reports can **not** be recovered.

Click the **Yes** button to save the all current data to a `.csv` file. See the next step for more information on saving the current data to a file.
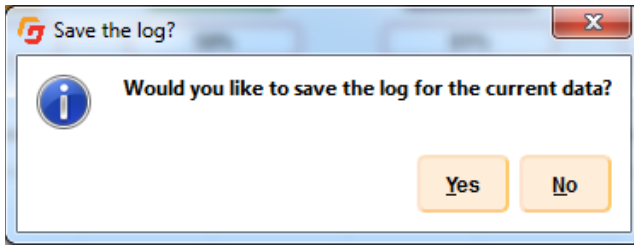

11. Click the **Download Log** button to save all recorded error reports to a `.csv` file. The `.csv` file is a comma-delimited file which allows data to be save in a structured, table-type format, which can be opened using a spreadsheet application.
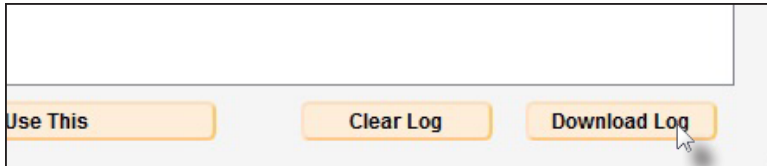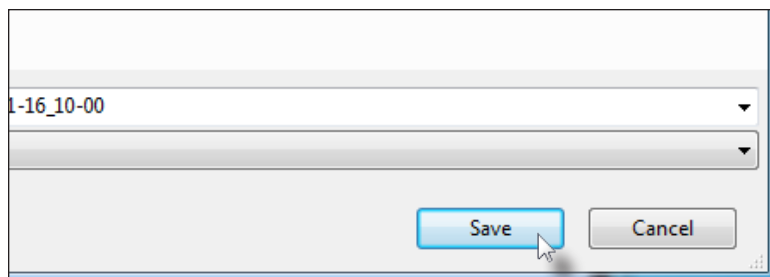

The **Save CSV** dialog will be displayed.
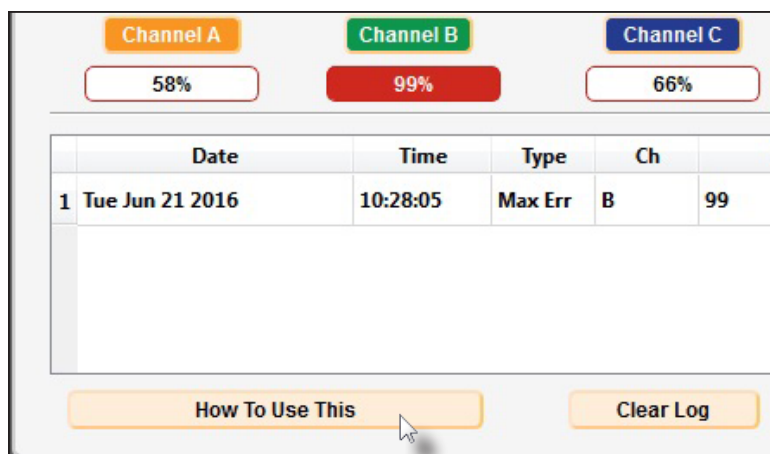
Advanced Operation
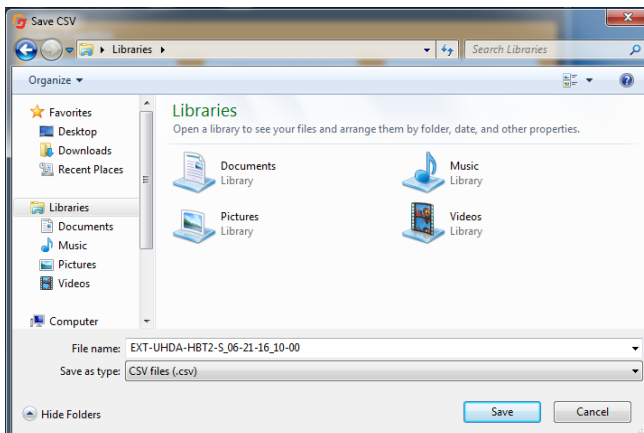
The filename will automatically be created and assigned to the **Filename** field. The name of the file can be changed, if desired.
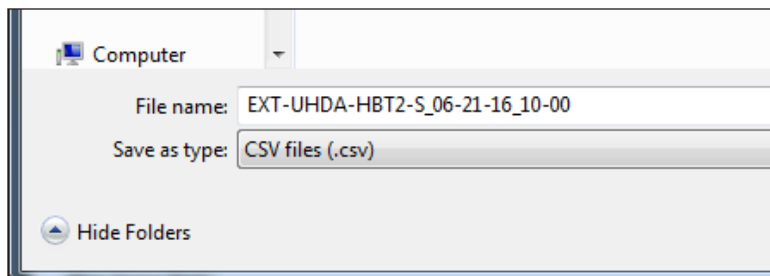
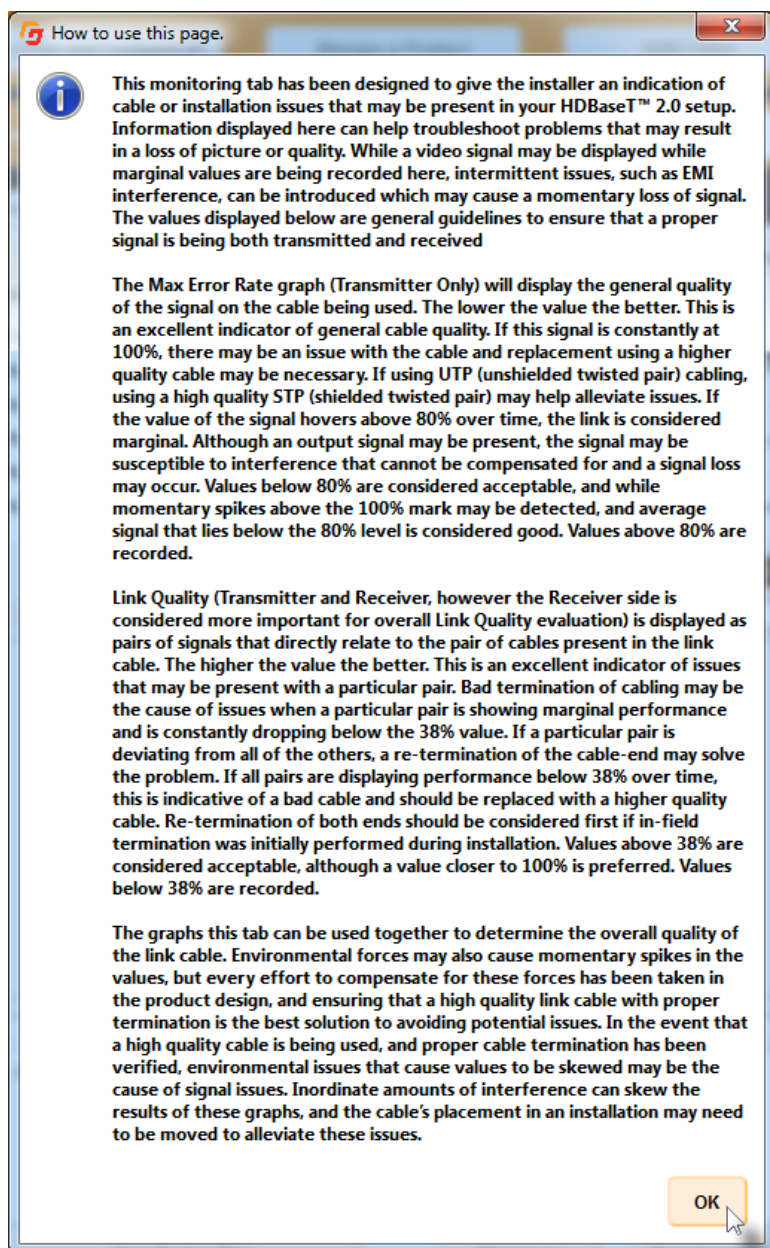Click the **Save** button to save the file.

12. To display detailed information on the use of Link Monitoring, click the **How to Use This** button, at the bottom of the Syner-G application window.

Advanced Operation

The **How to use this page** dialog will be displayed. It is recommended that this dialog be read in it entirety as it provides technical details on link monitoring.

To dismiss the dialog, click the **OK** button at the bottom of the dialog.

How to use this page.

This monitoring tab has been designed to give the installer an indication of cable or installation issues that may be present in your HDBaseT™ 2.0 setup. Information displayed here can help troubleshoot problems that may result in a loss of picture or quality. While a video signal may be displayed while marginal values are being recorded here, intermittent issues, such as EMI interference, can be introduced which may cause a momentary loss of signal. The values displayed below are general guidelines to ensure that a proper signal is being both transmitted and received

The Max Error Rate graph (Transmitter Only) will display the general quality of the signal on the cable being used. The lower the value the better. This is an excellent indicator of general cable quality. If this signal is constantly at 100%, there may be an issue with the cable and replacement using a higher quality cable may be necessary. If using UTP (unshielded twisted pair) cabling, using a high quality STP (shielded twisted pair) may help alleviate issues. If the value of the signal hovers above 80% over time, the link is considered marginal. Although an output signal may be present, the signal may be susceptible to interference that cannot be compensated for and a signal loss may occur. Values below 80% are considered acceptable, and while momentary spikes above the 100% mark may be detected, and average signal that lies below the 80% level is considered good. Values above 80% are recorded.

Link Quality (Transmitter and Receiver, however the Receiver side is considered more important for overall Link Quality evaluation) is displayed as pairs of signals that directly relate to the pair of cables present in the link cable. The higher the value the better. This is an excellent indicator of issues that may be present with a particular pair. Bad termination of cabling may be the cause of issues when a particular pair is showing marginal performance and is constantly dropping below the 38% value. If a particular pair is deviating from all of the others, a re-termination of the cable-end may solve the problem. If all pairs are displaying performance below 38% over time, this is indicative of a bad cable and should be replaced with a higher quality cable. Re-termination of both ends should be considered first if in-field termination was initially performed during installation. Values above 38% are considered acceptable, although a value closer to 100% is preferred. Values below 38% are recorded.

The graphs this tab can be used together to determine the overall quality of the link cable. Environmental forces may also cause momentary spikes in the values, but every effort to compensate for these forces has been taken in the product design, and ensuring that a high quality link cable with proper termination is the best solution to avoiding potential issues. In the event that a high quality cable is being used, and proper cable termination has been verified, environmental issues that cause values to be skewed may be the cause of signal issues. Inordinate amounts of interference can skew the results of these graphs, and the cable's placement in an installation may need to be moved to alleviate these issues.

OK

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4K ULTRA HD

HDBaseT™ Extender
w/ RS-232, 2-way IR, and POH

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4 | **Appendix**

The Syner-G™ Software Suite provides an easy way to perform firmware updates. Before launching Syner-G™, makre sure that a USB cable is connected between the product and the computer that is running the Syner-G™ software. Refer to the Syner-G™ Software Suite User Manual for more information on using other features with this product.
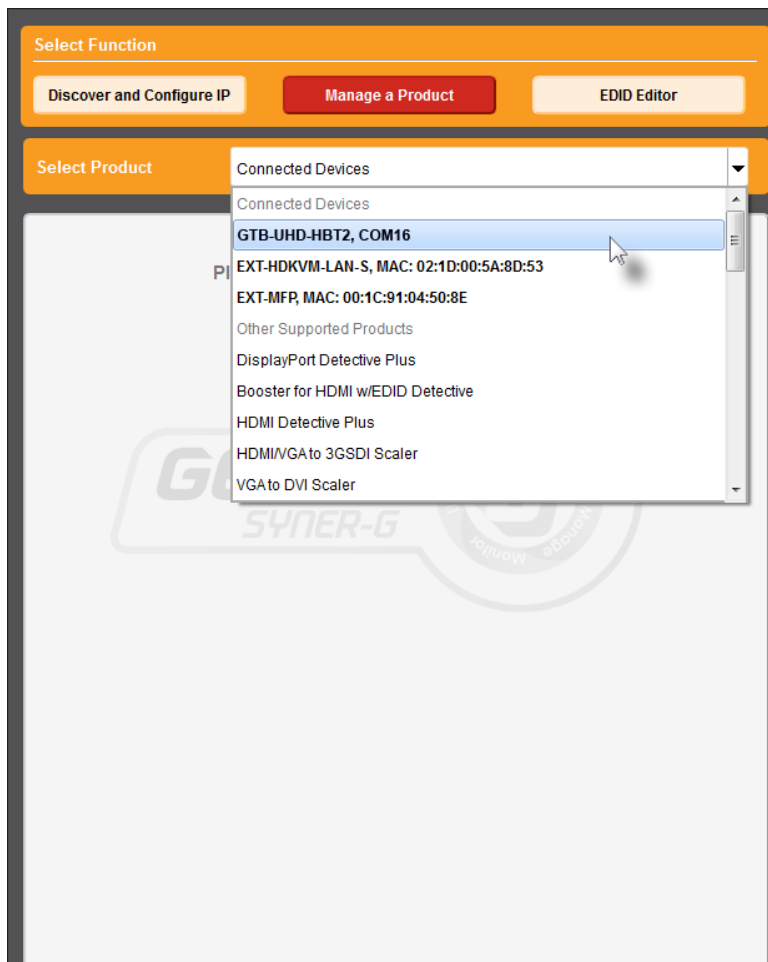
1. Launch the Syner-G™ Software Suite from the Start Menu or using the shortcut from the Windows Desktop.

2. Click the **Manage a Product** button.
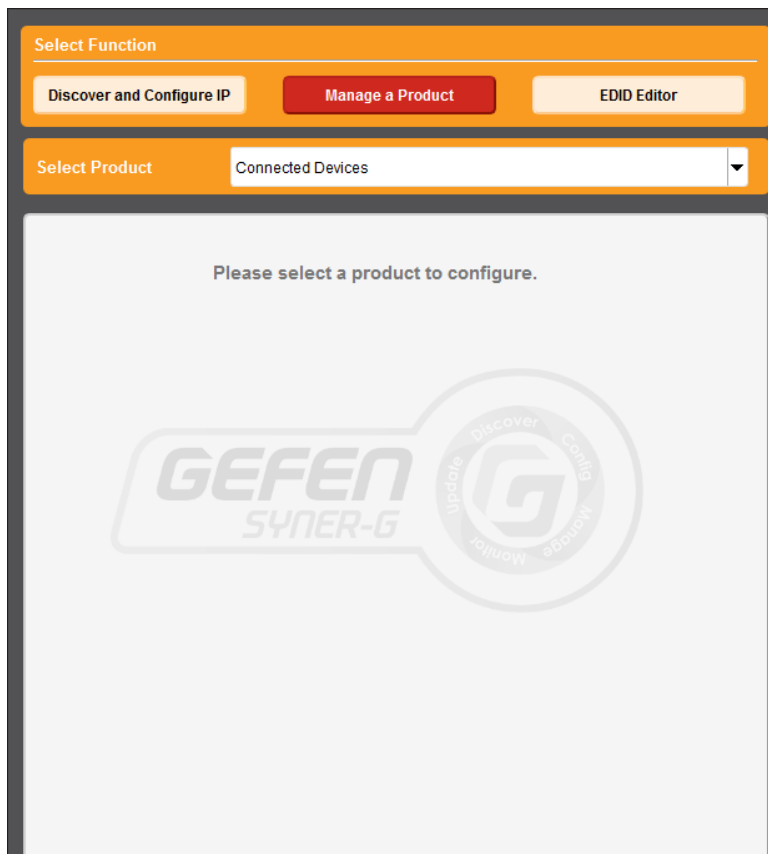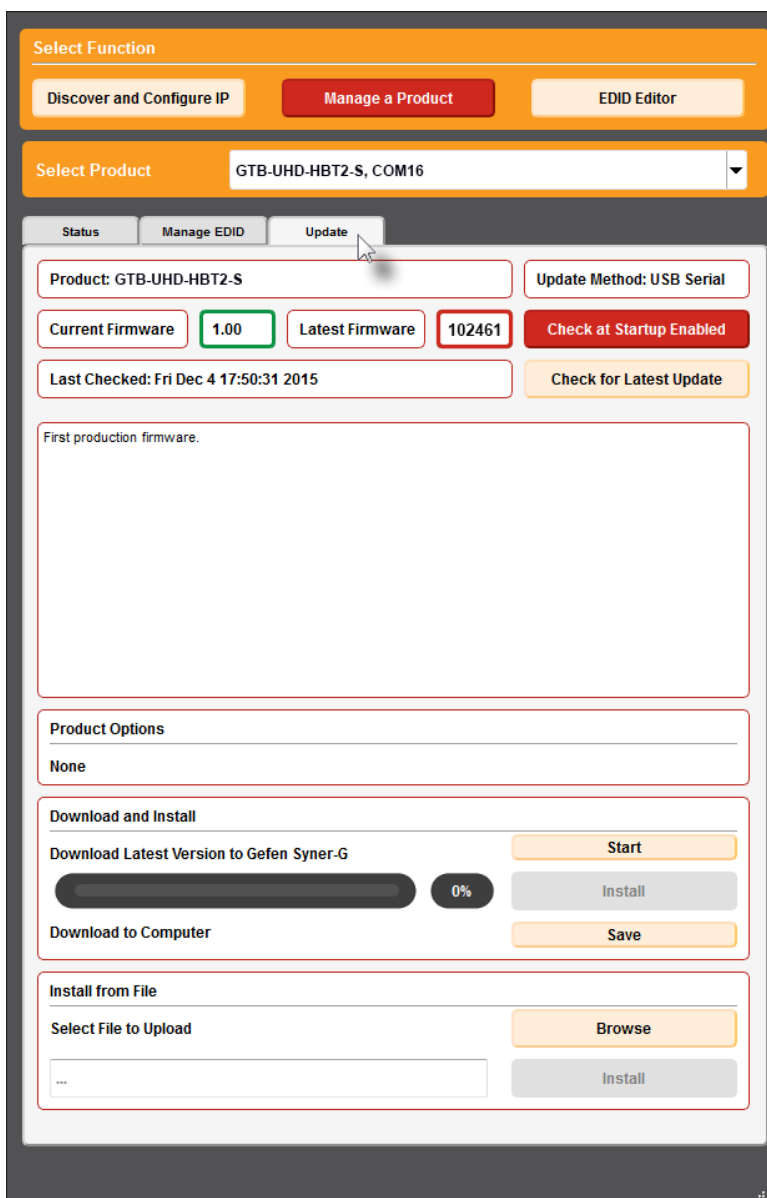
3.   Select the product from the **Select your product** drop-down list.

If the product is <u>not</u> detected by Syner-G™, then the product will not be listed in bold type, within the **Select your product** drop-down list. Verify the following:

►   The product is powered and connected to the computer that is running the Syner-G™ Software Suite, using a USB-to-Mini USB cable.

►   Make sure that the USB driver is installed and functioning correctly under Control Panel. See Verifying the USB Driver (page 24) for more information.

4.   Click the **Update** tab.

5.   Click the **Start** button to begin downloading the firmware.

The Syner-G™ Software Suite will automatically download the firmware file for the selected product. This process should take a few seconds.

Once the download process has completed, the progress bar will indicate 100%, as shown on the next page.

A message will also appear at the bottom of the window, indicating that the firmware file was successfully downloaded.
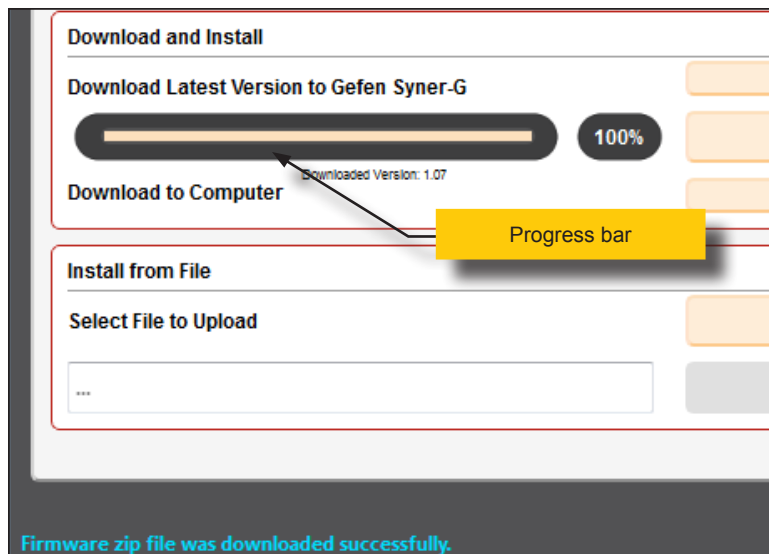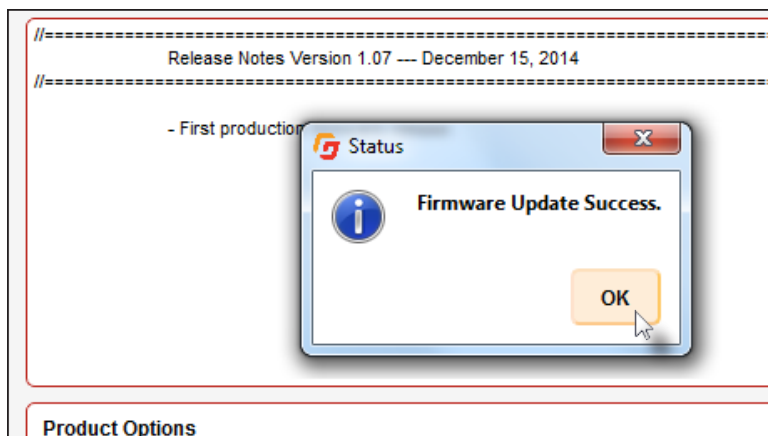

6. Click the **Install** button to begin installing the software.
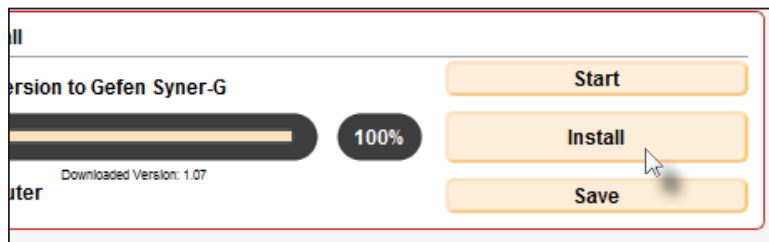
7. The installation process will begin and the progress bar will indicate the current status.
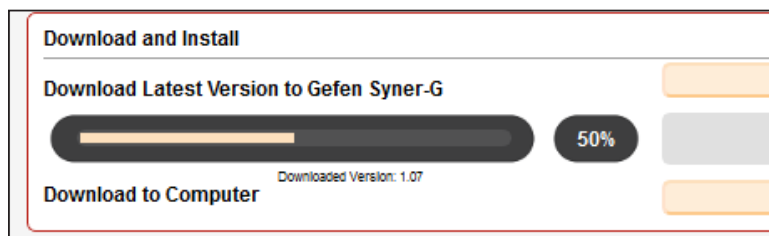
8. After the firmware update process has completed, the following message will be displayed.

9. Click the **OK** button to dismiss the message box.

10. The procedure is now complete.

Sender Unit DIP Switches

DIP swtich	Funciton	Default setting (OFF position)
1	EDID mode	Pass-through (downstream) EDID
2	Hot-Plug Detect (HPD)	Always high
3	EDID lock	Disabled
4	HDCP	Pass-through
5	Sender IR carrier	Pass-through
6	Receiver IR carrier	Pass-through
7	IR polarity	Uses Gefen part no. EXT-RMT-EXTIRN
8	Long-Reach mode	HDBT Mode
9	IR carrier frequency	38 kHz
10	IR carrier frequency	Depends on DIP 5 setting
11	N/A	---
12	N/A	---

Receiver Unit DIP Switches

DIP swtich	Funciton	Default setting (OFF position)
1	Sender IR carrier	Pass-through
2	Receiver IR carrier	Pass-through
3	IR polarity	Uses Gefen part no. EXT-RMT-EXTIRN
4	Long-Reach mode	HDBT Mode: Extend 4K up to 330 ft (4:2:0)
5	IR carrier frequency	38 kHz
6	IR carrier frequency	Depends on DIP 1 setting
7	N/A	---
8	N/A	---

Front of RJ-45 Connector
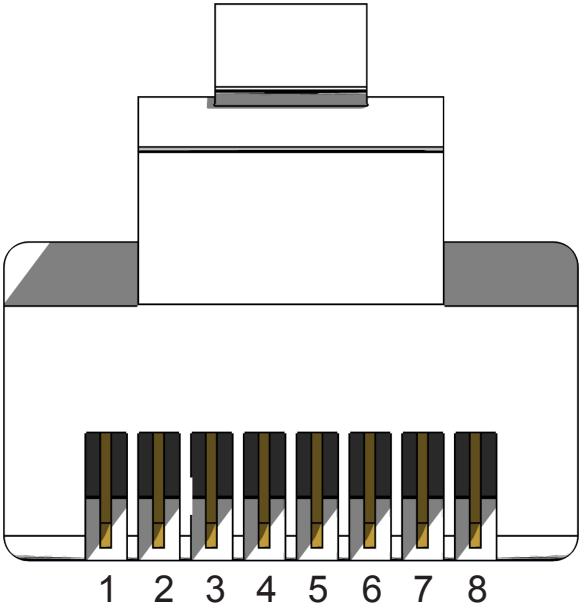
Gefen recommends the TIA/EIA-568-B wiring option. Use the table below when field-terminating cable for use with Gefen products.

Pin	Color	Description
1	Orange / White	TD+ (Transmit Data, positive differential signal)
2	Orange	TD- (Transmit Data, negative differential signal)
3	Green / White	RD+ (Receive Data, positive differential signal)
4	Blue	Unused
5	Blue / White	Unused
6	Green	RD- (Receive Data, negative differential signal)
7	Brown / White	Unused
8	Brown / White	Unused

> **Information**
>
> Shielded CAT-5e (or better) cabling is recommended.

Specifications

Supported Formats	
Resolutions (max.)	• 3840 x 2160p 60 Hz (4:2:0) • 4096 x 2160p 30 Hz (4:4:4) • 3840 x 2160p 30 Hz (4:4:4)

Connectors, Controls, and Indicators	
HDMI In (Sender)	• 1 x Type A 19-pin female, locking
HDMI Out (Receiver)	• 1 x Type A 19-pin female, locking
RS-232 (Sender)	• 1 x DB-9, female
RS-232 (Receiver)	• 1 x DB-9, male
Link (Sender / Receiver)	• 1 x RJ-45
IR In / Ext (Sender / Receiver)	• 1 x 3.5mm mini-stereo
IR Out (Sender / Receiver)	• 1 x 3.5mm mini-mono
POH 48V DC (Sender)	• 1 x power connector
Non-POH 48V DC (Receiver)	• 1 x power connector
USB (Sender / Receiver)	• 1 x mini-B type
DIP switches (Sender)	• 12 x poles, 4 per bank
DIP switches (Receiver)	• 8 x poles, 4 per bank
Link Indicator (Sender / Receiver)	• 1 x LED, blue
Video Indicator (Sender / Receiver)	• 1 x LED, amber
Power Indicator (Sender / Receiver)	• 1 x LED, green

Operational	
Maximum TMDS clock	• 300 MHz
Power input	• 48 V DC
Power consumption (Sender & Receiver, combined)	• 11 W
Operating temperature	• +32 to +122 °F (0 to +50 °C)
Operating humidity	• 5% to 90% RH, non-condensing
Storage temperature	• -4 to +185 °F (-20 to +85 °C)
Storage humidity	• 0% to 95% RH, non-condensing
MTBF	• 50000 hours

Physical	
Dimensions (W x H x D) (not including connectors)	• 5.8" x 1" x 3.4" (146mm x 25mm x 85mm)
Unit weight	• 0.50 lbs (0.23 kg) each

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