

4K ULTRAHD HDBaseT[™] Extender w/ RS-232, 2-way IR, and POH

GTB-UHD-HBT2

User Manual



AV II

GEFEN®

4K Onld The HDBaseT⁻⁻ Extender S w/ RS-232, 2-way IR, and POH

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.

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

Contacting Gefen Technical Support

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Important Notes

 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

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Gefen and Core Brands, LLC reserve the right to make changes in the hardware, packaging, and any accompanying documentation without prior written notice.



This product uses UL-Listed power supplies

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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)

1 Getting Started

Introd	luction	2
5	Sender Unit	2
F	Receiver Unit	4
Install	lation	6
C	Connection Instructions	6
A	Application Diagram	7

2 Basic Operation

DIP Switch Configuration	10
Sender unit	
Receiver unit	13
Notes on IR Carrier Signals	14
LED Status	15
Bidirectional IR Control	16
Controlling the Source from the Viewing Location	
Controlling the Display from the Source Location	17
Controlling the Source / Display from Different Locations	
RS-232 Interface	
RS-232 Interface	

3 Advanced Operation

Using Syner-G [™]	
Verifying the USB Driver	
Downloading an EDID	
Uploading an EDID	
Copying an EDID	
Viewing an EDID	
Link Quality Monitoring	

4 Appendix

Updating the Firmware	
Default Settings	
Sender Unit DIP Switches	
Receiver Unit DIP Switches	
Network Cable Diagram	53
Specifications	
Index	55

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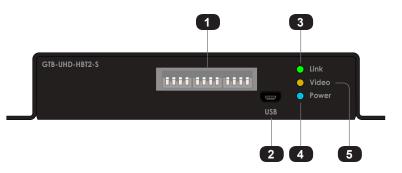
4K ULTRAHD HDBaseT[™] Extender w/ RS-232, 2-way IR, and POH

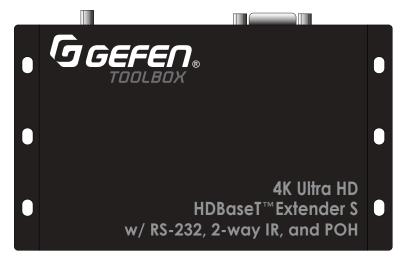
Getting Started

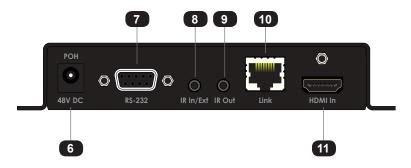
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Introduction

Sender Unit

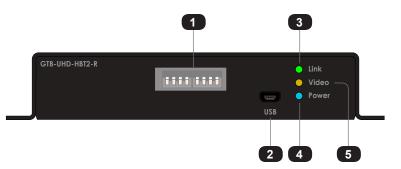


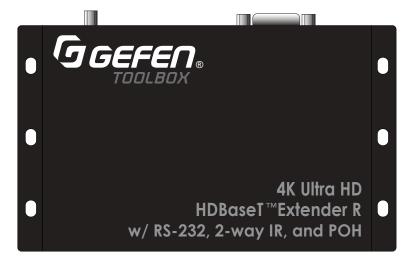


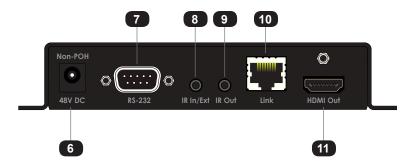


ID	Name	Description
1	DIP switches	See DIP Switch Configuration (page 10) for more information.
2	USB	For use with the Syner-G Software Suite. See Using Syner-G [™] (page 24) for more information.
3	Link (LED)	This LED indicator glows solid green when the Sender and Receiver unit are connected by a CAT-5 (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.









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)

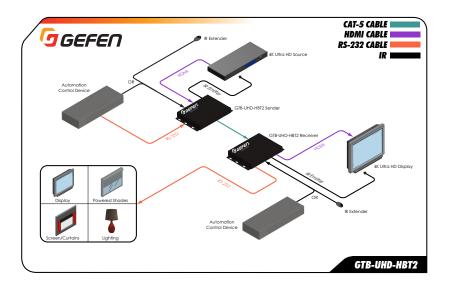
See DIP Switch Configuration (page 10) for more information on setting the extension distance.

- ▶ 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.

Application Diagram



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4K ULTRAHD HDBaseT[™] Extender w/ RS-232, 2-way IR, and POH

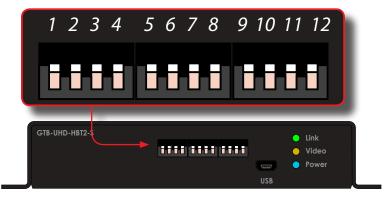
2 Basic Operation

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	Des	cription
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 <i>always</i> high, even when the display is hot-plugged (disconnected from then reconnected to the source device).

DIP	Feature	Des	cription
3	EDID Lock	•	ON EDID Lock <i>enabled</i> . The current EDID will be stored on the input even if the unit is power- cycled. OFF (default) EDID Lock <i>disabled</i> .
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).

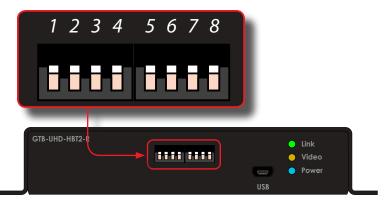
DIP	Feature	Description
9	IR Carrier Frequency	 ON 56 kHz. OFF (default) 38 kHz.
10	IR Carrier Frequency	 ON 47 kHz. OFF (default) Depends upon setting of DIP 9.
11	N/A	
12	N/A	

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.

LED Status

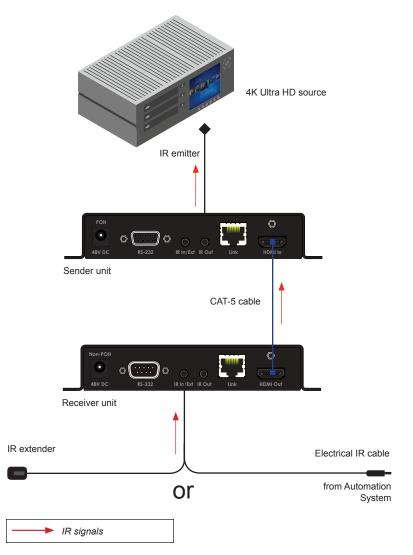
The Link, Video, and Power LED indicators provides basic information on the current status of the this product.

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.

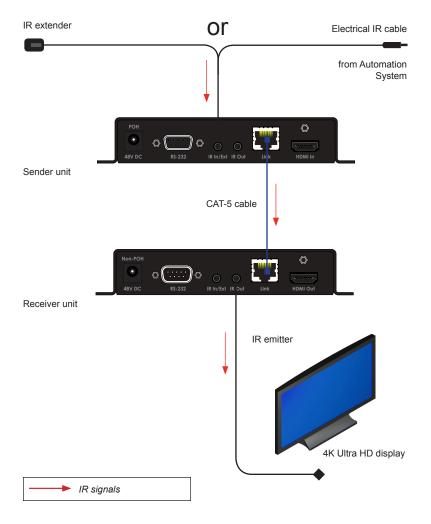
Controlling the Source from the Viewing Location

- 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.



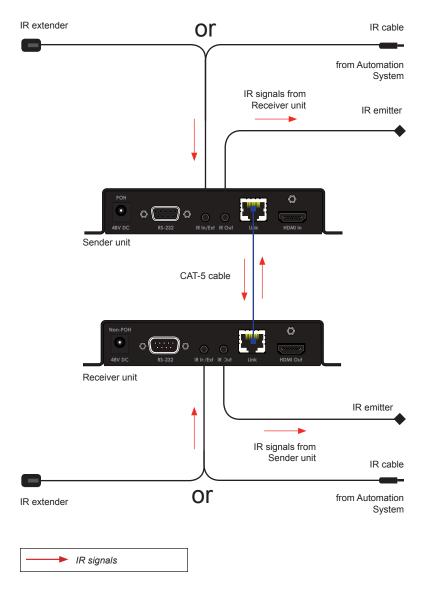
Controlling the Display from the Source Location

- 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.

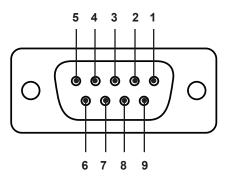


Controlling the Source / Display from Different Locations

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.

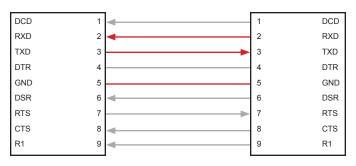


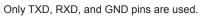




Automation Device

Extender

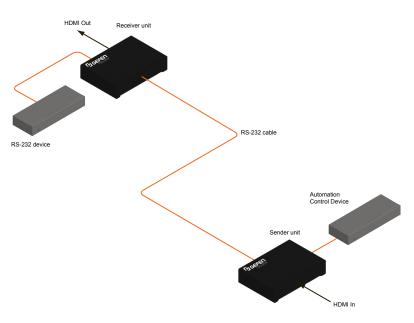




This product supports RS-232 pass-through, allowing the control of remote RS-232 devices.

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





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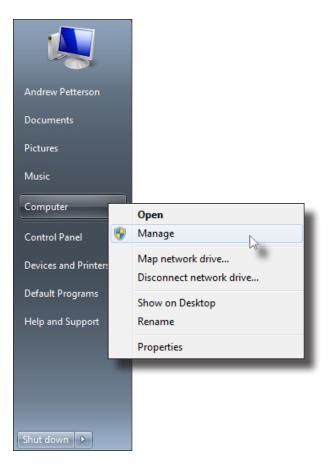
4K ULTRAHD HDBaseT[™] Extender w/ RS-232, 2-way IR, and POH

3 Advanced Operation

Verifying the USB Driver

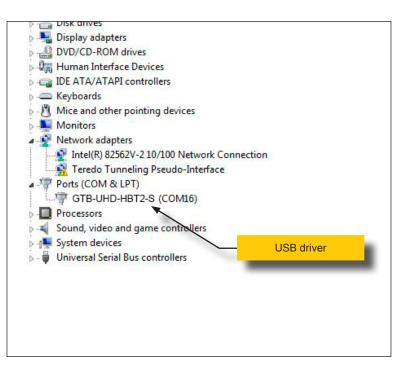
In order to use this product with the Gefen Syner-G[™] software, a USB driver must be installed on the computer that is running the Syner-G[™] software. This driver is automatically installed when the Syner-G[™] Software Suite is installed.

- 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.



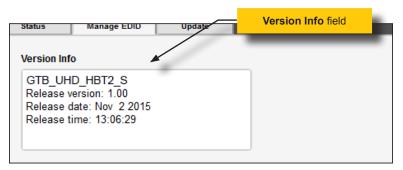
Downloading an EDID

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.

elect Function			
Discover and Configu	re IP	Manage a Product	EDID Editor
elect Product	GTB-UHD-H	BT2-S, COM18	•
Version Info GTB_UHD_HBT2 Release version: 1	2_S .00	date	
Release date: Nov Release time: 13:0			
Select EDID From	Device 🔻	Save As	View
Select EDID From	Device -	Save As	View
Select EDID From	Local EDID	Save As ▼	View Browse Upload
		Save As	
Upload EDID to	Local EDID	▼ to Local EDID	Browse Upload
Upload EDID to Copy EDID from	Local EDID Down Stream	▼ to Local EDID	Browse Upload

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



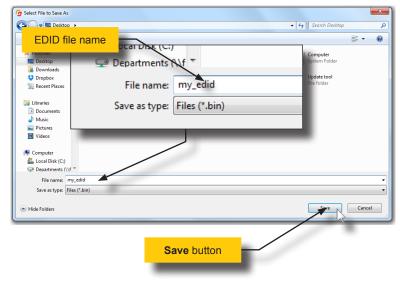
4. Click the drop-down list next to the **Download** button, and select the desired EDID. In this example, we will select Extender: Local EDID.

Select EDID From Device 🔻	Save As
Select EDID From Device	
Extender: Local EDID	
Extender: Bank 1	
Extender: Bank 2 Extender: Bank 3	
Extender: Bank 4	Br
Extender: Bank 5	
Extender: Bank 6	
Copy EDID from Down Strea	im 🔻 to Local EDID 💌 📿

5. Click the Save As button.

Extender: Local EDID	-	Save As	Vi
		45	

 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.



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.

Vie
Browse
Сору

4. Click the **Browse** button.

				View	
Upload EDID to	ocal EDID	-			Browse
Copy EDID from D	own Stream		Local EDID	-	Сору

- 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.

G Select File								x
Desktop >				• ⁴ 7	Search Desk	top		٩
Organize 👻 New folder							- 11	0
★ Favorites		File folder		File folder				*
E Desktop		Setup_GefenSyner-G_v2.0.5		Setup_GefenSyr	ner-G_v2.1.3			
Downloads		File folder		File folder				
Dropbox Recent Places		temp	3	4K-2ch.bin				
and freedom in the set		File folder		BIN File 256 bytes				
Calibraries		4K-multich.bin	3	720p-2ch.bin				
Documents		BIN File 256 bytes		BIN File 256 bytes				
E Pictures		720p-multich.bin	3	1080p-2ch.bin				
H Videos		BIN File 256 bytes		BIN File 256 bytes				E
r Computer	3	1080p-multich.bin		my_edid.bin				
Local Disk (C:)		BIN File 256 bytes		BIN File 128 bytes				
🛫 apa4f6 (\\fileserver2\users) (U:)	4	samsung.bin		test.bin				
Departments (\\fileserver2.gefen.local) (W:) andrew (\\fileserver2.gefen.local\users) (X:)		BIN File 256 bytes		BIN File 256 bytes				-
File name: my_edid.bin				•	Files (*.bin)			•
x					Open N	7	Cancel	
						2		
			_					
		File nan	ne: n	ny_edid.l	bin			
				-				
			_					

8. Click the **Upload** button.

ID to	Local EDID	▼ pa4f	6/Desktop/my_e	did.bin	Browse	Upload
from	Down Stream	▼ to	Local EDID	T	Сору	

 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.

Uploading	Upload Complete.

page | 30

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.
- 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**.

Upload EDID to	Local EDID	·			Browse
Copy EDID from	Down Stream 🔻	to	Local EDID	-	Сору
	Down Stream Bank 1				
EDID Mode	Bank 2 Bank 3 Bank 4 Bank 5 Bank 6 Default EDID 1		Custom		
	Default EDID 2 Default EDID 3				

 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.

Upload EDID to	Local EDID	•				Browse
Copy EDID from	Down Stream	•	to	Local EDID	-	Сору
				Bank 1 Bank 2	-h² -	
				Bank 3 Bank 4	- 1	
EDID Mode	Internal			Bank 5 Bank 6		

5. Click the Copy button.

Upload EDID to	Local EDID	•			Browse
Copy EDID from	Down Stream	to	Local EDID	•	Сору
EDID Mode	Internal		Custom		

 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.



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.

Manage EDID	Update	
13		
on: 1.00 : Nov 2 2015		
	HBT2_S on: 1.00 : Nov 2 2015 : 13:06:29	on: 1.00 : Nov 2 2015

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

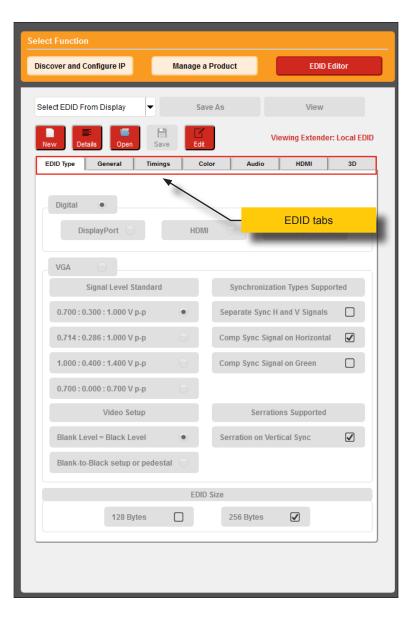
Select EDID From Device	Save As	Vie
Select EDID From Device Extender: Local EDID Extender: Down Stream		
Extender: Bank 1 Extender: Bank 2		
Extender: Bank 3 Extender: Bank 4	•	Browse
Extender: Bank 5 Extender: Bank 6		

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.

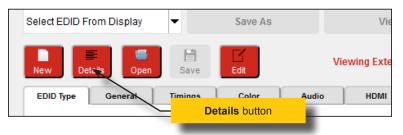
4. Click the View button.

al EDID	-	Save As	View
			45

- 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.



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

		E	DID Si	ımm	ary								8
00 01 02 03	04 05	06	07 08	8 09	0A	0B	00	00	OE	01	1		~
00 00								00					
10 00	Scr		har				55		9E				
20 12	001		Jai				95	00	19	40)		
30 B3 00 71 4F	95 OF	02 :	3A 80) 18	71	38	2 D	40	58	X			
40 45 00 09 25 3	21 00	00 :	1E 00	00	00	FD	00	38	4E	11		-	Ξ
50 51 11 00 OA :												-	
60 4D 45 32 34													
70 00 48 56 4E													
80 02 01 04 00													
90 09 25 21 00 A0 55 00 09 25 ;													
AU 55 00 09 25 . BO B8 28 55 40 1													
C0 31 20 0C 40													
D0 20 E0 2D 10 :													
E0 00 00 00 00													
F0 00 00 00 00													
header: 0	O FF I	FF F	F FF	FF	FF	00							
serial number: 10	C CE (9 7	2 00	00	00	00	00	12					
	1 03												
	0 34 1												
	E D1 J		5 48	9B	26	12	50	54					
	FEF 8			~ ~		~ ~				~ ~			
	1 00 8 2 3A 8												
descriptor 1: 0. descriptor 2: 0	2 3A 0												
	0 00 0												
-	0 00 0												
extensions: 0													
checksum: 71	в												
extension header:		01 0	4										
display supports:													
descriptor 1:			0 D0										
descriptor 2:	01 1												
descriptor 3:	01 1												
descriptor 4: descriptor 5:	8C (
descriptor 5: padding:			0 8A 0 00										
checksum:	5E	10 0	0.00	00	00	00	00	50	50	50	00	00	
	01												
manufacturer:	GFN												
product code:	729												
serial number:	N/A												
manufacture date:	Week	0 0	f 200	8					~				
edid version:	1.3								S	cro		bai	
display type:	digit		\sim										
Maximum image siz		m x	29c1	n									
Gamma:	2.2												
DPMS levels:	Stand	iby l	Mode:		No	t S	upp	ort	ed				*
۰ (-												•
													F.
Removed	Ad	ded								D	iff		Save
													_

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

		EDID Summary
cover and Configure IP Manage a	Product EDID Editor	00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0E
		00 00 FF FF FF FF FF FF 00 1C CE 09 72 00 00 00 00 10 00 12 01 03 80 34 1D 78 2A EE D1 A5 55 48 9B 26 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
elect EDID From Display 💌 Sa	/e As	3A 80 18 7 38 2D 40 58 2C
	view	rate" button
Vew Details Open Save Edit		70 00 48 56 4E 42 42 30 30 34 31 37 0A 20 20 01 7B 80 02 01 04 00 02 3A 80 D0 72 38 2D 40 10 2C 45 80
EDID Type General Timings Co	lor Audio HDMI 3D	90 09 25 21 00 00 1E 01 1D 00 72 51 D0 1E 20 6E 28 A0 55 00 09 25 21 00 00 1E 01 1D 00 BC 52 D0 1E 20
		B0 B8 28 55 40 09 25 21 00 00 1E 8C 0A D0 90 20 40 C0 31 20 0C 40 55 00 09 25 21 00 00 18 8C 0A D0 8A
Digital		D0 20 E0 2D 10 10 3E 96 00 09 25 21 00 00 18 00 00 E0 00 00 00 00 00 00 00 00 00 00 00 00
DisplayPort 🕞 HDM	I 🔾 DVI 💌	F0 00 00 00 00 00 00 00 00 00 00 00 00
		header: 00 FF FF FF FF FF FF 00 serial number: 1C CE 09 72 00 00 00 00 12
VGA		version: 01 03 basic params: 80 34 1D 78 2A
Signal Level Standard	Synchronization Types Supported	chroma info: EE D1 A5 55 48 9B 26 12 50 54 established: BF EF 80
0.700 : 0.300 : 1.000 V p-p	Separate Sync H and V Signals	standard: 81 00 81 40 81 80 95 00 A9 40 B3 00 71 4F 9 descriptor 1: 02 3A 80 18 71 38 2D 40 58 2C 45 00 09 25 2
0.714 : 0.286 : 1.000 V p-p	Comp Sync Signal on Horizontal	descriptor 2: 00 00 00 FD 00 38 4B 1E 51 11 00 0A 20 20 2 descriptor 3: 00 00 00 FC 00 53 4D 45 32 34 32 30 4C 0A 2
1.000 : 0.400 : 1.400 V p-p	Comp Sync Signal on Green	descriptor 4: 00 00 00 FF 00 48 56 4E 42 42 30 30 34 31 3 extensions: 01 checksum: 7B
		extension header: 02 01 04
0.700 : 0.000 : 0.700 V p-p		display supports: 00 descriptor 1: 02 3A 80 D0 72 38 2D 40 10 2C 45 80 09 2
Video Setup	Serrations Supported	descriptor 2: 01 1D 00 72 51 D0 1E 20 6E 28 55 00 99 2 descriptor 3: 01 1D 00 72 51 D0 1E 20 6E 28 55 00 99 2
Blank Level = Black Level	Serration on Vertical Sync 🖌	descriptor 4: 8C 0A D0 90 20 40 31 20 0C 40 55 00 09 2 descriptor 5: 8C 0A D0 8A 20 E0 2D 10 10 3E 96 00 09 2
Blank-to-Black setup or pedestal		padding: 00 00 00 00 00 00 00 00 00 00 00 00 00
EDID	Size	manufacturer: GFN product code: 729
	256 Bytes	serial number: N/A manufacture date: Week 0 of 2008
128 Bytes		

- 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.
- To close the EDID Summary window, either click the X 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.

Select Produc	ct	EXT-	UHDA-HBT2-S, C	OM21	
Status	Manage ED	DID	Update		

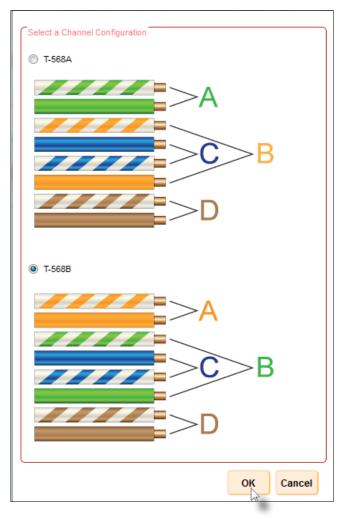
 Under the Status tab will automatically be selected. If a Sender unit is selected, both the Link Quality and Max Error Rate graphs will be displayed. If a Receiver unit is selected, only the Link Quality graph will be displayed.

Sender unit	Receiver unit
Link Quality	Link Quality
Step Reset Max Interval 10 Seconds Channel Contrg MUD Dot Met 100 000000000000000000000000000000000000	See Read Max Narval 19 Seconds Change This 29 Min Line Chally
How To Use This Clear Log Download Log	How To Use This Clear Log Download Log

3. Click the Channel Config button, above the Link Quality graph.

	Stop	Reset	Max Interval	10 Seconds	•	Channel Config TMDS
	Link Quality					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
1	0.00/					

- 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.

Status	Manage EDI	ID Upda	te		
Stop	Reset	Max Interval	10 Seconds	-	Channel Config
Link Quality			10 Seconds 30 Seconds 1 Minute	22	
80%			3 Minutes 5 Minutes	1	
60% 40%			10 Minutes 30 Minutes 1 Hour		
20%				_	1

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

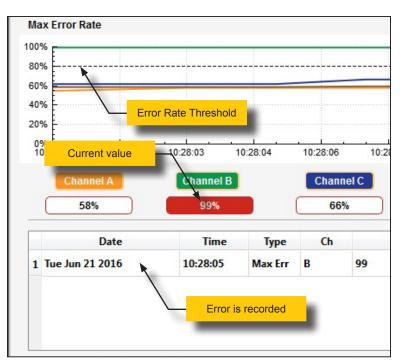
When the **Stop** button is clicked, the monitoring process will stop and the button will read **Start.** In addition, Syner-G will ask if the log file should be saved. To continue the monitoring process, click the **Start** button.

Status	Manage EDI	D	[St	atus	Upd	ate	
Stop Link Quality	Reset) Max			Start Quality	Res	et	Max
100%	:			100%	'E			

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

1 Tue Jun	21 2016	10:2	8:05	Max Err	в	99
						33
						3

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.



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.

🕝 Save t	he log?	-	x
0	Would you like to save the log f	or the cu	rrent data?
		<u>Y</u> es	No

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.

Jse This	Clear Log	Download Log

The Save CSV dialog will be displayed.

g Save CSV		×
😋 🔾 🗢 🗔 🕨 Lil	braries > 4 Search Libraries	۶
Organize 🔻	2)≓ 9)≓ ▼	0
☆ Favorites ■ Desktop ▶ Downloads ₩ Recent Places	Libraries Open a library to see your files and arrange them by folder, date, and other properties. Decuments Library	
Comparises Comparises Comparises Comparises Computer Computer	Pictures Library Library	
File name:	EXT-UHDA-HBT2-5_06-21-16_10-00 (SV files (.csv)	•
) Hide Folders	Save	

page | 41

The filename will automatically be created and assigned to the **Filename** field. The name of the file can be changed, if desired.

🖳 Computer	-
File name:	EXT-UHDA-HBT2-S_06-21-16_10-00
Save as type:	CSV files (.csv)
Alide Folders	

Click the Save button to save the file.

1-16_10-00	
	Save Cancel

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.

	Channel A	Channel B		Chanr	iel C
	58%	99%		66	%
	Date	Time	Туре	Ch	
1	Tue Jun 21 2016	10:28:05	Max Err	в	99
-		10.20.05	Max LIT		
-					veren eren Veren state
	How To Use	e l'his		Clear L	_00

X

OK

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.

Advanced Operation

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4K ULTRAHD HDBaseT[™] Extender w/ RS-232, 2-way IR, and POH

4 Appendix

Updating the Firmware

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.

Select Function	
Discover and Configure	IP Manage a Product EDID Editor
Select Product	Connected Devices
	Please select a product to configure.
G	EFER SYNER-G

3. Select the product from the Select your product drop-down list.

Select Function	
Discover and Configure II	P Manage a Product EDID Editor
Select Product	Connected Devices -
	Connected Devices
	GTB-UHD-HBT2, COM16
P	EXT-HDKVM-LAN-S, MAC: 02:1D:00:5A:8D:53
	EXT-MFP, MAC: 00:1C:91:04:50:8E
	Other Supported Products
	DisplayPort Detective Plus
	Booster for HDMI w/EDID Detective
	HDMI Detective Plus
	HDMI/VGA to 3GSDI Scaler
	VGA to DVI Scaler 🗸
/	SYNER-G
	9/UOW ar

If the product is <u>not</u> detected by Syner- G^{TM} , 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.

Select Function			
Discover and Configure IP Manage a Product	EDID Editor		
Select Product GTB-UHD-HBT2-S, COM16	_		
Status Manage EDID Update			
Product: GTB-UHD-HBT2-S	Update Method: USB Serial		
Current Firmware 1.00 Latest Firmware 102461	Check at Startup Enabled		
Last Checked: Fri Dec 4 17:50:31 2015	Check for Latest Update		
Last Check di Fri Dec 4 17:50:31 2015 Check for Latest Update First production firmware. Product Options			
None			
Download and Install Download Latest Version to Gefen Syner-G	Start		
0%	Install		
Download to Computer Save			
Install from File			
Select File to Upload	Browse		
	Install		

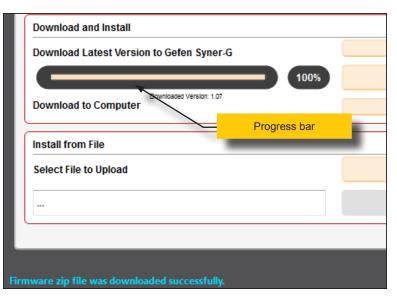
5. Click the Start button to begin downloading the firmware.

Select Function			
Discover and Configure IP	Manage a Product	EDID Editor	
Select Product GTB-UHD-HE	T2- S , COM16	-	
Status Manage EDID Upd	ate		
Product: GTB-UHD-HBT2-S		Update Method: USB Serial	
Current Firmware 1.00 Late	st Firmware 102461	Check at Startup Enabled	
Last Checked: Fri Dec 4 17:50:31 2015		Check for Latest Update	
First production firmware.			
Product Options]	
None			
Download and Install Download Latest Version to Gefen Syne	r-G	Start	
0% Install			
Download to Computer Save			
Install from File			
Select File to Upload		Browse	
Install			

The Syner-G^M 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.



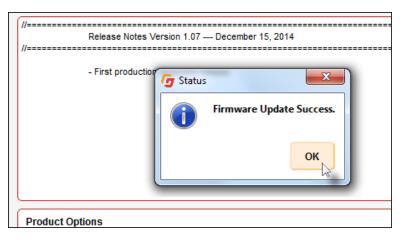
6. Click the **Install** button to begin installing the software.

И		
ersion to Gefen Syner-G	Start	
100%	Install	
Downloaded Version: 1.07	Save	

7. The installation process will begin and the progress bar will indicate the current status.

Download and Install	
Download Latest Version to Gefen Syner-G	
50%	
Download to Computer	

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.

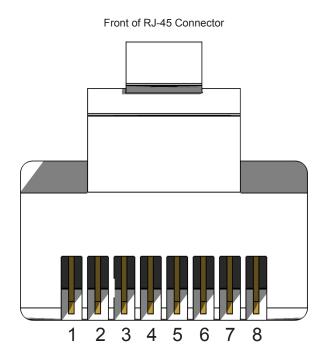
Sender Unit DIP Switches

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	

Network Cable Diagram



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.

dix	S
ben	R
Ap	

Supported Formats		
Resolutions (max.)	• 409	40 x 2160p 60 Hz (4:2:0) 96 x 2160p 30 Hz (4:4:4) 90 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

<u>Α</u>

Application Diagram 7

B

Bidirectional IR Control controlling the display 17 controlling the source 16 from different locations 18

<u>C</u>

Connection Instructions 6

D

Default Settings receiver unit, DIP 52 sender unit, DIP 52 DIP Switch Configuration 10 receiver unit 13 sender unit 10

E

EDID copying 31 downloading 26 hot-plug detect 10 local / pass-through 10 lock 11 uploading 29 viewing 33

F

Features vi Firmware updating 46

H

HDCP control 11

Ī

IR carrier notes 14 receiver unit 11 sender unit 11 IR Carrier Frequency 12, 13, 14 IR polarity 11, 13

L

LED Status 15 Link Quality 37 channel configuration 37 clearing logs 40 error logging 39 help 42 link quality graph 37 max error rate graph 37 max interval 39 saving logs 41 start monitoring 39 stop monitoring 39 thresholds 40 Long-Reach Mode 11, 14

N

Network Cable Diagram 53

P

Packing List vii

<u>R</u>

Receiver Unit 4 RS-232 Interface 19

<u>S</u>

Sender Unit 2 Specifications 54 Syner-G copying an EDID 31 downloading an EDID 26 link quality. See Link Quality uploading an EDID 29 verifying the USB Driver 24 viewing an EDID 33

T

Table of Contents viii

U

Updating the Firmware 46 USB Driver 24



1800 S McDowell Blvd. Petaluma CA 94954 (707) 283-5900 (800) 472-5555