



## Application Guides

4K Ultra HD HDMI Extenders, Splitters & Matrixes • KVM Over IP • Wireless Extenders for HDMI

# Eight in.

## Route Eight 4K Ultra HD



# Eight Out.

## Sources to Eight Displays



### Features:

- Compact, wall-mountable solution
- Intuitive, easy-to-use web server
- Simplified IP configuration through Gefen Syner-G™ software
- Part of the complete line of Gefen 4K Ultra HD products



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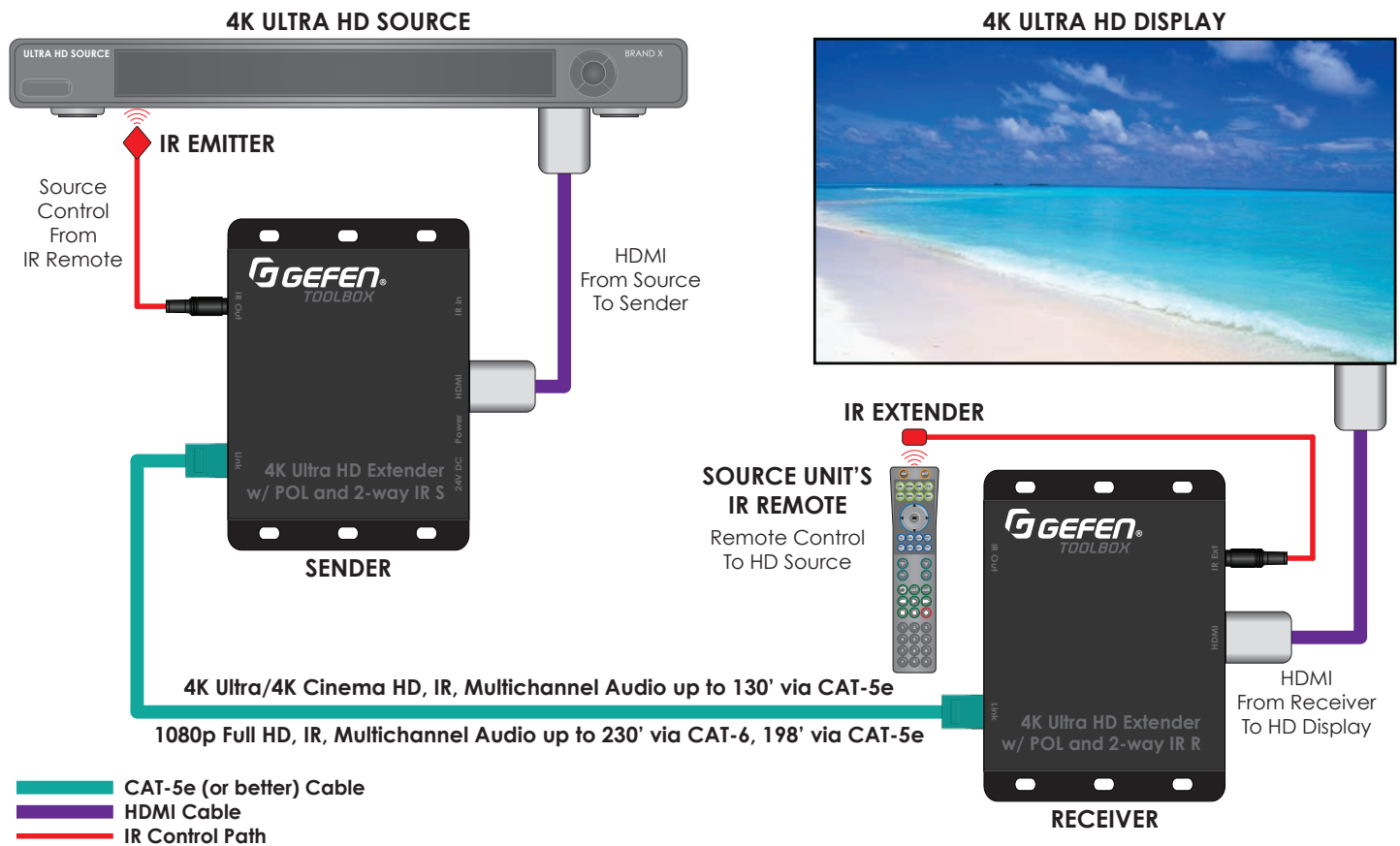
# Extenders

## 4K Ultra HD HDMI Extenders

Gefen's implementation of HDBase™ Technology extends the possibilities of remote Ultra HD display installation. HDMI resolutions up to 4K Ultra HD can be combined with multichannel audio, 2-way IR, RS-232 and Ethernet to assure full video signal quality, audio content and source control.

4K resolutions can be extended up to 330 feet (100m) on a single CAT-5e, 1080p Full HD up to 495 feet (150m). The compact chassis of the Senders and Receivers connect with a single CAT5e/6 cable and use a single power supply to increase design options and simplify installation.

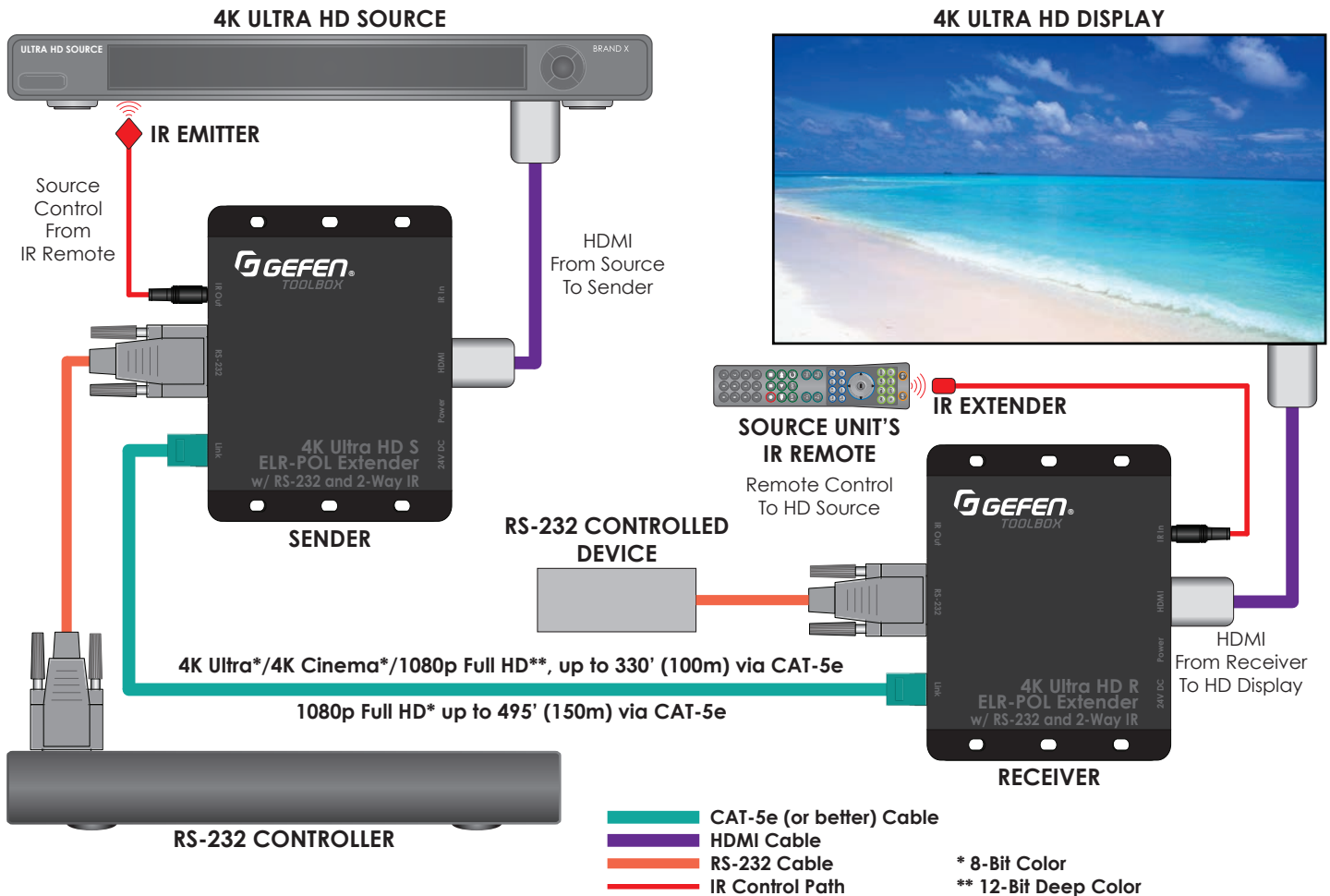
### Application 1 - 4K Ultra HD Extender for HDMI with POL, 2-Way IR, 4K up to 130' (40m), 1080p Full HD up to 230' (70m)



The illustration shows a typical application for a Gefen 4K Ultra HD Extender. This application features the Gefen **GTB-HDBT-POL-BLK** 4K Ultra HD Extender. The 4K Ultra HD source is connected to the Sender via HDMI Cable. 4K Ultra/4K Cinema HD video, LPCM 7.1 channel's audio, Dolby® TrueHD, Dolby Digital® Plus and DTS-HD Master Audio™ and 2-way IR are then transmitted over CAT-5e (min) cable to the Receiver up to 130 feet (40m) away. 1080p Full HD can be transmitted up to 230 feet (70m) via CAT-6 or up to 198 feet (60m) via CAT-5e. The 2-way IR allows control of the source from the Receiver location, or control of the display (display ON/OFF, etc) from the Sender location...all over a single CAT-6/5e cable.

# Gefen 4K Ultra HD Extenders

## Application 2 - 4K Ultra HD ELR Extender for HDMI with 2-Way IR, RS-232, 4K up to 330' (100m), 1080p Full HD up to 495' (150m)



This application, featuring the **GTB-UHD2IRS-ELRPOL-BLK**, adds additional transmission range and RS-232 control to 4K Ultra HD and 1080p Full HD extension.

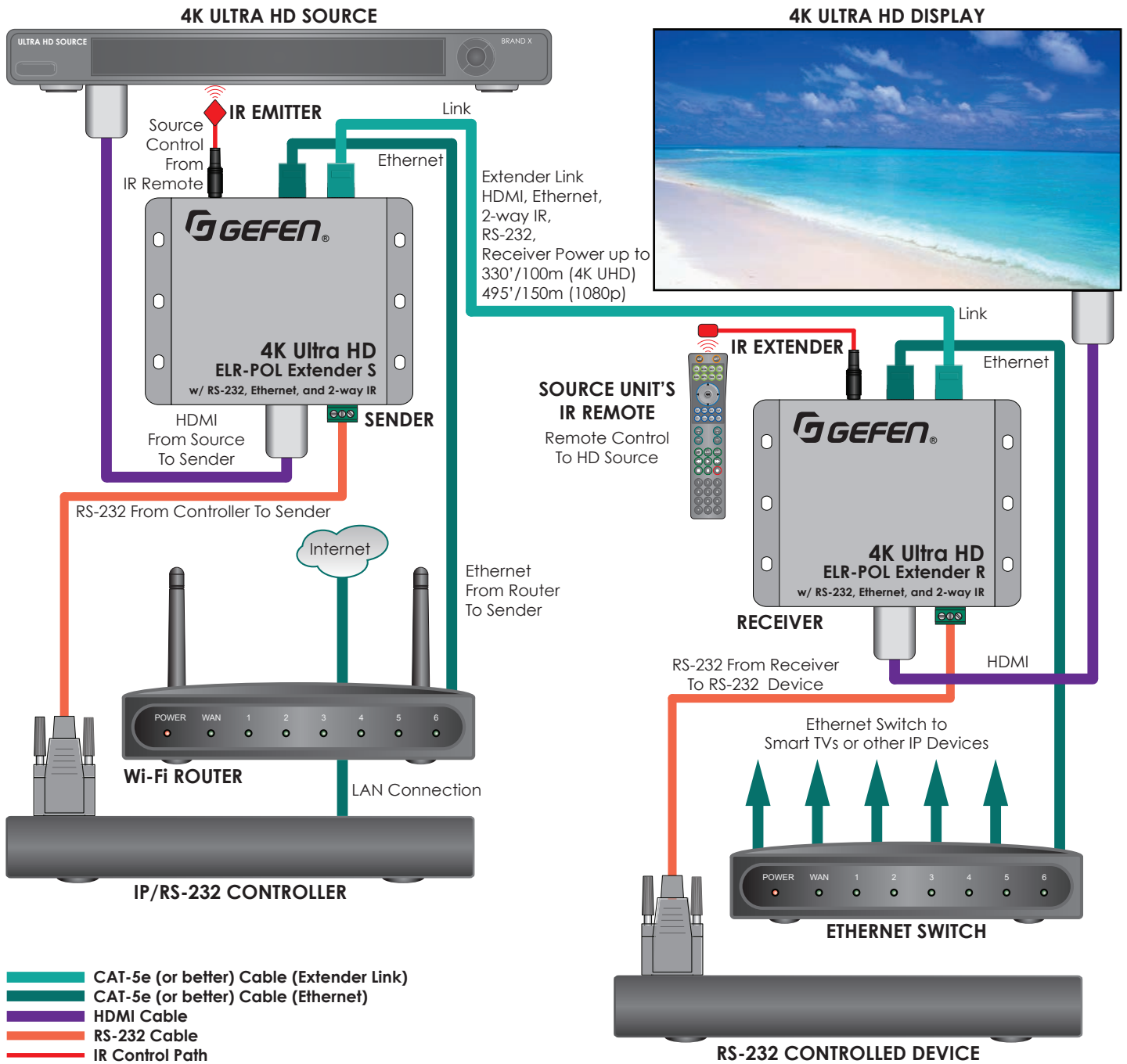
This ELR (Extra Long Range) 4K Ultra HD Extender with POL (Power Over Line) can transmit 4K Ultra/4K Cinema HD video, LPCM 7.1 channel audio, Dolby® TrueHD, Dolby Digital® Plus and DTS-HD Master Audio™, RS-232 and 2-way IR up to 330 feet (100m) over a single CAT-5e cable. 1080p Full HD can be transmitted up to 495 feet (150m) via CAT-5e.

For greater control flexibility, in addition to 2-way IR, the GTB-UHD2IRS-ELRPOL-BLK also provides RS-232 control extension. Elements of automation can be incorporated by connecting an RS-232 controller to the Sender and transmitting RS-232 commands to the Receiver for control of RS-232 devices located near the Receiver.

In addition to RS-232 control, 2-way IR allows control of the Ultra HD source from the Receiver location, or control of the display, (display ON/OFF, etc) or other IR controlled devices from the Sender location.

# Gefen 4K Ultra HD Extenders

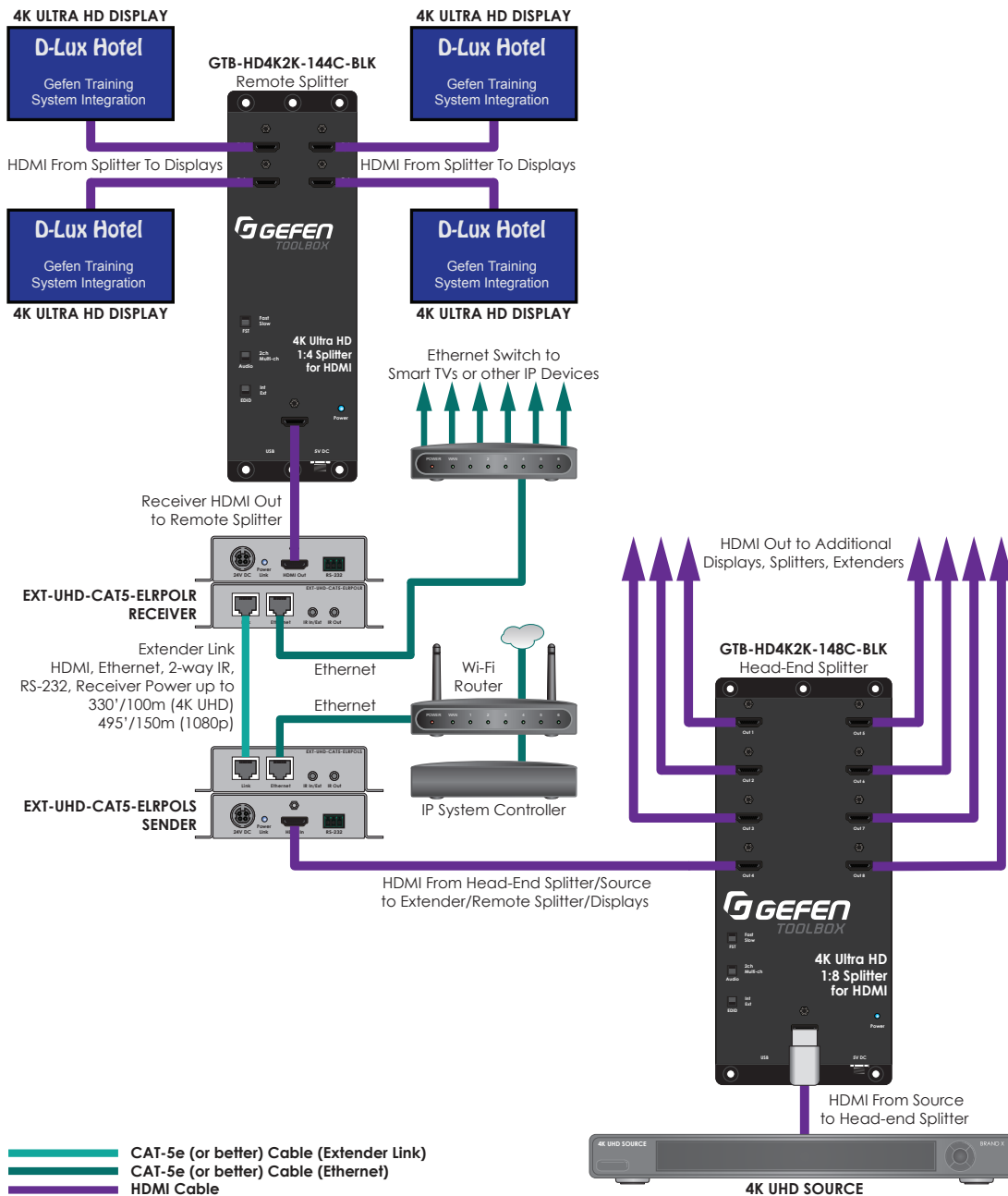
## Application 3 - 4K Ultra HD ELR-POL Extender for HDMI with Ethernet, 2-Way IR, RS-232, 4K up to 330' (100m), 1080p Full HD up to 495' (150m)



The **EXT-UHD-CAT5-ELRPOL** includes all of the features shown in the previous applications...including ELR (Extra Long Range)...and adds Ethernet extension. This now allows extending 4K Ultra HD (or 1080p Full HD), HBR (High Bit Rate) lossless digital audio, RS-232, 2-way IR and Ethernet...all on a single shielded CAT-5e/6 cable making 10/100BaseT reliable, wired Ethernet available at the remote location without the need to run a separate cable.

# Gefen 4K Ultra HD Extenders

## Application 4 - Using Splitters & Extenders for Remote Ultra HD Display Clusters with IP Control



This application shows how to incorporate Gefen splitters and extenders to create a 4K Ultra HD distribution system with remote 4K Ultra HD display clusters and IP (and/or RS-232/2-way IR) control for Smart TVs or other IP, RS-232 and IR controlled devices.

Inserting a Gefen Extender, EXT-UHD-CAT5-ELRPOL shown, between a Head-end Splitter and Remote Splitters can extend HDMI, Ethernet, 2-way IR, RS-232 and Receiver Power to create remote Ultra HD display clusters for video distribution or digital signage in bars, hotels or other commercial applications.



# Gefen 4K Ultra HD Extenders

## Settings

### GTB-HDBT-POL-BLK

The GTB-HDBT-POL-BLK is designed for fast, clean installation and stable, reliable performance. Just hook it up and it's ready to go!

### GTB-UHD2IRS-ELRPOL-BLK

**Long Reach Mode** - In the **ON** position, resolutions up to 1080p Full HD can be extended to a maximum distance of 495 feet (150m). In this configuration, color depth is limited to 8-bit color. In the **OFF** position (default), all resolutions up to 4K x 2K can be extended up to 330 feet (100m). 1080p Full HD up to 12-bit Deep Color can also be extended up to 330 feet (100m) in this configuration.

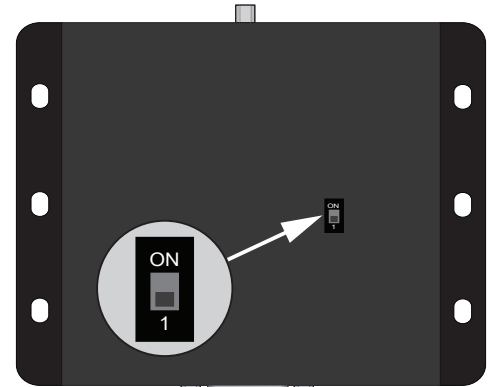
### EXT-UHD-CAT5-ELRPOL

**EDID Management** - When **Sender Switch 1** is in the **ON** position, all video and audio features of the connected device (display or other sink device) will be passed through to the source. When **Sender Switch 1** is in the **OFF** position, the Sender copies and then modifies the downstream EDID to support only up to 1080p60, 8-bit color in 'long-reach' mode.

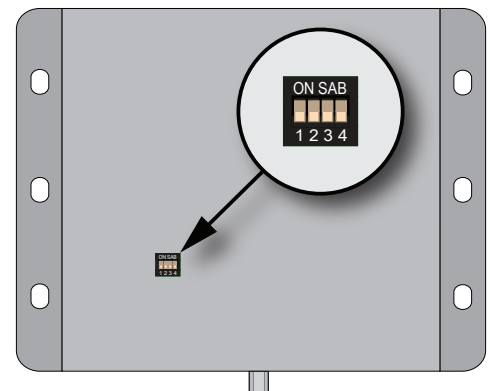
**HPD Mode** - Hot Plug Detect is an HDMI feature that senses if the HDMI cable has been disconnected from the source or display (sink device). When **Sender Switch 1** is in the **OFF** position, HPD will toggle, depending on the HPD status of the display (sink) or source device. When **Sender Switch 1** is in the **ON** position, HPD is always high, even when the display is hot-plugged (disconnected from, then reconnected to the source device).

**HDBT (HDBaseT) Mode - HDBT Normal Mode** (default), **Sender Switch 3 OFF**, allows all resolutions up to 4K x 2K to be extended up to 330 feet (100m). **HDBT Long-Reach Mode, Sender Switch 3 ON**, allows resolutions up to 1080p Full HD @ 8-bit color to be extended up to a maximum distance of 495 feet (150m).

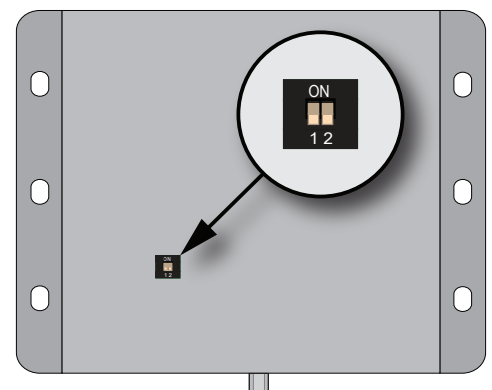
**RS-232 Mode** - Toggles between RS-232 pass-through mode and service mode. When **Sender Switch 4** and **Receiver Switch 1** are in the OFF position, RS-232 data is passed between the Sender and Receiver units. When **Sender Switch 4** and **Receiver Switch 1** are in the **ON** position, the Sender and Receiver are set for firmware update.



GTB-UHD2IRS-ELRPOL-BLK Receiver



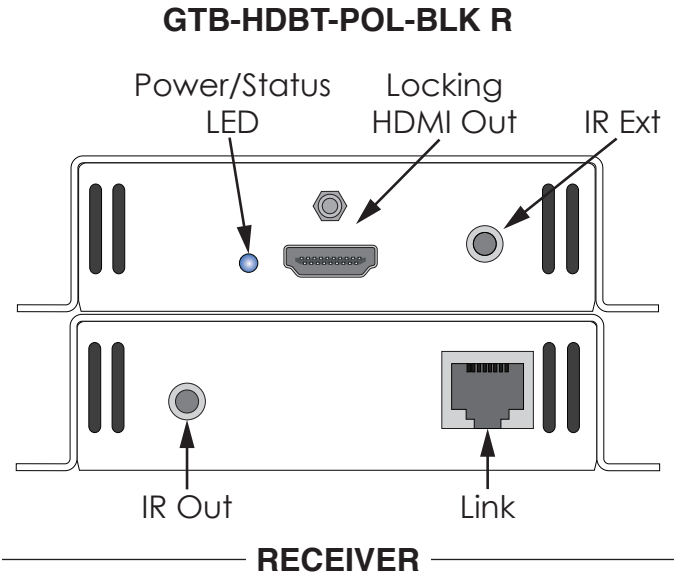
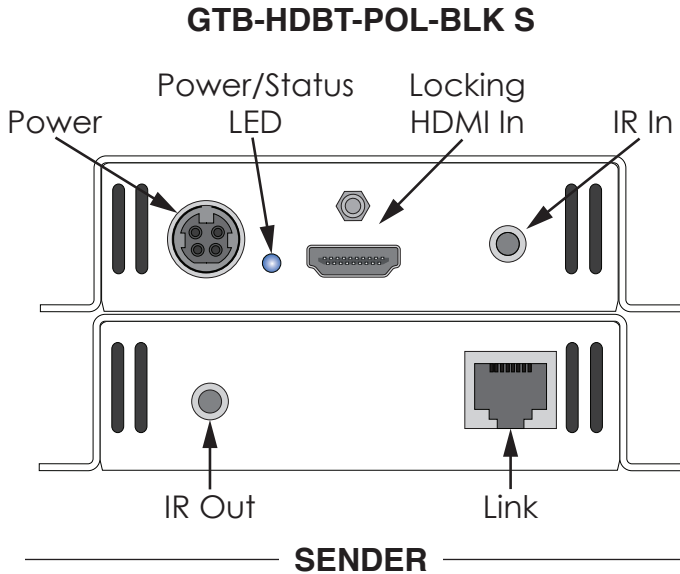
EXT-UHD-CAT5-ELRPOL Sender



EXT-UHD-CAT5-ELRPOL Receiver

# Gefen 4K Ultra HD Extenders

## Connections



## Features & Benefits

### Features

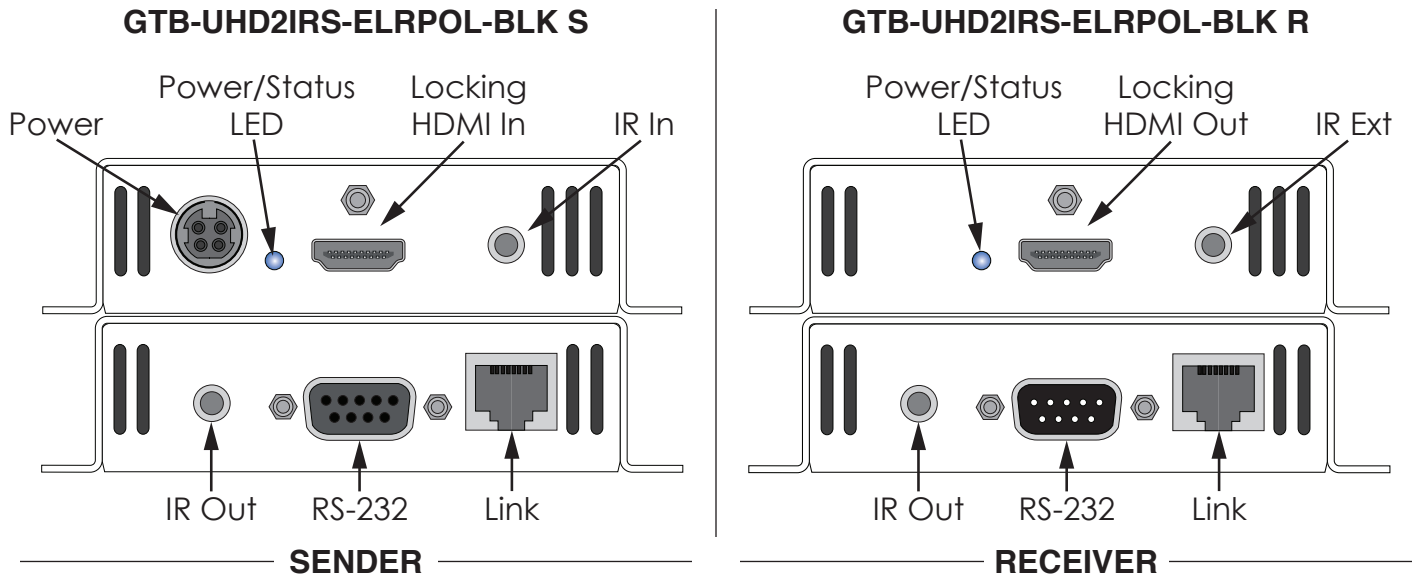
- Extends 4K Ultra HD (3840 x 2160 @ 60Hz 4:2:0, or 30Hz, 4:4:4 up to 130 feet (40m) over a single CAT-5e cable (8-bit color)
- Extends 4K Cinema HD (4096 x 2160 @ 24 or 30Hz 4:4:4), up to 130 feet (40m) over a single CAT-5e cable
- Extends 1080p Full HD up to 230 feet (70m) over a single CAT-6 cable, or 198 feet (60m) over CAT-5e
- Uses Gefen's implementation of HDBase™ Technology
- Gefen POL (Power Over Line) sends power from the Sender to the Receiver over the same CAT5e/6 cable as the HDMI signal
- Bi-Directional IR control, HDMI 2.0, HDCP 2.2 and 1.4, 12-bit Deep Color (up to 1080p), LPCM 7.1 audio, Dolby® TrueHD, Dolby Digital® Plus and DTS-HD Master Audio™, 3DTV pass-through, CEC pass-through, Lip Sync pass-through

### Benefits

- Allows locating a Ultra HD Display well beyond the limit of a standard HDMI connection...typically 15 feet
- Extends HDMI signal, multichannel audio, bi-directional IR and power to the Receiver via a single CAT5e/6...simplifying installation & reducing cost
- No loss of video signal quality or multi-channel audio content over extended run
- Bi-directional IR allows source control from the viewing area via IR Remote and IR control from an automation system or base station to control the display or other devices located near the Receiver
- Compact chassis allows surface mount of the Sender just about anywhere in an equipment cabinet and the Receiver behind the display

# Gefen 4K Ultra HD Extenders

## Connections



## Features & Benefits

### Features

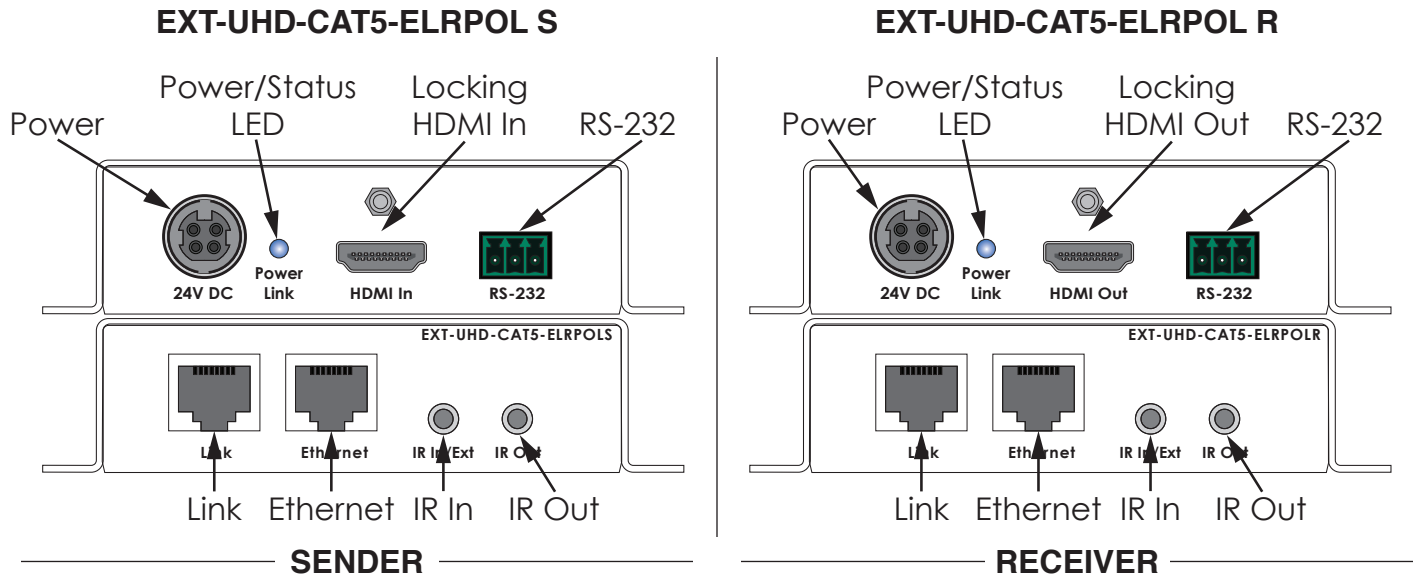
- Extends 4K Ultra HD (3840 x 2160 @ 60Hz 4:2:0, or 30Hz, 4:4:4 up to 330 feet (100m) over a single CAT-5e cable (8-bit color)
- Extends 4K Cinema HD (4096 x 2160 @ 24 or 30Hz 4:4:4), up to 330 feet (100m) over a single CAT-5e cable
- Extends 1080p Full HD up to 330 feet (100m) over a single CAT-5e cable (up to 12-bit Deep Color), or 495 feet (150m) over CAT-5e (8-bit color)
- Uses Gefen's implementation of HDBase™ Technology
- Gefen POL (Power Over Line) sends power from Sender to Receiver over same CAT5e/6 cable as HDMI signal
- Bi-Directional IR control, RS-232, HDMI 2.0, HDCP 2.2 and 1.4, 12-bit Deep Color (up to 1080p), LPCM 7.1 audio, Dolby® TrueHD, Dolby Digital® Plus and DTS-HD Master Audio™, 3DTV pass-through, CEC pass-through, Lip Sync pass-through

### Benefits

- Gefen Trademarked ELR (Extra Long Range) technology allows 4K Ultra HD extension up to 330 feet (100m), 1080p Full HD up to 495 feet (150m)
- RS-232 extension provides additional control and automation options for control of RS-232 devices located near the Receiver
- Extends HDMI signal, multichannel audio, bi-directional IR, RS-232 and power to the Receiver via a single CAT5e/6...simplifying installation & reducing cost
- No loss of video signal quality or multi-channel audio content over extended run
- Bi-directional IR allows source control from the viewing area via IR Remote and IR control from an automation system or base station to control the display or other devices located near the Receiver
- Compact chassis allows surface mount of the Sender just about anywhere in an equipment cabinet and the Receiver behind the display

# Gefen 4K Ultra HD Extenders

## Connections



## Features & Benefits

### Features

- Same features as GTB-UHD2IRS-ELRPOL-BLK with these additional features:
- Ethernet extension up to the same distance as any given video resolution
- Advanced EDID management for HPD (Hot Plug Detect) Mode, HDBT (HDBaseT) Mode (long-reach mode) and RS-232 Mode for RS-232 pass-through or Firmware Upgrade Mode
- Bi-directional POL (Power over Line) allows connection of power supply at Sender or Receiver

### Benefits

- Same benefits as GTB-UHD2IRS-ELRPOL-BLK with these additional benefits:
- Ethernet extension allows additional control and automation options for control of IP devices located near the Receiver
- Advanced EDID management provides setup options for improved performance and stability
- Upgradeable firmware helps assure optimal performance and compatibility with latest HDMI technologies



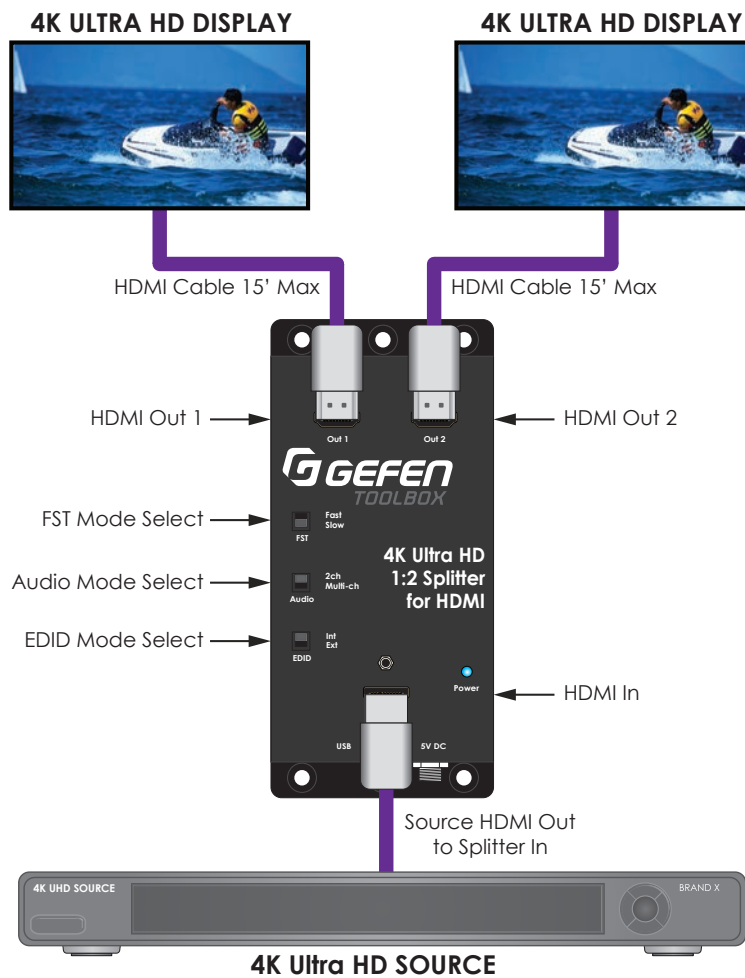
# Splitters

## 2/4/8 Way 4K Ultra HD HDMI Splitters

Gefen 4K Ultra HD Splitters route a single 4K Ultra HD source to multiple 4K Ultra HD displays. Available in 2, 4 and 8-way configurations, these splitters provide simple and reliable solutions for residential and commercial applications. Split a single Ultra HD source to multiple 4K Ultra HD displays in adjoining common areas.

Mount two 4K Ultra HD displays at either end of a bar. Provide digital signage messaging in hotel lobbies and larger facilities. All models can split, daisy-chain and cascade, making Gefen splitters the high performance and capable choice for any small or large 4K Ultra HD video distribution system.

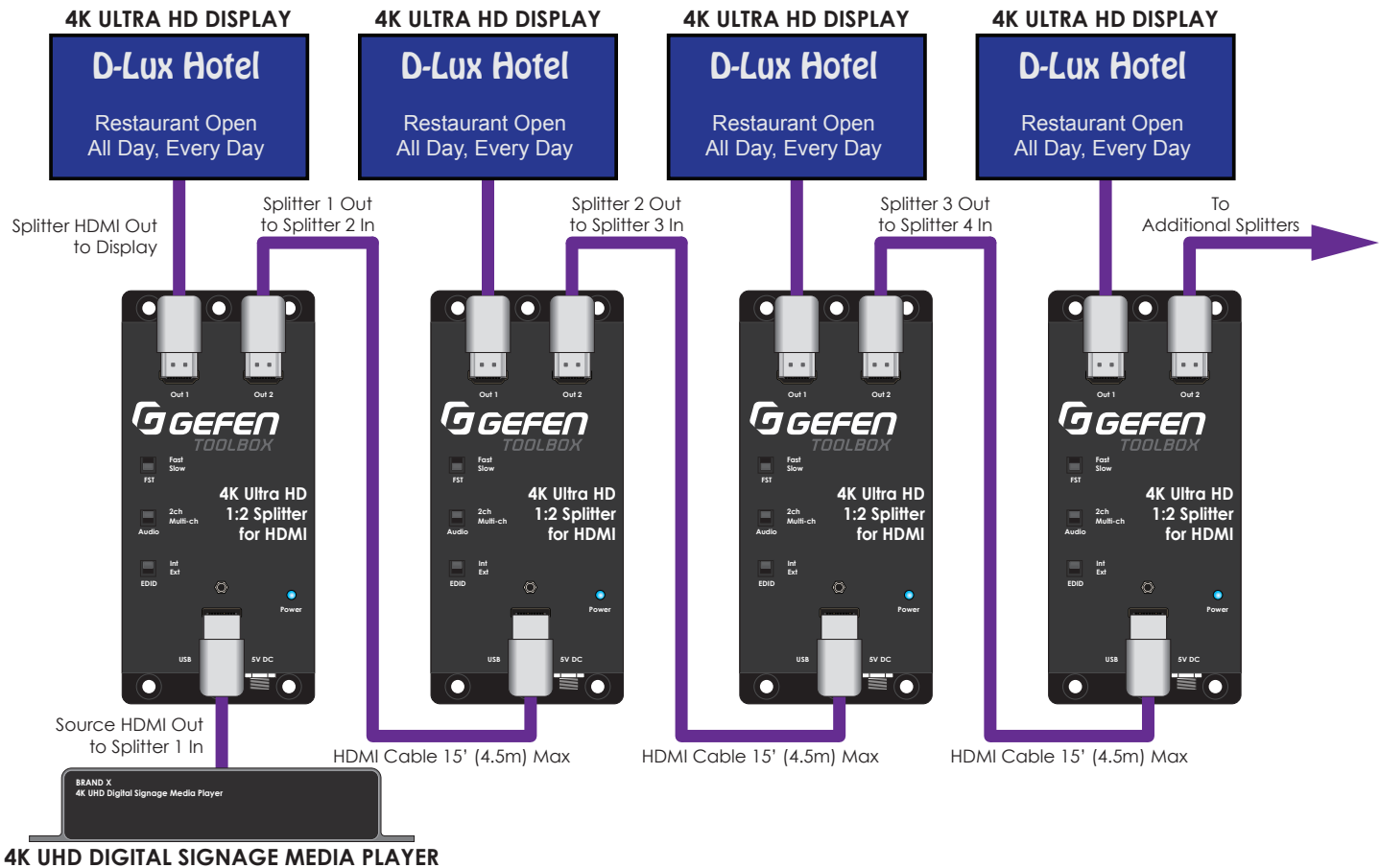
### Application 1 - Single 4K Ultra HD Source to Two 4K Ultra HD Displays



The illustration shows the most basic application for a Gefen 4K Ultra HD Splitter. This application features a Gefen **GTB-HD4K2K-142C-BLK** two-way splitter distributing a single 4K Ultra HD source to two 4K Ultra HD displays. This type of application is perfect for residential applications in common areas such as an adjoining kitchen and family room. It is also a simple and reliable application for a small sports bar or other lounge area where a single 4K Ultra HD video source is going to be shared on two displays.

# Gefen 4K Ultra HD Splitters

## Application 2 - Two-Way Splitters Daisy-Chained For Digital Signage (10 Displays)

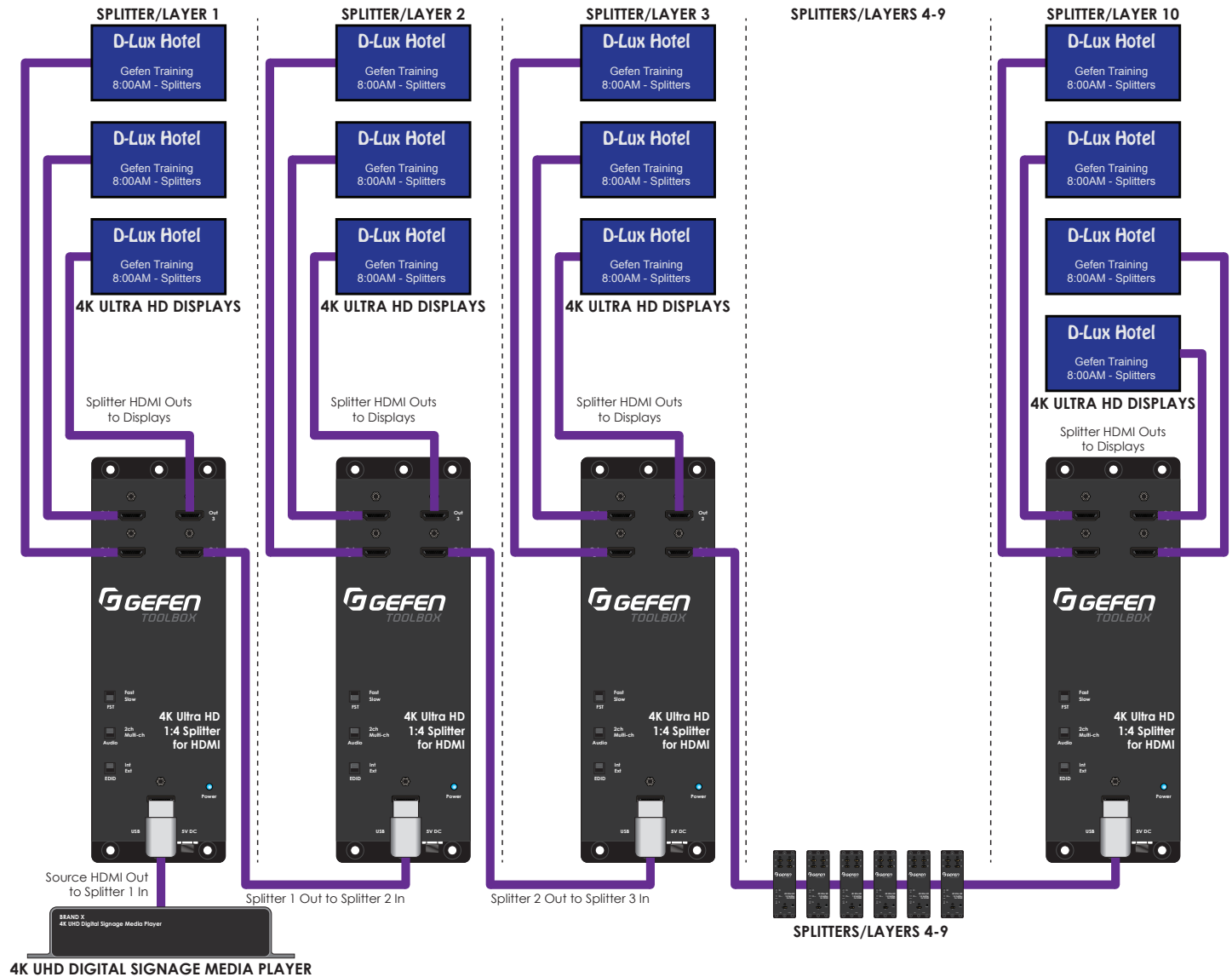


This application distributes a single 4K Ultra HD video source to multiple 4K Ultra HD Displays by daisy-chaining multiple Gefen **GTB-HD4K2K-142C-BLK** two-way splitters. The source in the example is a 4K Ultra HD digital signage media player, but could be any Ultra HD or HD source. The example shows an application for the D-Lux Hotel lobby, displaying information about the day's schedule of events, with the current screen calling attention to the hotel restaurant being open all day.

This is a very simple application to design and install. Simply connect the HDMI output on the source to the HDMI input on Splitter 1. Connect one HDMI Out on Splitter 1 to a 4K Ultra HD display. Connect the other HDMI Out on Splitter 1 to the HDMI In on Splitter 2 and repeat for the number of required displays. Each 'split' in a daisy-chain or cascade system (page 4) is called a 'layer'. The maximum number of layers for Gefen GTB 4K UHD Series Splitters is ten. The maximum number of displays for this application is ten. For more displays, daisy-chain four-way or eight-way splitters, (next page) or use just about any combination of two, four and eight-way splitters to accommodate the number of displays needed to show a single source.

# Gefen 4K Ultra HD Splitters

## Application 3 - Four-Way Splitters Daisy-Chained For Digital Signage (31 Displays)



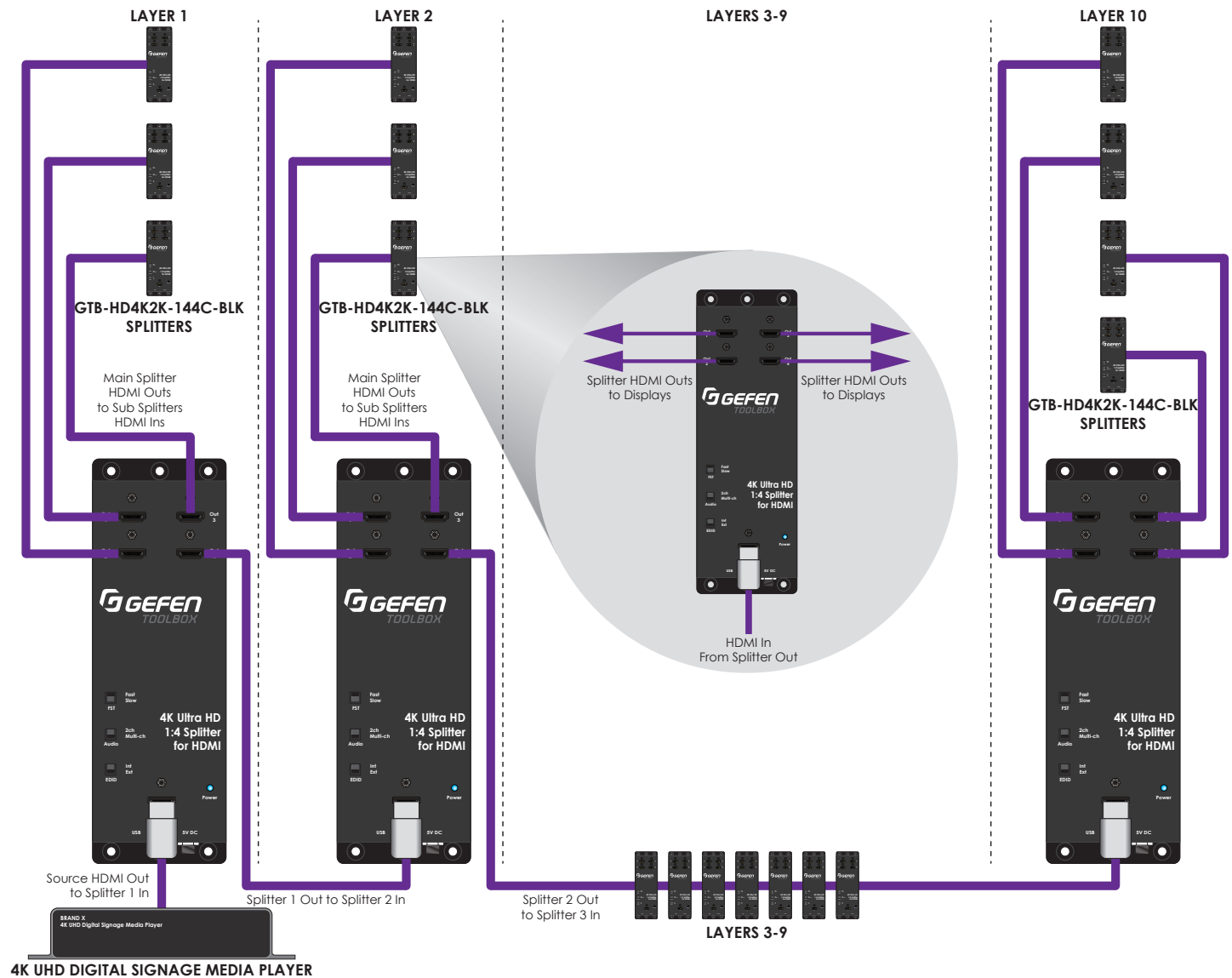
This application shows multiple Gefen **GTB-HD4K2K-144C-BLK** four-way splitters in a daisy-chain application. In this application, each splitter uses three outputs to feed three displays with the fourth output feeding the next splitter. The last splitter in the system can use all four outputs to feed displays.

This application is also easy to design and install, and the four-way splitters will allow connection of up to 31 displays. If more displays are required, Gefen **GTB-HD4K2K-148C-BLK** eight-way splitters can be configured in a similar configuration with each splitter feeding up to seven displays, with the last splitter being able to feed up to eight displays, for a total of up to 71 displays.

Ultimately, just about any combination of two, four and eight-way splitters can be used to accommodate the required number of displays. For applications that require even more displays... see the next page...

# Gefen 4K Ultra HD Splitters

## Application 4 - Four-Way Splitters Cascaded in a 124 Display System



The illustration shows **GTB-HD4K2K-144C-BLK** four-way splitters cascaded to create a 4K Ultra HD distribution system for up to 124 displays.

In this application the ten 'main' splitters are daisy-chained as shown in Application 3 but this time, rather than feeding three displays and the next splitter in the chain, each of the daisy-chained splitters is feeding three additional 'sub' splitters and the next splitter in the chain.

The enlarged detail shows how each of the 'sub' splitters would then feed up to four displays.

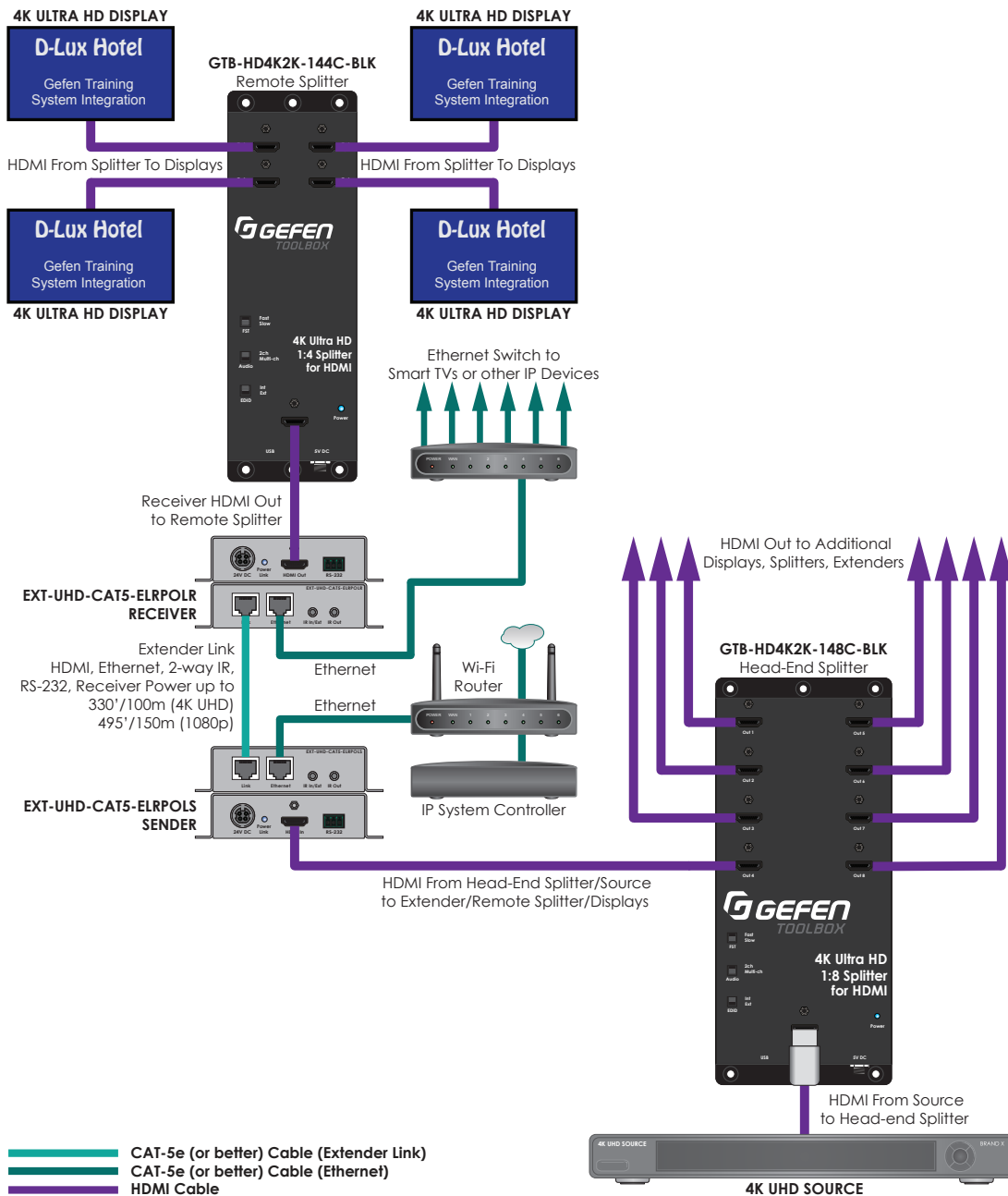
In the same configuration, Gefen **GTB-HD4K2K-148C-BLK** eight-way splitters, would net a total of 224 displays.

But what do we do when the displays are needed in locations farther than the typical, even daisy-chained runs of HDMI cable will allow? Keep reading...



# Gefen 4K Ultra HD Splitters

## Application 5 - Using Splitters & Extenders for Remote Ultra HD Display Clusters with IP Control



This application shows how to incorporate splitters and extenders to create a 4K Ultra HD distribution system with remote 4K Ultra HD display clusters and IP control for Smart TVs or other IP controlled devices.

Inserting a Gefen **EXT-UHD-CAT5-ELRPOL** Extender between the Head-end Splitter and Remote Splitter can extend HDMI, Ethernet, two-way IR, RS-232 and Receiver Power up to 330' (100m) for 4K Ultra/4K Cinema (8-bit) or 1080p Full HD (12-bit Deep Color). 1080p Full HD (8-bit color) can be extended up to 495' (150m). The 2, 4 and 8-way splitters can be implemented at either the head-end or remote locations as needed.

Incorporating a third-party IP System system controller will provide discreet system-wide control of Smart TVs and other IP controlled devices in remote locations.

# Gefen 4K Ultra HD Splitters

## Settings

Gefen GTB-HD4K2K-142/4/8C-BLK Splitters feature three settings that help improve performance and stability in HDMI distribution systems.

**FST** - Fast Switching Technology (FST) **Fast Mode** improves performance when connecting/disconnecting HD sources, and powering HD displays ON/OFF. **Slow Mode** will follow the standard authentication process based upon the HDMI and HDCP specifications. Slow Mode is recommended when the source does not support multiple devices.

**Audio**- As part of EDID management, splitter audio output can be set to 2-channel or multi-channel when EDID is set to Int (Internal). **2ch Mode** is used when *all* displays and/or sink devices support *only* 2-channel LPCM audio. **Multi-ch Mode** is used when *all* displays and/or sink devices are capable of multichannel audio.

**EDID**- Extended Display Identification Data (EDID) contains the A/V capabilities of a display device in regard to video resolutions and audio formats supported. This information is used by the source device to determine the format of the A/V signals on the outputs. In **Ext Mode** (External) the splitter 'builds' an EDID based upon the highest common video resolution and most superior audio format supported by *all* displays. This EDID is then transmitted to the source device. In **Int Mode** (Internal) the built-in internal EDID provides the source device with a 'generic' EDID that can be used by all displays.



## Features & Benefits

### Features

- Simultaneously display a 4K Ultra HD source on up to 2, 4 or 8 Ultra HD displays (depending on splitter model)
- Specifically designed to support 10 layers of splitting/ cascading in large video distribution and signage applications, supporting hundreds of displays
- Support resolutions up to 4K Cinema (4096 x 2160 @ 24 and 30 Hz), 4K Ultra (3860 x 2160 @ 60 Hz 4:2:0 color space), 1080p Full HD and 1920 x 1200 WUXGA
- 12-bit Deep Color at 1080p, 3DTV pass-through, Lip Sync pass-through
- Fast Switching Technology (FST) speeds up HDCP authentication
- EDID management and Audio Mode selectors for rapid integration of source and displays
- Supports LPCM7.1, Dolby® TrueHD, Dolby Digital® Plus and DTS-HD Master Audio™
- Field upgradeable firmware via Mini-USB port

### Benefits

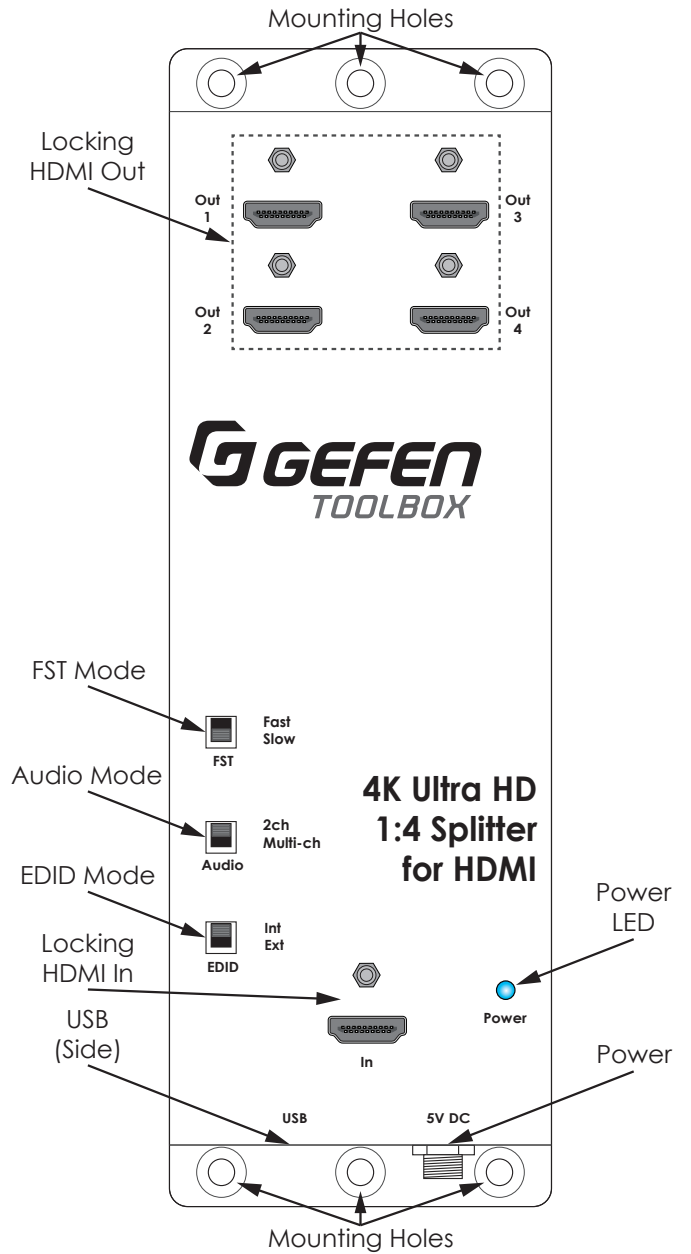
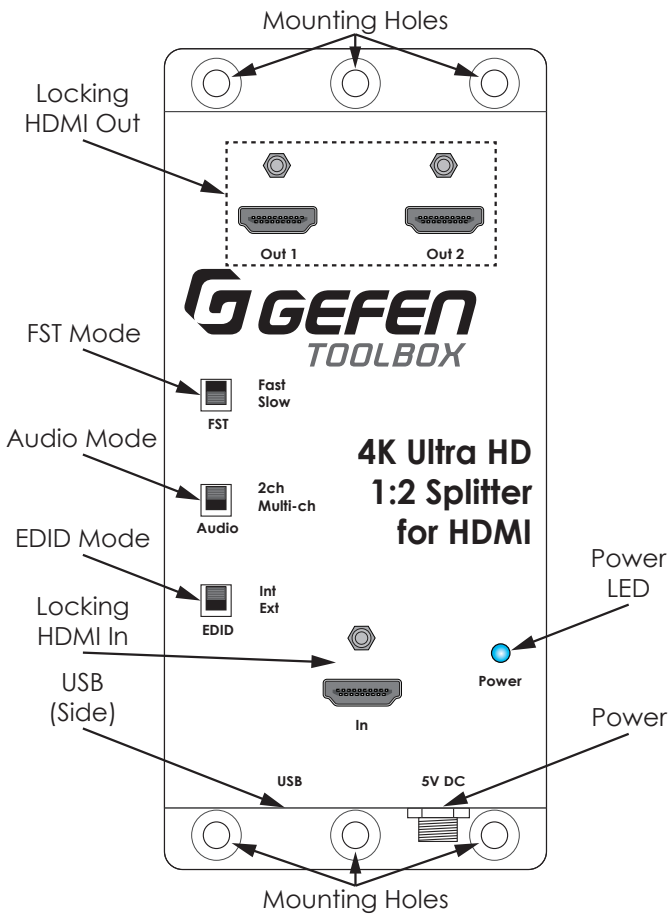
- Flat pack surface-mountable...splitters mount almost anywhere
- FST eliminates the lengthy HDMI authentication process
- FST allows disconnecting, reconnecting, or powering down HDTV displays without causing picture loss on other displays within the same distribution system
- EDID management allows the choice between built-in and passed-through EDIDs
- Daisy-chain/cascade capability allows connection of up to hundreds of displays
- Incorporating splitters with extenders can create simple to design and install video distribution systems with remote display clusters with IR, RS-232 or IP control of remote displays or other devices
- Support the use of DVI sources and DVI displays with HDMI-to-DVI adapters (not included)

# Gefen 4K Ultra HD Splitters

## Connections & Controls

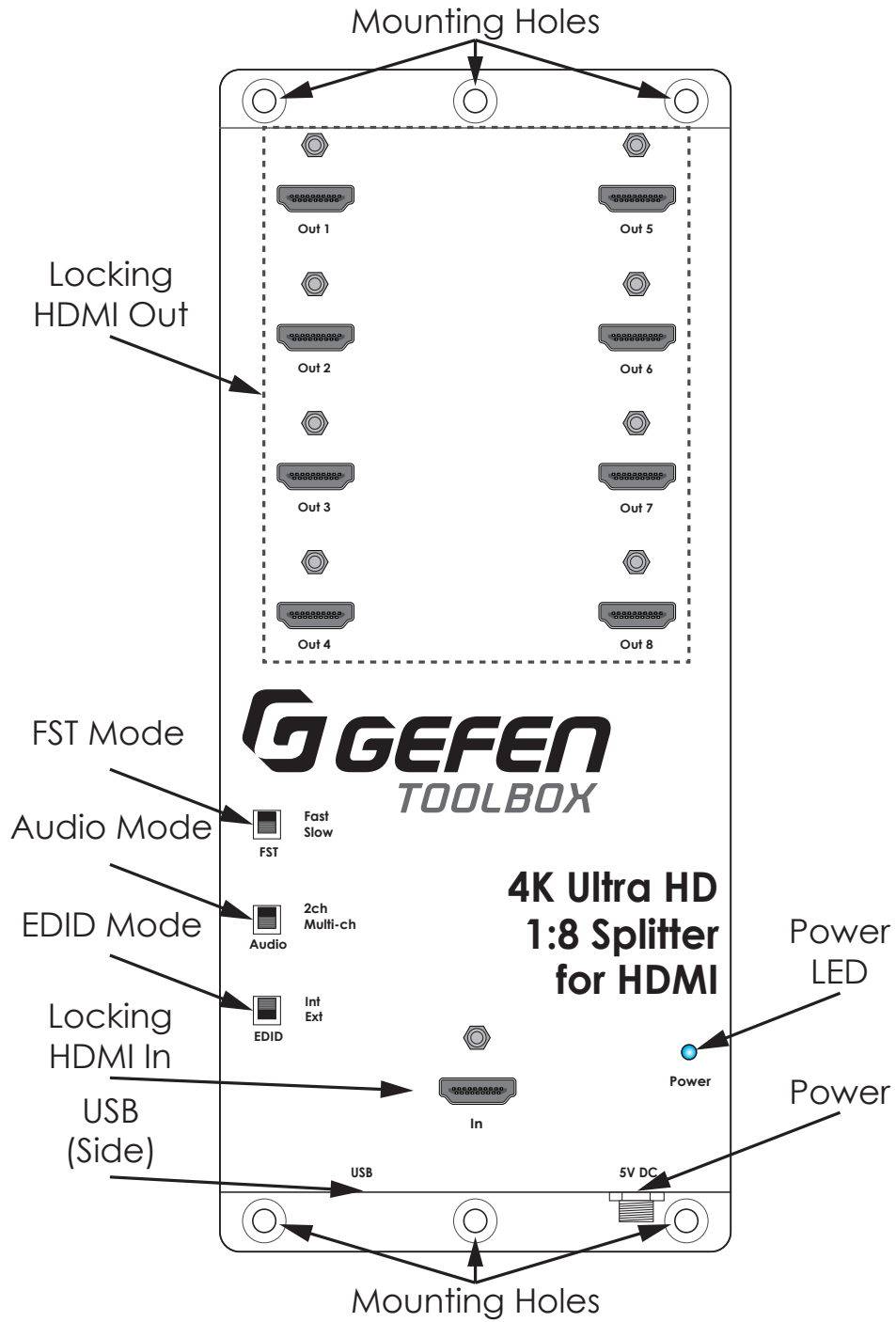
**GTB-HD4K2K-142C-BLK**

**GTB-HD4K2K-144C-BLK**



# Gefen 4K Ultra HD Splitters

GTB-HD4K2K-148C-BLK





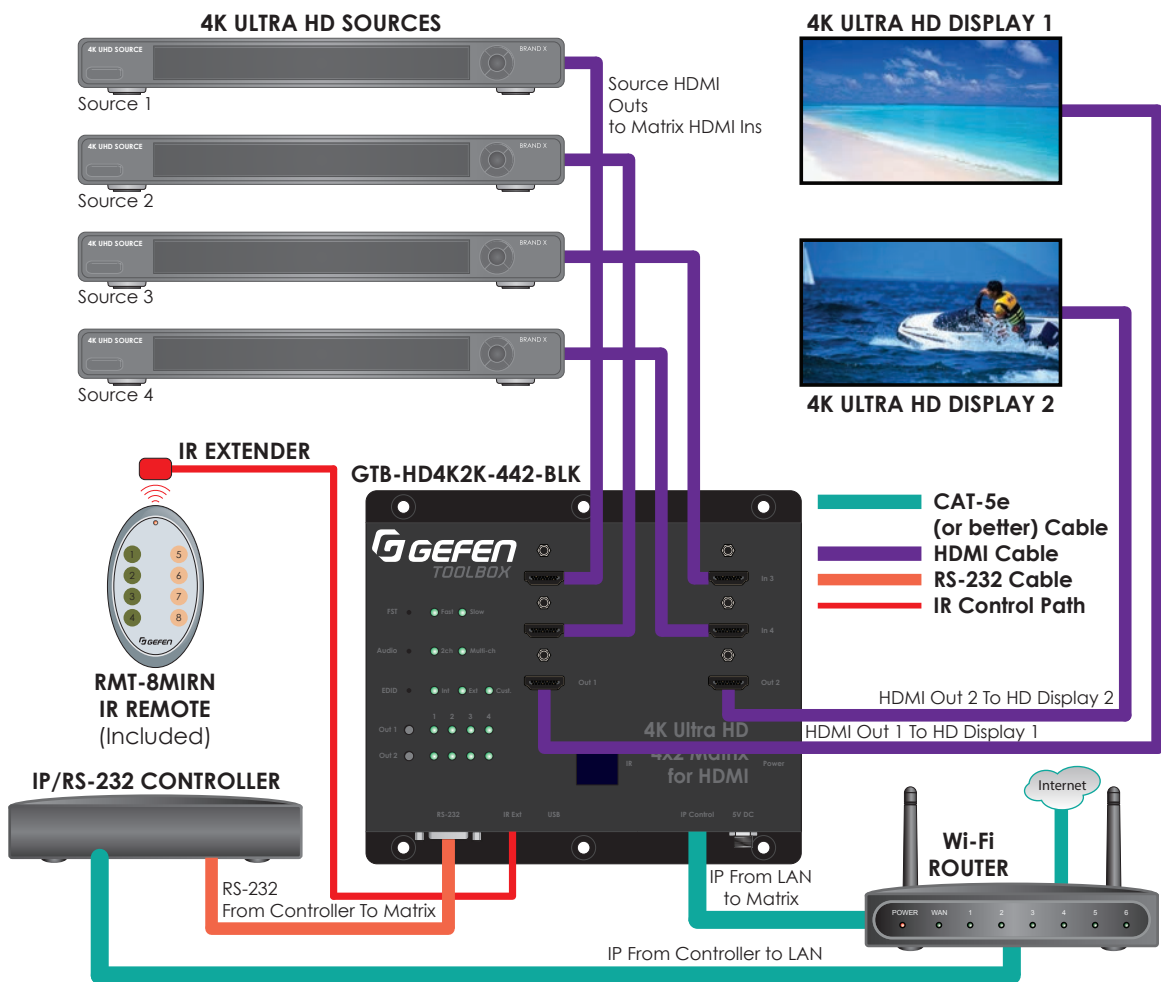
# Matrixes

## 4K Ultra HD Matrixes for HDMI

The Gefen ToolBox Matrixes for 4K Ultra HD are compact and lightweight alternatives to rack-mounted matrixes. Available in 4x2, 4x4, 6x2 and 8x8 configurations, these matrixes are ideal for residential and commercial systems where multiple 4K Ultra HD sources need to be routed to multiple 4K Ultra HD displays.

Sources are easily routed to connected displays using the front panel push-button controls, the included IR Remote, RS-232, or IP using Telnet, UDP or Web Server Interface. Routing status, FST, Audio and EDID settings are displayed with front panel LEDs (442, 444, 642) or LCD (848).

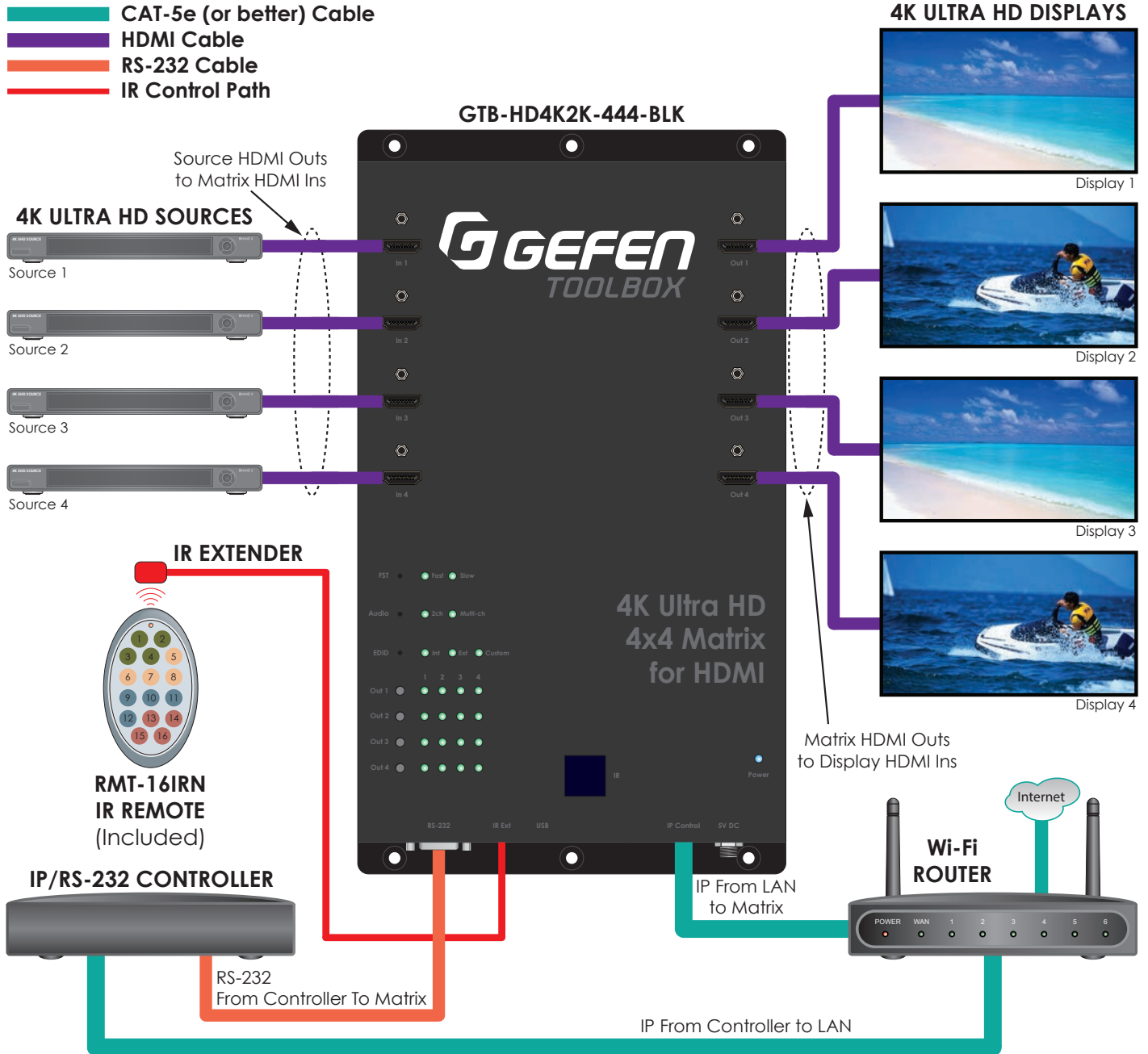
### Application 1 - 4x2 4K Ultra HD Matrix for HDMI



The illustration shows the **GTB-HD4K2K-442-BLK** 4x2 4K Ultra HD Matrix. Any one of the four sources can be routed to either or both of the two displays via the included IR Remote, RS-232 or IP. Routing status, FST, Audio and EDID settings are displayed via the front-panel LEDs. All ToolBox Matrixes have a built-in IR Sensor on the front panel and also provide an IR EXT jack for connecting a Gefen IR Receiver (part no. EXT-IRN-EXTIRN, option, available separately) allowing IR control when the matrix is installed in a cabinet, equipment rack or closet.

# Gefen 4K Ultra HD Matrixes

## Application 2 - 4x4 4K Ultra HD Matrix for HDMI



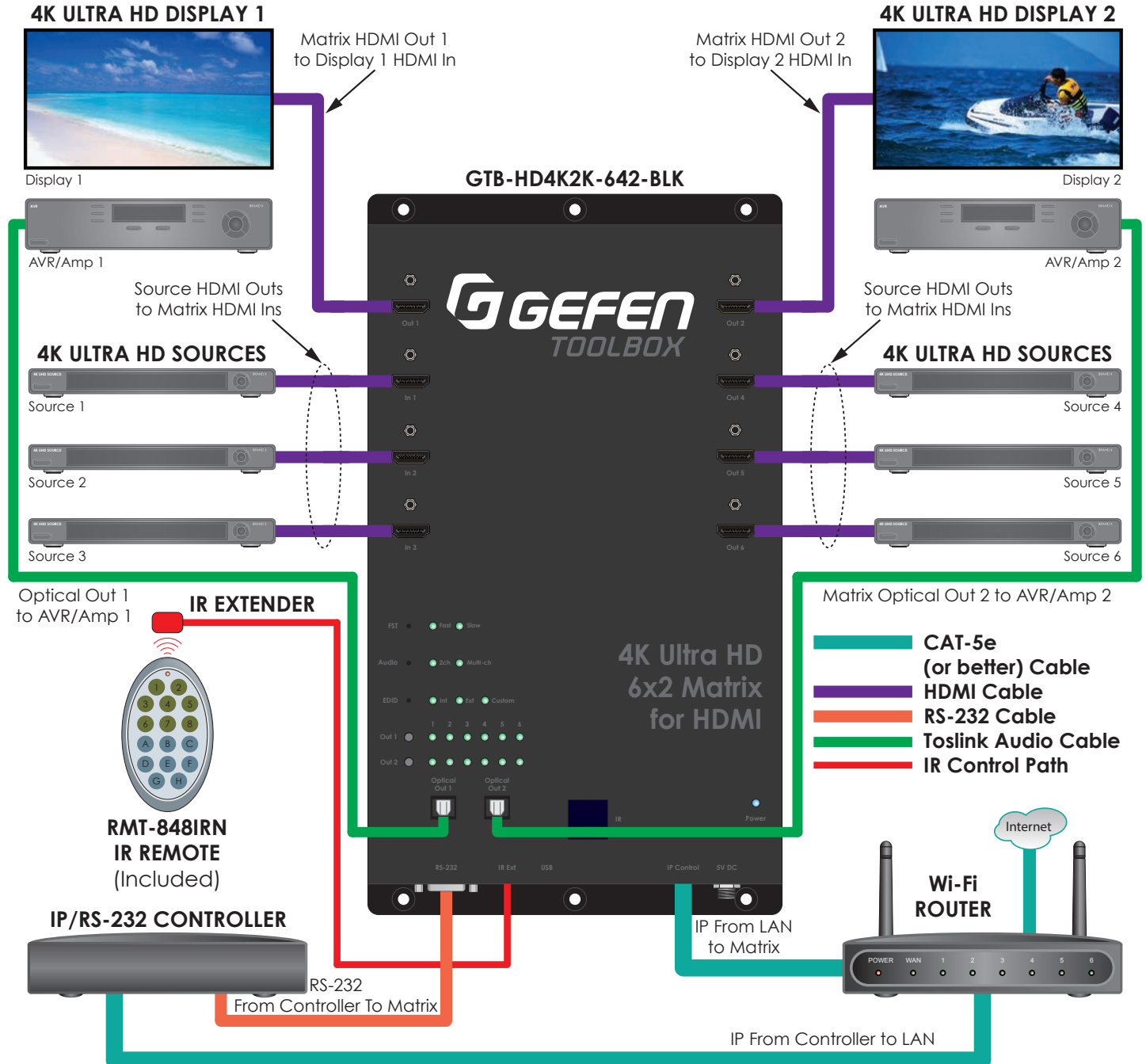
This application features the **GTB-HD4K2K-444-BLK** 4X4 4K Ultra HD Matrix. This model includes all of the same features as the 442 4x2 matrix with two additional outputs. Two additional rows of Output Status LEDs indicate current routing of available sources to connected displays.

The flat-pack design of the GTB Series Matrixes allows installation just about anywhere...wall-mount, cabinet side-wall, or the back-side of a video display providing ultimate convenience for installation. The 442, 444 and 642 are a slim 1" (26mm) thick and the 848 is 1.75" (44mm).

In addition to IR control, all Toolbox Matrixes have RS-232, and IP control capability for integration with third-party RS-232 and IP controllers, for control of 4K Ultra HD matrix switching in a wide range of commercial and residential applications.

# Gefen 4K Ultra HD Matrixes

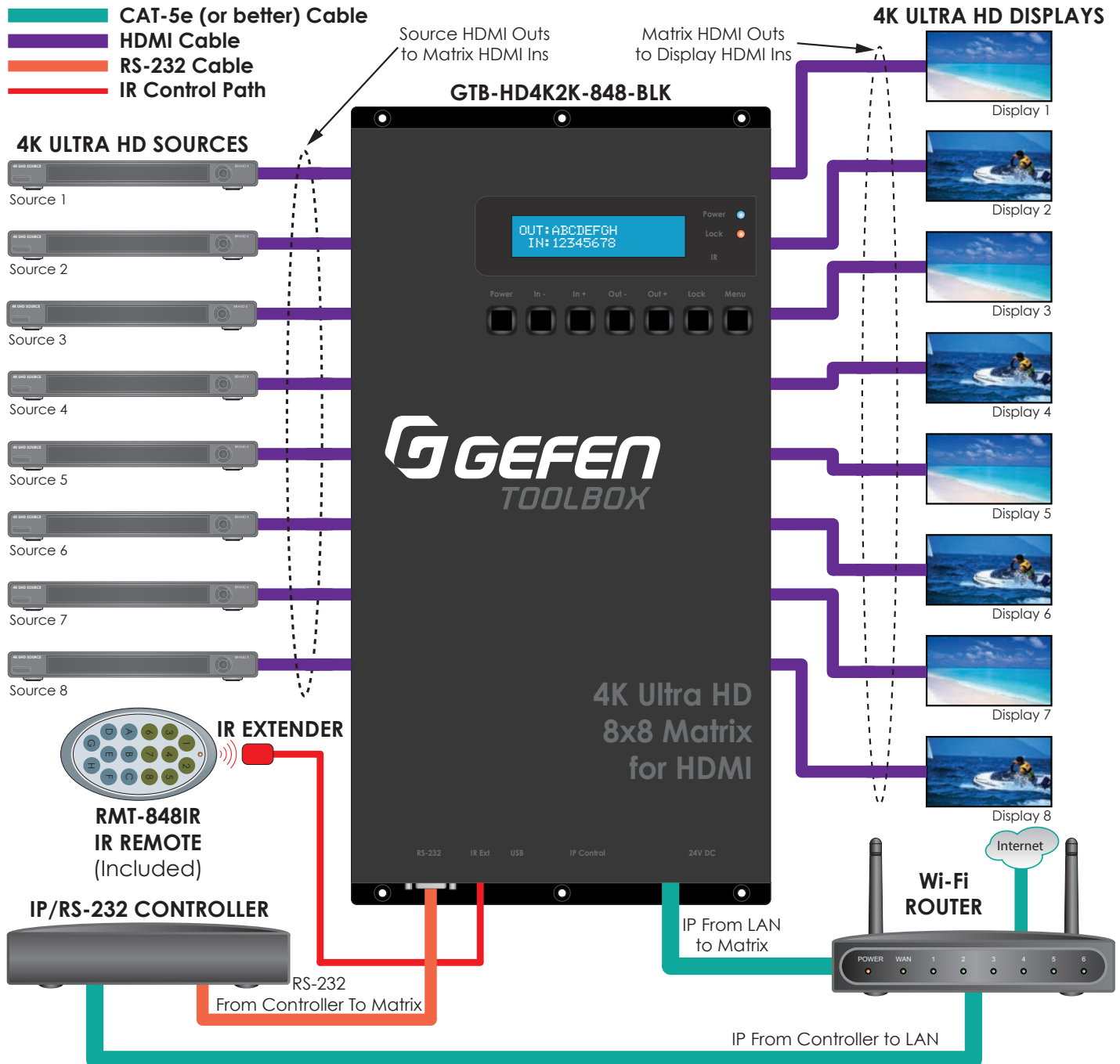
## Application 3 - 6x2 4K Ultra HD Matrix with 2 Optical Audio Outs



This application features the Gefen **GTB-HD4K2K-642-BLK**. The 642 is a 6x2 4K Ultra HD matrix with all of the same features as the 442 and 444 with one great addition...two Optical Audio Outputs. These outputs provide 'zone' specific audio outs that can be used to add audio in residential or commercial applications. In a residential application the audio can be fed to AVRs located near displays for a simple two-zone 4K UHD system. In a commercial application, the matrix Optical Outs can be fed to 2-channel, multi-channel or 70V amps with the corresponding video distributed to multiple displays using Gefen 4K Ultra HD Splitters for selecting and distributing video and audio in large areas.

# Gefen 4K Ultra HD Matrixes

## Application 4 - 8x8 4K Ultra HD Matrix for HDMI



The illustration shows **GTB-HD4K2K-848-BLK** 8x8 4K Ultra HD Matrix. The 848 is a 8x8 4K Ultra HD matrix with eight HDMI inputs and eight HDMI outputs located on the side panels. This configuration results in a very low profile installation with the input and output cables laying flat to the wall surface with the 1.75" (44mm) thin matrix.

All GTB Series matrixes feature a Web Server Interface that allows device configuration from a connected computer. Settings such as Input/Output names, Input/Output select, Lock/Unlock, Manage/Edit EDID, Preset Configurations, HPD Control, FST, HDCP Disable, IP Settings, Telnet/UDP Settings and System Configuration can all be configured with real-time status windows that display current settings.



# Gefen 4K Ultra HD Matrixes

## Settings - GTB-HD4K2K-442/444/642-BLK

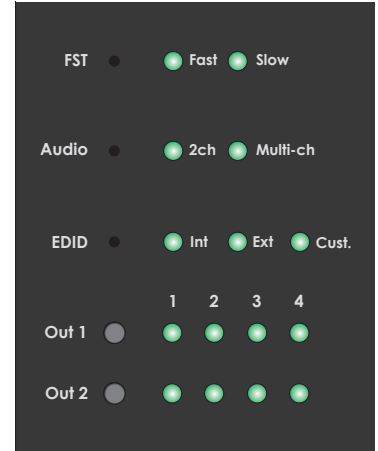
Gefen **GTB-HD4K2K-442/444/642-BLK** Matrixes feature front panel push-button controls to route HDMI signals and select settings that help improve performance and stability in HDMI distribution systems.

**FST** - Fast Switching Technology (FST) **Fast Mode** improves performance when connecting/disconnecting HD sources, and powering HD displays ON/OFF. **Slow Mode** will follow the standard authentication process based upon the HDMI and HDCP specifications. Slow Mode is recommended when the source does not support multiple devices.

**Audio**- As part of EDID management, splitter audio output can be set to 2-channel or multi-channel when EDID is set to Int (Internal). **2ch Mode** is used when *all* displays and/or sink devices support *only* 2-channel LPCM audio. **Multi-ch Mode** is used when *all* displays and/or sink devices are capable of multichannel audio.

**EDID**- Extended Display Identification Data (EDID) contains the A/V capabilities of a display device in regard to video resolutions and audio formats supported. This information is used by the source device to determine the format of the A/V signals on the outputs. In **Ext Mode** (External) the matrix 'builds' an EDID based upon the highest common video resolution and most superior audio format supported by *all* displays. This EDID is then transmitted to the source device. In **Int Mode** (Internal) the built-in internal EDID provides the source device with a 'generic' EDID that can be used by all displays.

**Out** - Repeatedly pressing a specific Out button will sequentially select the matrix's inputs until the desired input is routed to that output. The LED indicators illuminate to show which input is routed to each output.



## Settings - GTB-HD4K2K-848-BLK

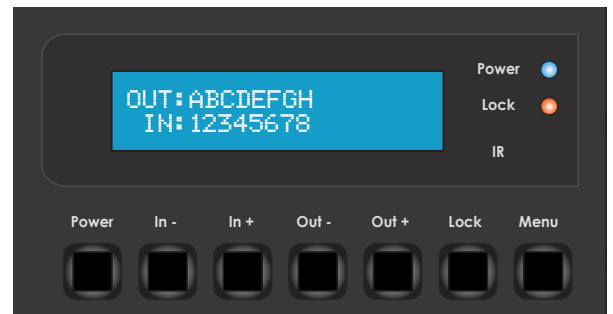
The Gefen **GTB-HD4K2K-848-BLK** Matrix features a front panel LCD with push-button menu controls that route HDMI signals and select settings that help improve performance and stability in HDMI distribution systems.

The top image shows the display, controls and routing status. The top row (A-H) are the Outputs the bottom row (1-8) are the Inputs. The In +/- and Out +/- buttons provide simple I/O selection.

Repeatedly pressing the Menu button will cycle through the menu options and display current settings. The middle image shows the current FST settings. In this case all Inputs are set for Fast Mode.

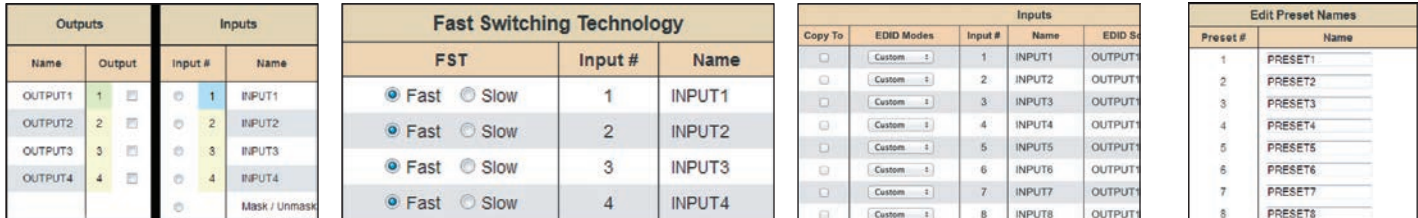
The bottom image shows the IP Address. The IP Address can be set from the Web Server Interface, and can be used for controlling the matrix from a third-party IP controller.

The display will also show different status and configuration windows for In/Out settings, Lock/Unlock, FST and setting the IR Remote Channel,



# Gefen 4K Ultra HD Matrixes

## Web Interface



All Gefen 4K Ultra HD Matrixes have a Web Server Interface that can be used for device setup and control. The Web Server Interface is divided into four main pages: Main, I/O Setup, Manage EDID and Configuration and include the following status windows, settings and controls:

**Main Page:** Routing, Lock, I/O Status, Input Device Info and Display Info.

**I/O Setup Page:** I/O Device Names, Presets, HPD (Hot Plug Detect), FST, and HDCP.

**Manage EDID Page:** Lock, Copy From/To, Modes, Bank Name and Upload/Download.

**Configuration Page:** Change IP Settings, Telnet Login Settings, UDP Connection Settings, Web Login Settings, System Configuration and Firmware Update.

## Features & Benefits

### Features

- Route 4K Ultra HD sources to 4K Ultra HD displays up to 8x8 in configurations of: 4x2, 4x4, 6x2 or 8x8 (depending on matrix model)
- Support resolutions up to 4K Cinema (4096 x 2160 @ 24 and 30 Hz), 4K Ultra (3860 x 2160 @ 60 Hz 4:2:0 color space), 1080p Full HD and 1920 x 1200 WUXGA
- Front Panel routing controls
- 12-bit Deep Color, 3DTV pass-through, Lip Sync pass-through
- Fast Switching Technology (FST) speeds up HDCP authentication (All models are HDCP v1.4)
- EDID management and Audio Mode selectors for rapid integration of source and displays
- Support LPCM7.1, bitstream and HBR (High Bit Rate) formats such as: Dolby® TrueHD, and DTS-HD Master Audio™
- IR, RS-232 and IP Control
- Field Upgradeable firmware via Mini-USB port or Web Server Interface

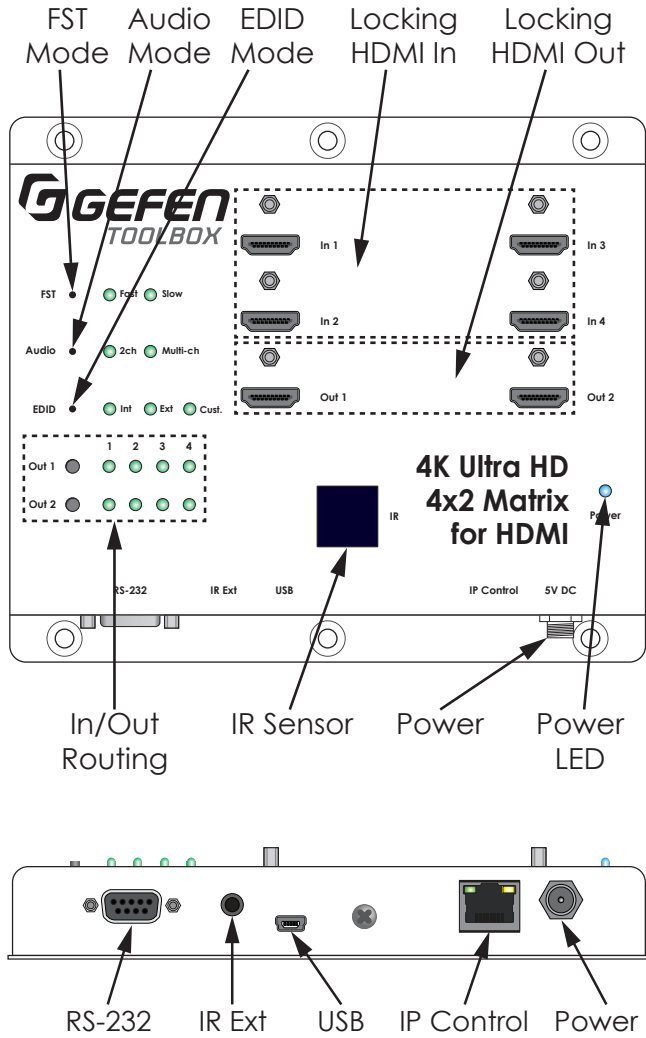
### Benefits

- Flat pack surface-mountable...matrixes mount almost anywhere
- Front Panel LEDs (442, 444, 642) or LCD (848) indicate routing status, FST, EDID, Audio Settings
- Compatible with Gefen Syner-G™ Software (848)
- Web Server Interface provides setup, control and status of matrix settings
- FST eliminates the lengthy HDMI authentication process
- FST allows disconnecting, reconnecting, or powering down HDTV displays without causing picture loss on other displays within the same distribution system
- EDID management allows the choice between built-in and passed-through and custom EDIDs
- Support the use of DVI sources and DVI displays with HDMI-to-DVI adapters (not included)

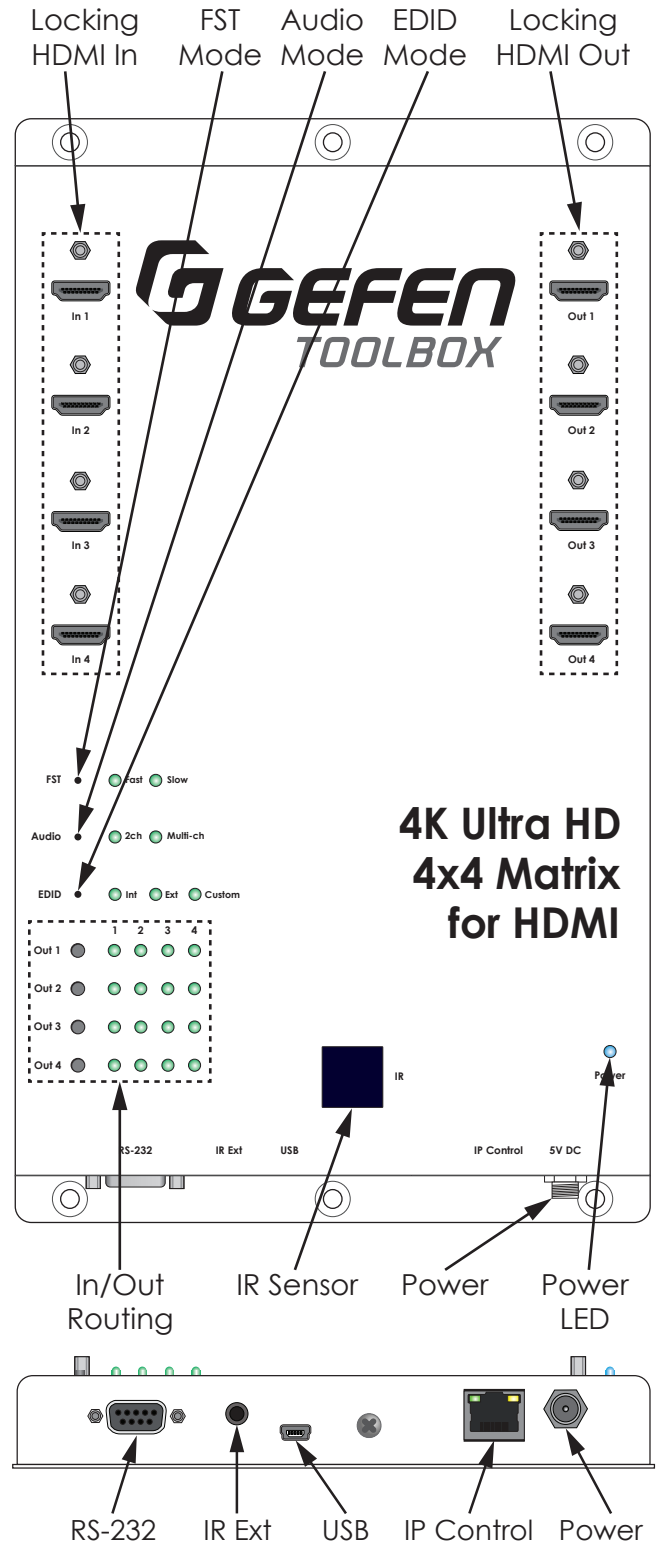
# Gefen 4K Ultra HD Matrixes

## Connections & Controls

**GTB-HD4K2K-442-BLK**

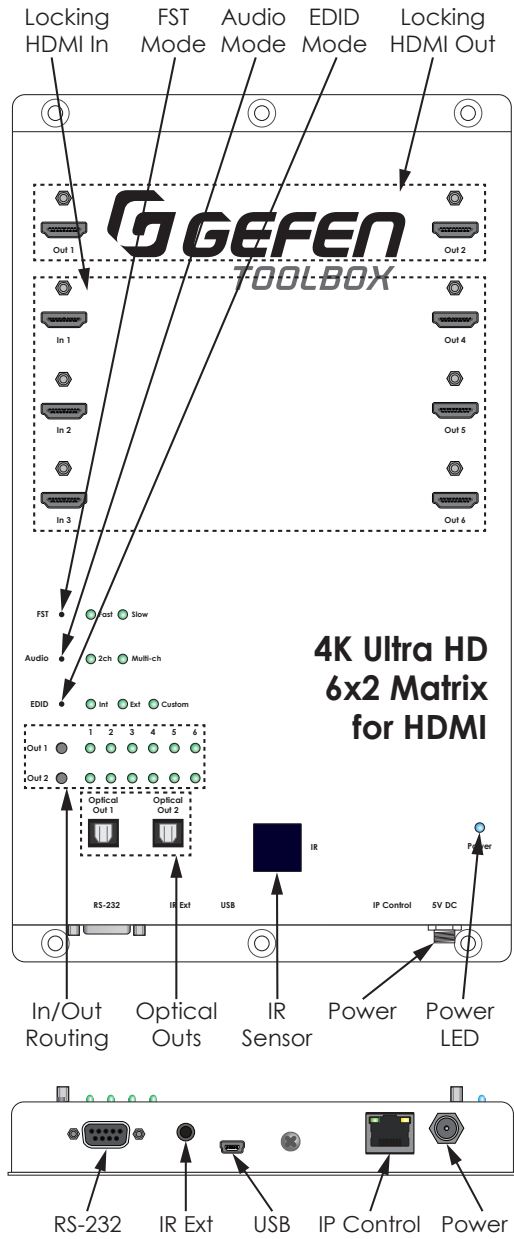


**GTB-HD4K2K-444-BLK**

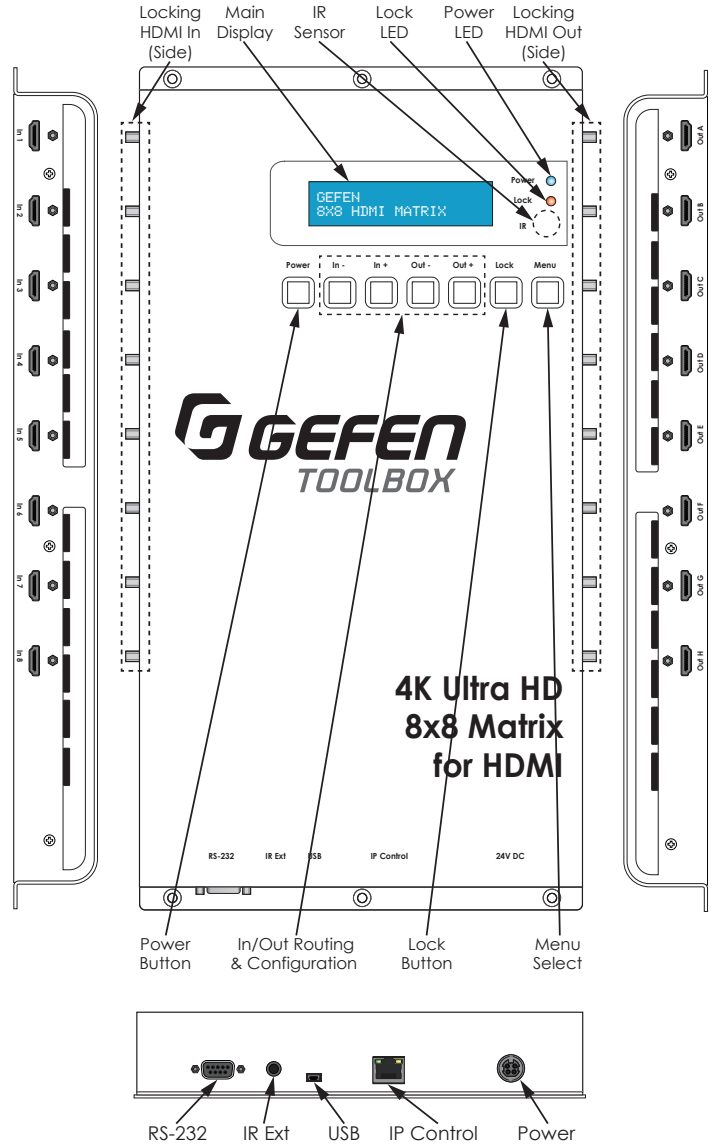


# Gefen 4K Ultra HD Matrixes

**GTB-HD4K2K-642-BLK**



**GTB-HD4K2K-848-BLK**



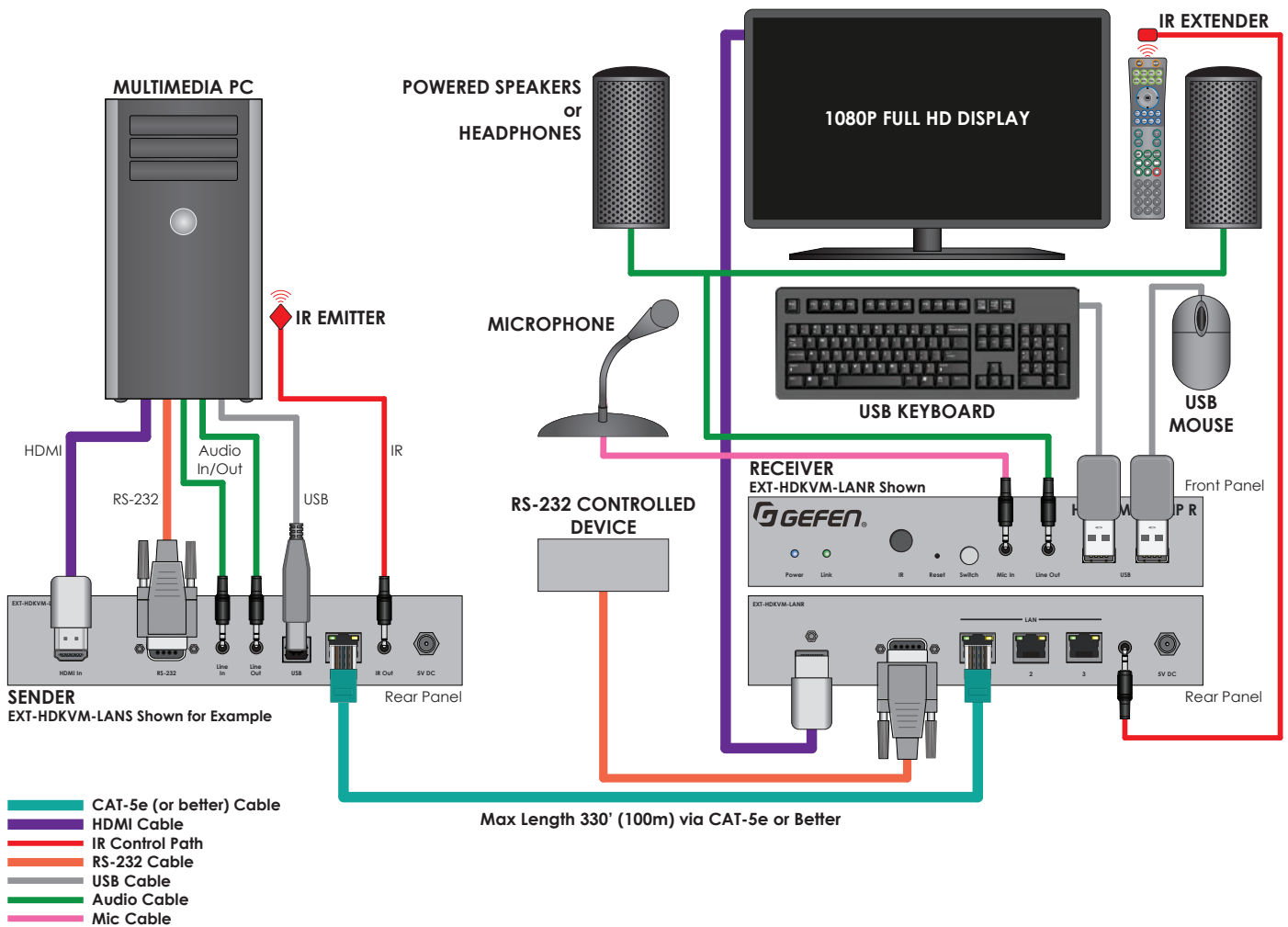
# KVM over IP

## Keyboard, Video & Mouse over IP

Gefen KVM and Video over IP products allow configuration of custom, scalable KVM and video matrixes. KVM, or Keyboard, Video & Mouse signals for up to 65,000 Sender and Receiver units can be matrixed via standard network infrastructure to create virtually limitless matrix and switching combinations.

A PC or video source can be located in one location and accessed from single or multiple locations on the matrix. System configuration can be simple KVM extension, a LAN based matrix with locally selectable sources or a master controlled system with the EXT-CU-LAN Matrix Controller.

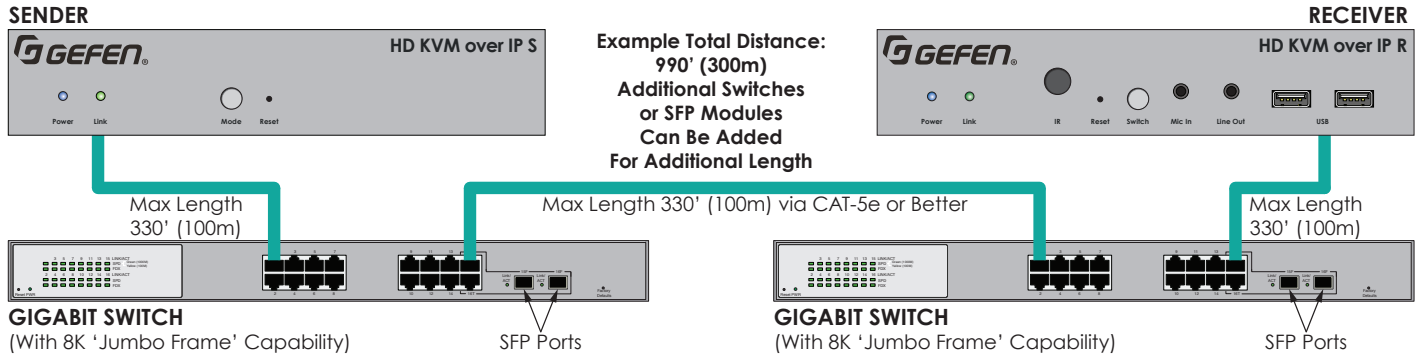
### Application 1 - Direct Connect KVM Extension



The illustration shows the typical connections on a Gefen KVM Sender and Receiver. This application has the Sender and Receiver setup in a standalone, direct connect configuration for KVM extension. This application does not require a network switch. KVM Senders and Receivers can also be configured for extension, switching, distribution and matrix over IP. The Senders and Receivers are available with HDMI 1080p Full HD, VGA or DVI video, in addition to the other shown connections. An HDMI version with 2-way IR and RS-232 is also available.

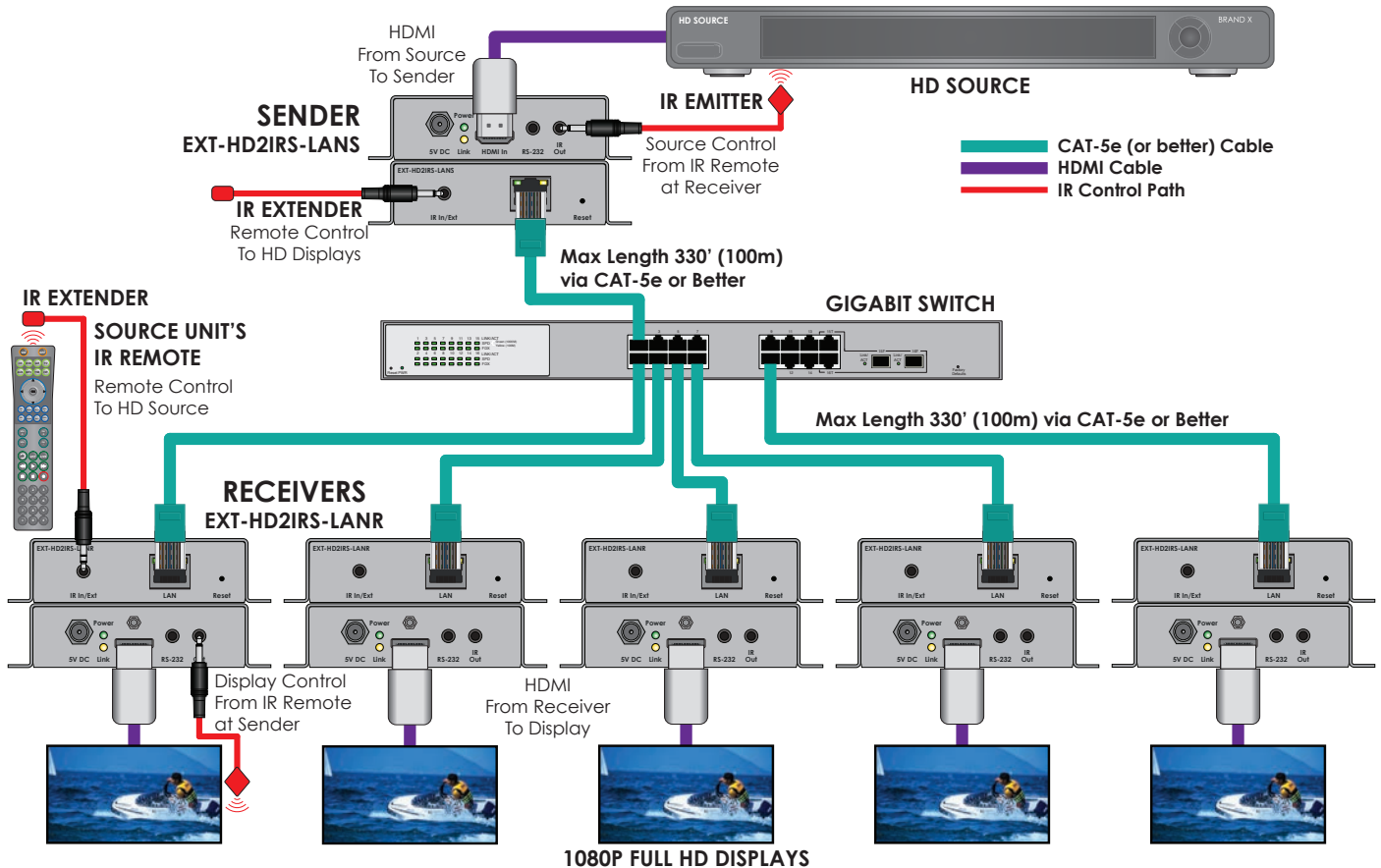
# Gefen KVM over IP

## Application 2 - KVM & Video Extension - Extended Range



Maximum cable length for direct connection between a Sender and Receiver is 330 feet (100m) on CAT-5e or better cable. A gigabit switch adds another 330 feet (100m), 660 feet (200m) total, from the Sender, to the switch, to the Receiver. Additional switches add increments of 330 feet (100m) per hop. Fiber optic SFP Gigabit Ethernet Modules can be connected to gig switch SFP ports to extend connected range up to 6.2 miles (10km).

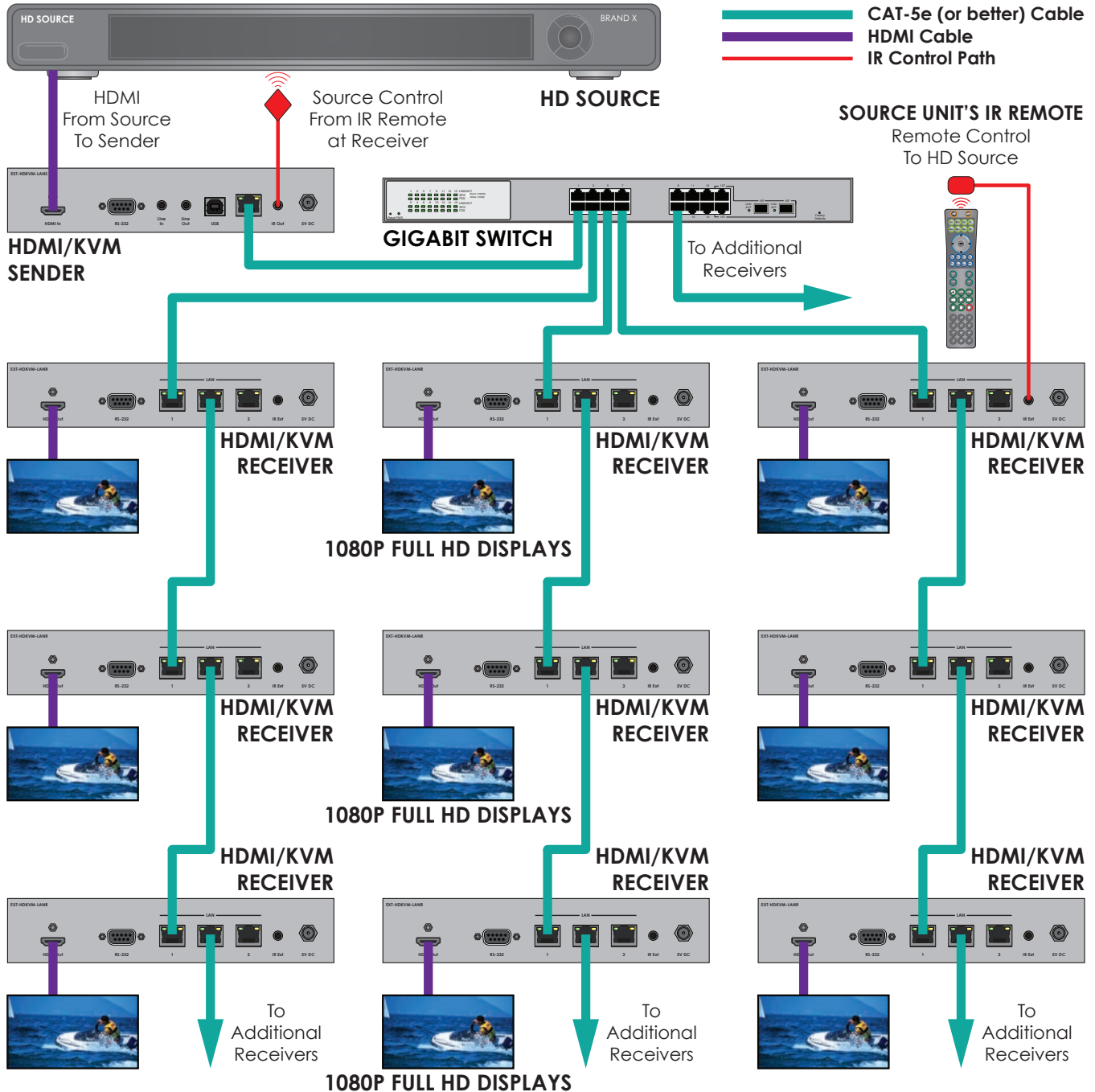
## Application 3 - Video Distribution - Video over IP



This application distributes a single HD video source to multiple HD Displays over IP. HDMI 1080p Full HD can be distributed from the Sender to as many Receivers as the network will allow. 2-way IR control allows control of the HD Displays from the Sender location and control of the HD source from or any or all of the Receiver locations. RS-232 can also be implemented to control the HD Displays, or other devices, from an RS-232 Controller connected to the Sender (connection not shown).

# Gefen KVM over IP

## Application 4 - Video Distribution - Daisy Chain



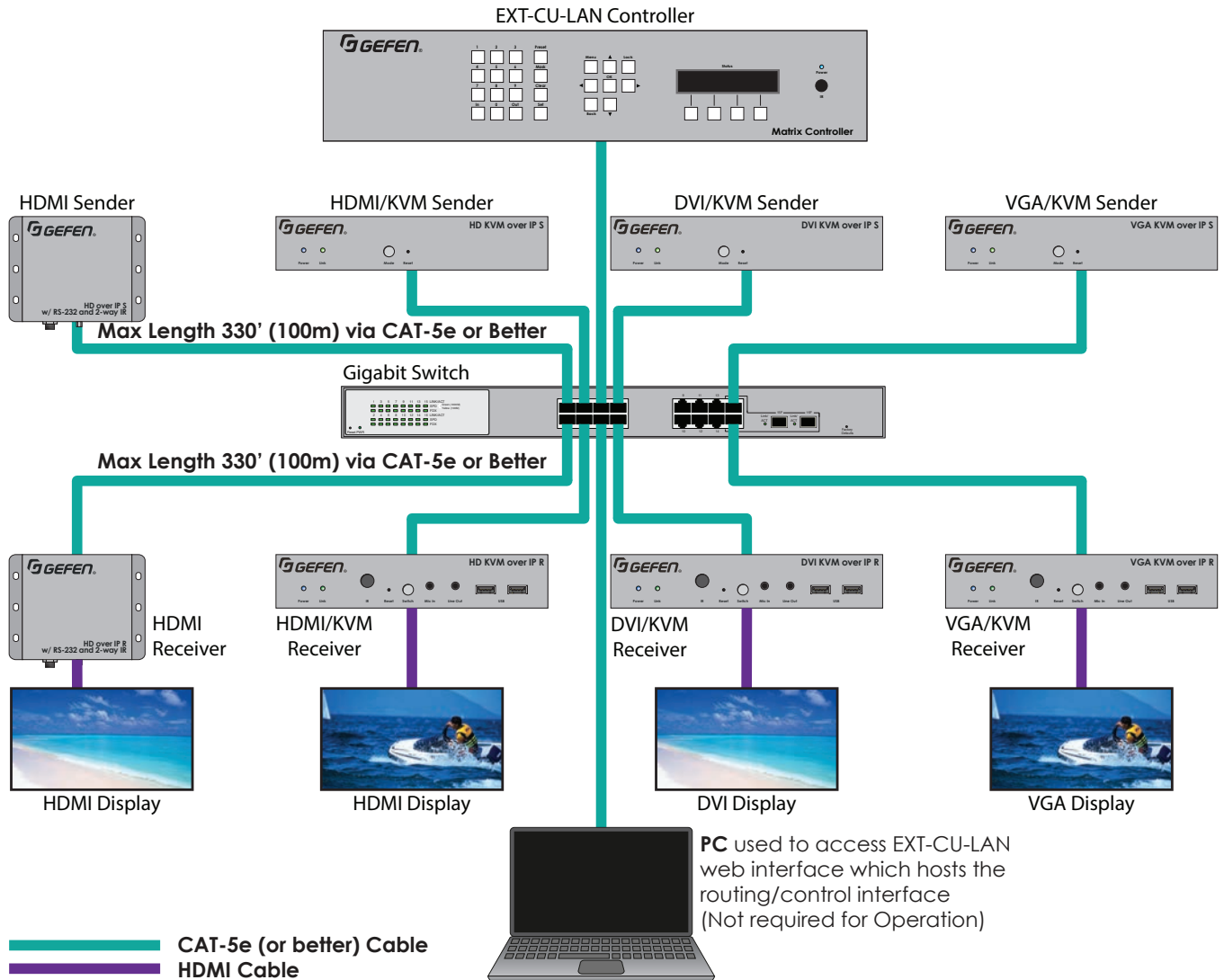
This application shows a daisy chain configuration with an EXT-HDKVM-LAN Sender feeding multiple EXT-HDKVM-LAN Receivers via a gigabit switch with 8K jumbo frame and multicast capabilities. Each Receiver has a built-in 3 port gigabit switch that can be used to connect multiple Receivers.

This application is best used for a single source system when a given video program or digital signage content is going to be distributed to multiple 1080p Full HD Displays.

IR Control from the Receiver(s) to the Sender or RS-232 control from the Sender to the Receivers can also be incorporated for control of the HD source and displays. (RS-232 connection not shown.)

# Gefen KVM over IP

## Application 5 - KVM & Video Matrix over IP (Combined Mode)



The illustration shows the KVM Senders and Receivers configured in a simple matrix. The example shows Gefen KVM Senders and Receivers for HDMI 1080p Full HD, VGA, DVI and the HDMI/IR/RS-232 model. All Senders and Receivers are connected to a gigabit switch with 8K jumbo frame and multicast capabilities.

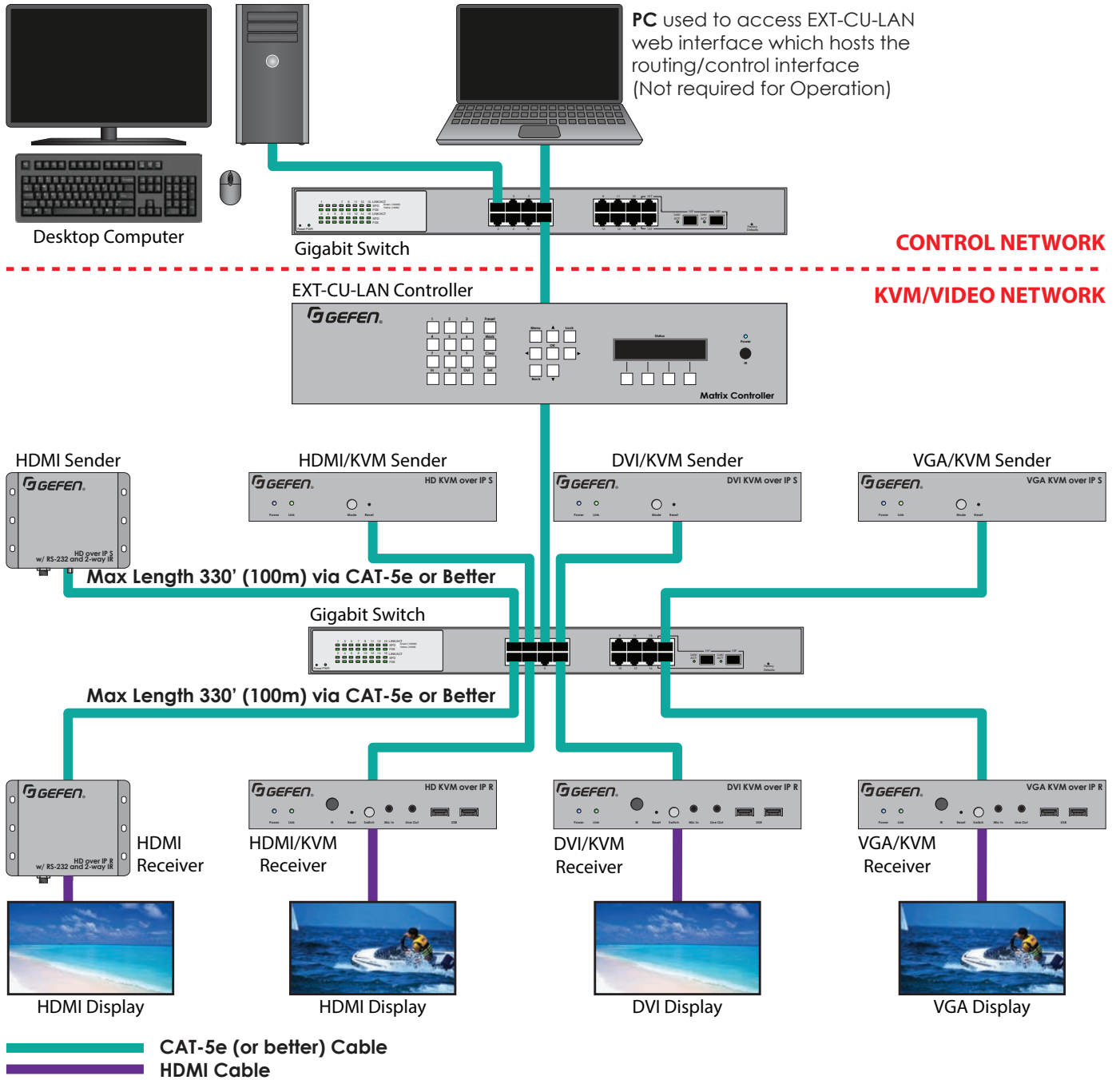
The video format from any Sender can be converted to the video format of any Receiver on the matrix. (HDCP content is only supported by HDMI Sender and Receiver units.)

The EXT-CU-LAN Controller is optional, but is highly recommended for large systems or systems that will be frequently changing signal routing. Third-party controllers (Elan, Crestron, etc) can also be used for matrix control and only have to communicate with EXT-CU-LAN controller, simplifying third-party control setup. The example shown here uses the 'combined' mode of the EXT-CU-LAN Controller. In this mode a KVM over IP matrix can reside on a network with other devices as long as the network's bandwidth supports all devices without affecting performance (average bitrate of each sender is ~150Mbps). Setup can be performed via the Sender/Receiver embedded web pages or more quickly with the EXT-CU-LAN Controller that uses the same discovery service that's built into the Gefen Syner-G™ Software.



# Gefen KVM over IP

## Application 6 - KVM & Video Matrix over IP (Separate Mode)

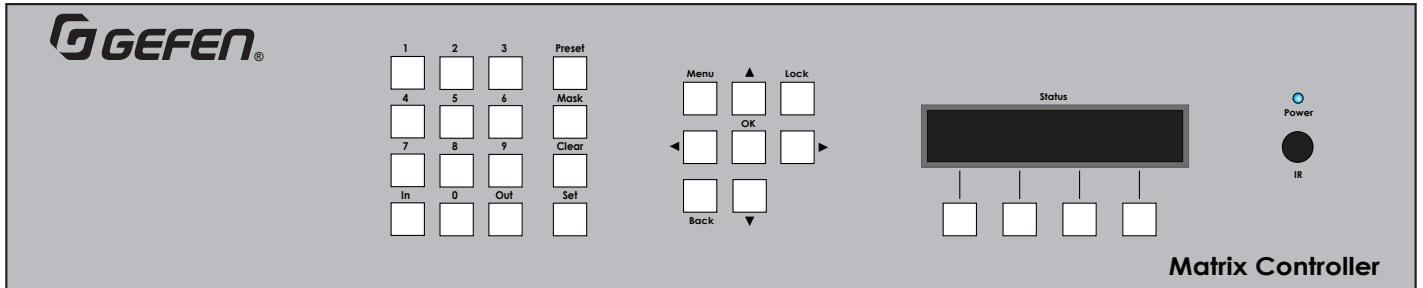


This application shows the KVM matrix setup in 'separate mode'. This configuration isolates all of the KVM traffic from other network data, VoIP services, Internet access, etc.

The EXT-CU-LAN Controller has two isolated LAN ports. This allows the controller to be connected to both the video and control networks. Although the LANs can be completely separate, the EXT-CU-LAN will allow control of Gefen KVM and Video over IP devices from computers or third-party controllers on the 'Control Network' and computers or third-party controllers on the Video Network.

# Gefen KVM over IP

## EXT-CU-LAN



There is a discovery protocol built into each KVM over IP Sender and Receiver. The software simply sends out a beacon that each unit responds to with its specific information, (model, IP Address, MAC Address, etc). In a simple Sender/Receiver extender configuration, this exchange of information allows the two units to communicate, connect and function. That same beacon is also built into the EXT-CU-LAN. The EXT-CU-LAN however, takes all of this a step further by having specific logic built-in that will allow the system to assign IP addresses and make setting changes on each unit remotely and automatically. Given the potential number of devices on a KVM over IP system, attempting the same thing manually would require having to address each device individually...and likely take longer than a typical client would care to pay for. EXT-CU-LAN's auto assignment capabilities reduce this discovery and configuration to mere minutes...automatically! Once all Senders and Receivers have been identified and configured, routing setup and control are easily managed either directly from the EXT-CU-LAN or a third-party controller.

## Features & Benefits

### Features

- Create scalable and expandable custom KVM (Keyboard, Video, Mouse) or video only matrixes in any configuration up to 256 sources and 65,000 displays
- Gefen KVM over IP allows 'non-square' matrix configurations (e. g., 5 x 20, 10 x 100, etc); just about any configuration can be created and controlled... and additional Senders and Receivers can be added or removed at any time
- Extend and matrix HDMI 1080p Full HD, DVI, VGA, USB 2.0, 2-way analog audio, RS-232 and IR over gigabit network
- EXT-CU-LAN Controller can automatically discover and configure compatible Gefen devices' network addresses and settings
- Once EXT-CU-LAN Controller is configured third-party control systems need only send single, simple commands to trigger complex matrix switching
- Standalone, direct-connect extension, does not require a network switch

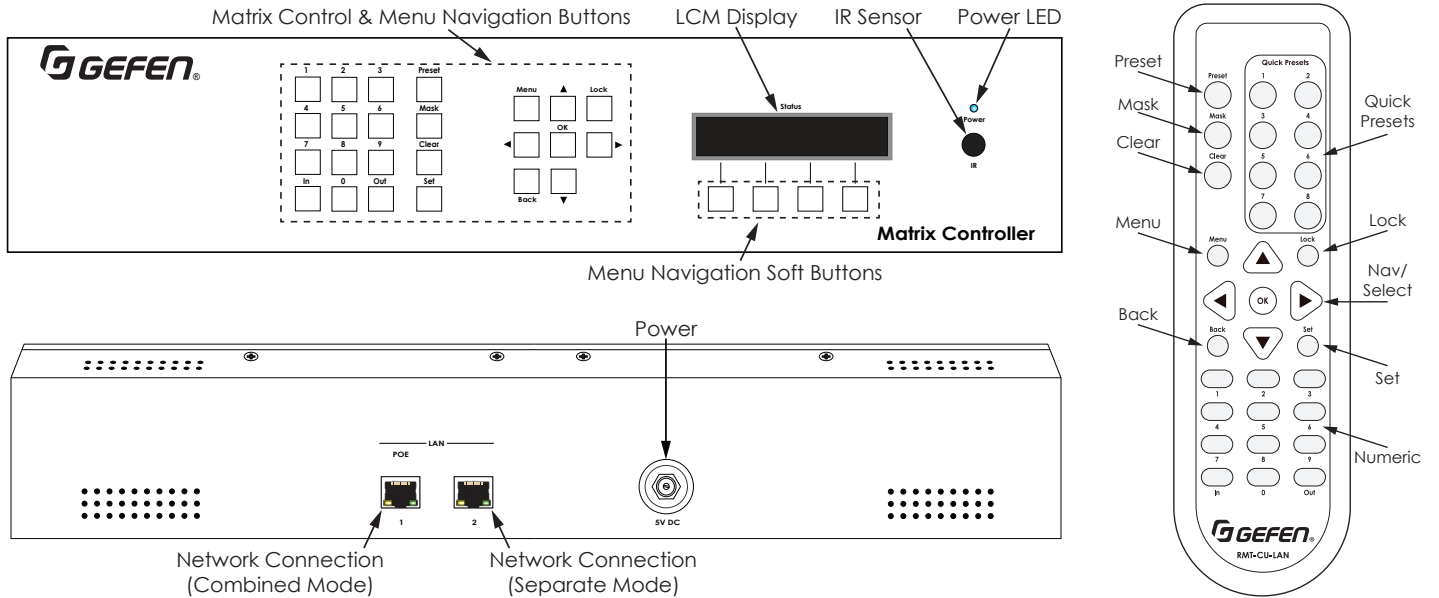
### Benefits

- Maximum flexibility of signal distribution and matrix over IP...from HDMI 1080p Full HD video only to complete KVM
- Design and implementation options from standalone extender to IP matrix
- Control options include manual, local source selection at the Receivers, built-in web interface, full system matrix control via EXT-CU-LAN Controller, IR control and third-party IP system control
- Gefen KVM over IP products are ideal for controlling multiple computers remotely, such as in edit bays, server rooms or classrooms
- Gefen Syner-G™ Software, as well as the Android and iOS Discover Tools auto-discover Gefen products, streamlining setup and reducing installation time of the EXT-CU-LAN
- Gefen Syner-G™, Android and iOS Discover Tools allow local management of network settings

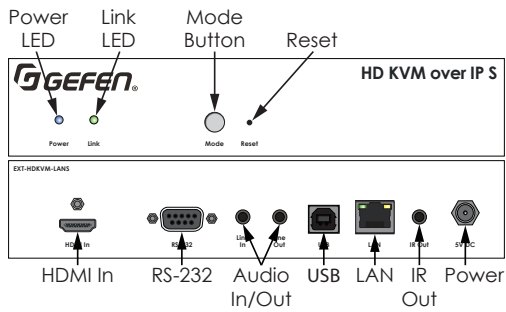
# Gefen KVM over IP

## Connections & Controls

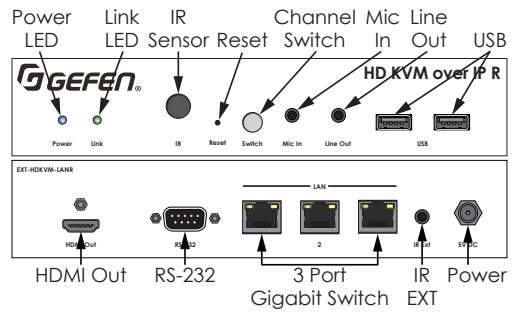
### EXT-CU-LAN Controller



### EXT-HDKVM-LAN

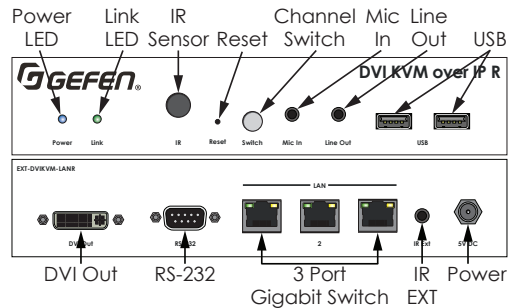
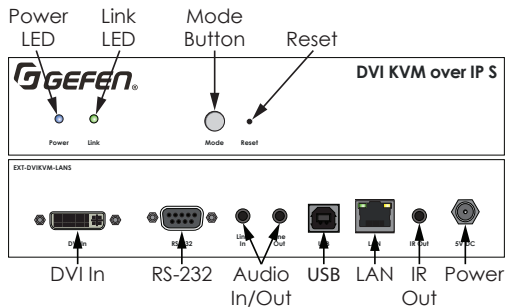


Sender



Receiver

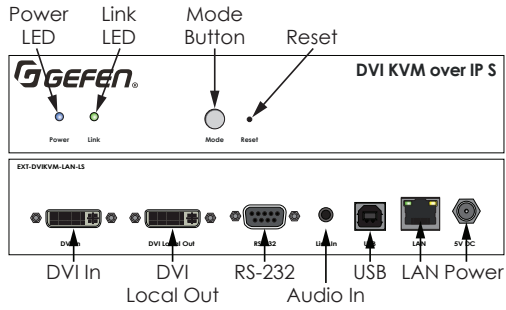
### EXT-DVIKVM-LAN



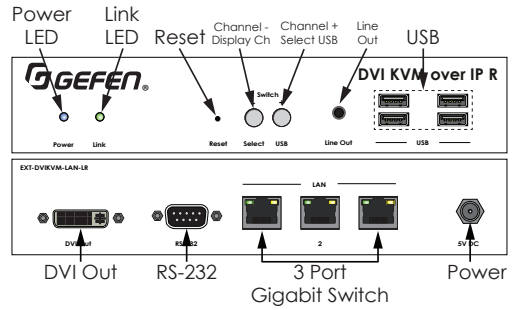
# Gefen KVM over IP

## Connections & Controls

### EXT-DVIKVM-LAN-L

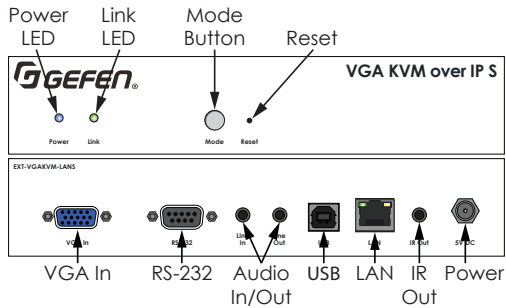


Sender

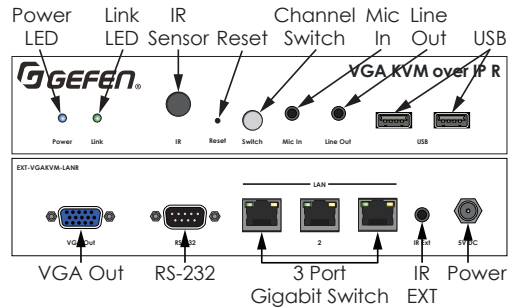


Receiver

### EXT-VGAKVM-LAN

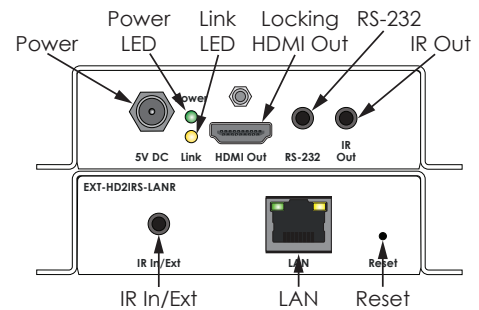
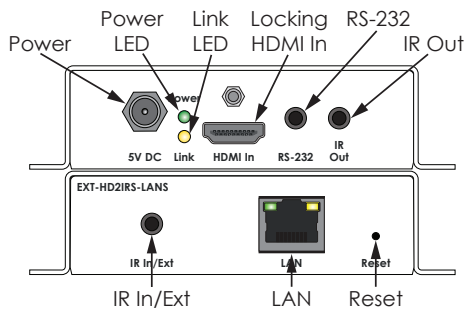


Sender



Receiver

### EXT-HD2IRS-LAN





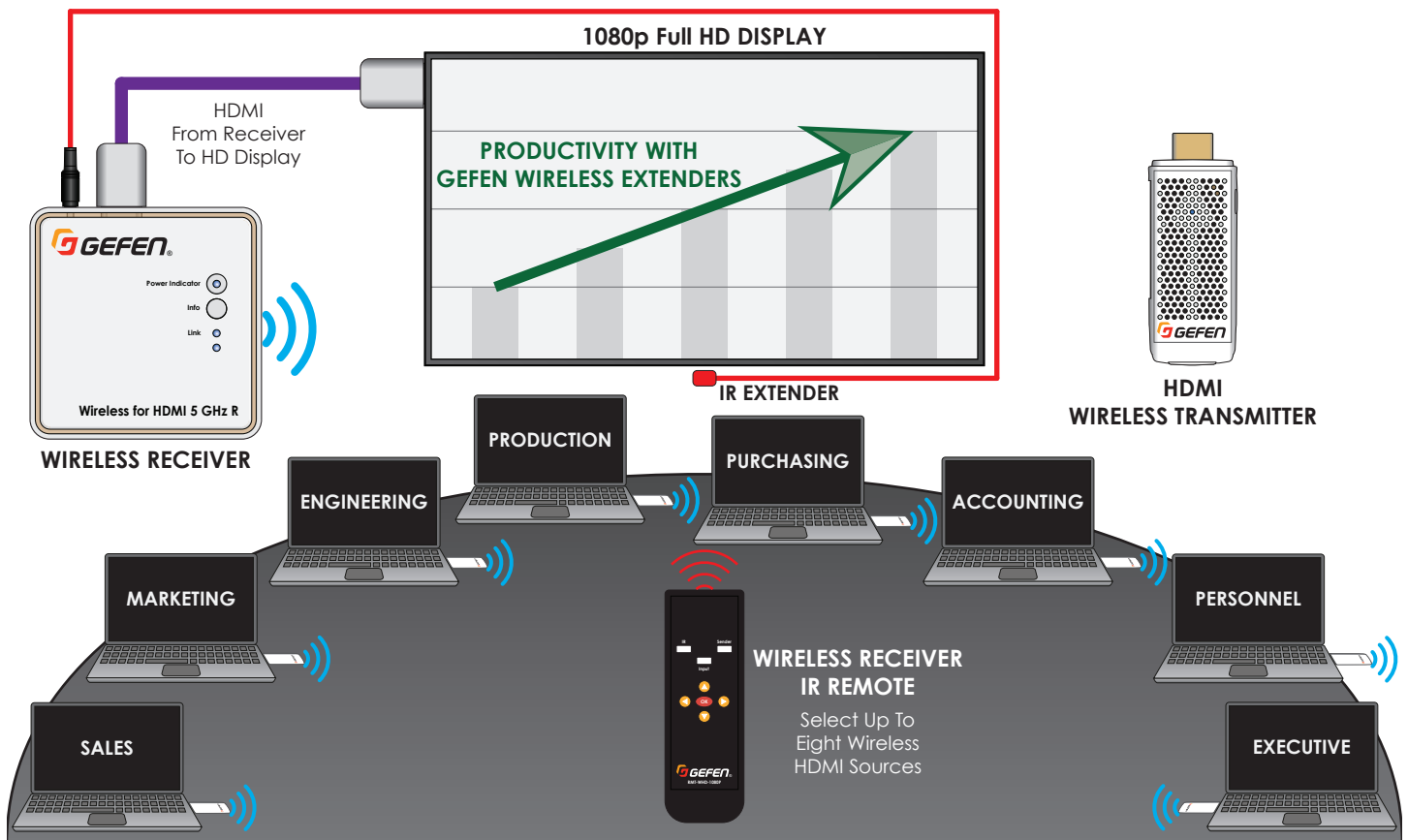
# Wireless Extenders for HDMI

## EXT-WHD-1080P-SR

Gefen's 5 GHz short range Wireless HDMI Extender transmits HDMI content up to 1080p Full HD from computers, game consoles and Blu-ray players to an HD display up to 33 feet (10m) away. Up to eight HDMI sources can be connected in a single system. Sources are selected via the included IR Remote.

In conference rooms, everyone gets a seat at the table. For home theater, sharing personal videos with family and friends has never been easier. The compact receiver can be mounted behind a video display, on a wall, shelf, tripod or hidden in an audio/video equipment cabinet.

### Application - Conference Room



Conference Room application with Wireless Transmitters connected to laptops for a staff meeting. Up to eight Wireless Transmitters can be used to transmit 1080p HDMI to the Wireless Receiver. Laptops can be individually selected with the IR Remote for presentation on the HD Display.

# Gefen Wireless Extenders for HDMI

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## Features & Benefits

### Features

- Transmits 1080p Full HD up to 33 feet (10m); (obstructions such as walls and furniture, and RF interference can reduce wireless range)
- Up to eight Wireless Transmitters can be linked to one receiver; (one transmitter included with system, additional transmitters available separately)
- OSD Setup allows registration, selection, naming and removing of Wireless Transmitters
- Firmware updateable via Gefen Syner-G™
- Wireless Transmitters connects to source HDMI port; powered by source USB port or external power supply
- Includes IR Extender for IR control when receiver is hidden in an equipment cabinet
- 7.1 channels of LPCM and 5.1 channels of Dolby® and DTS®, 3DTV pass-through, HDCP pass-through, Lip Sync pass-through

### Benefits

- Residential and Commercial applications
- Compact transmitter provides quick, easy temporary or permanent connection of HDMI sources
- In conference rooms, up to eight users can display presentations on a single display (one at a time)
- Wireless Transmitters easily selected via IR Remote
- Transmits through obstacles - does not require line-of-sight
- Uncompressed High Definition A/V from source to display
- Compatible with legacy DVI displays
- Compact receiver can be mounted behind a video display, on a wall, shelf, tripod or hidden in an equipment cabinet

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## Long Range Wireless HDMI Extender

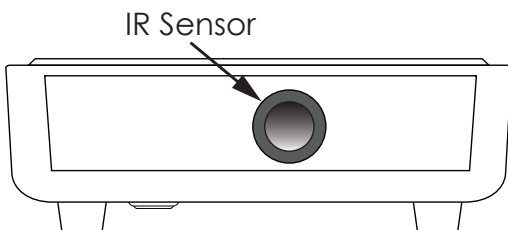
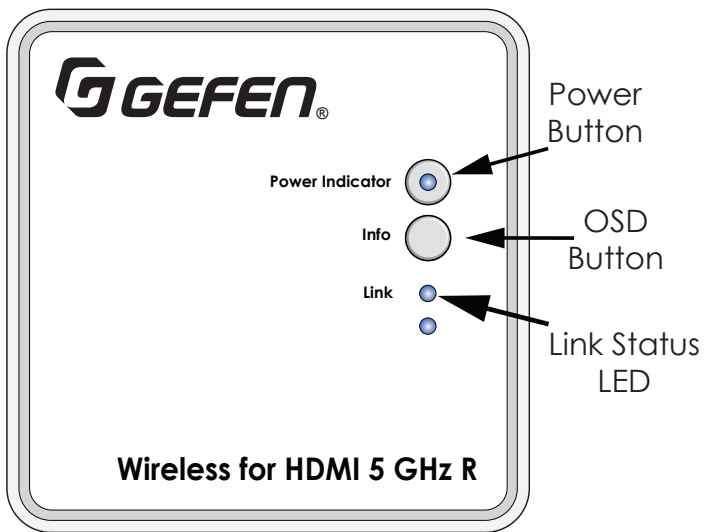
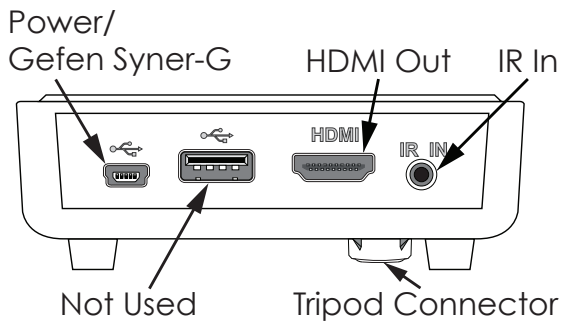
While the EXT-WHD-1080P-SR Wireless Extender system can transmit through obstacles and does not require line of sight placement of its transceivers, it is optimized for shorter distances that are typical of in-room use. For longer range extension use the Gefen **EXT-WHD-1080P-LR**.

The EXT-WHD-1080P-LR 5 GHz Extender provides wireless extension of HDMI up to 100 feet (30m). It supports video resolutions up to 1080p Full HD along with 7.1 channels of LPCM digital audio and up to 5.1 channels of Dolby® and DTS® formats. Two HDMI inputs can be selected manually or with the included IR Remote control. Up to eight two-source Transmitters can be linked to one Receiver. HDMI features include: CEC, 12-bit Deep Color, 3DTV pass-through, HDCP pass-through and Lip Sync. Includes an IR Extender for hidden installations and converts IR commands to wireless for source control from Receiver location.

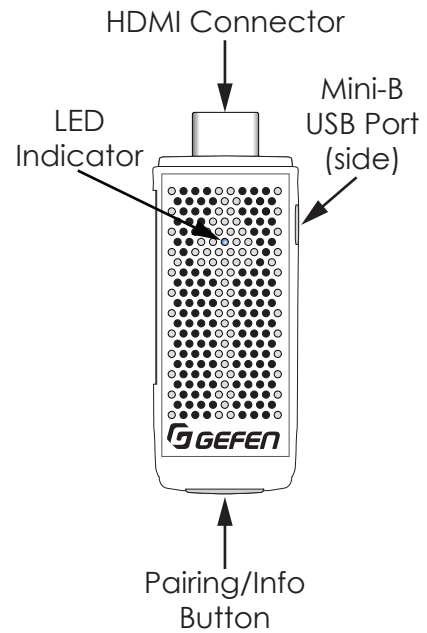
# Gefen Wireless Extenders for HDMI

## Connections & Controls

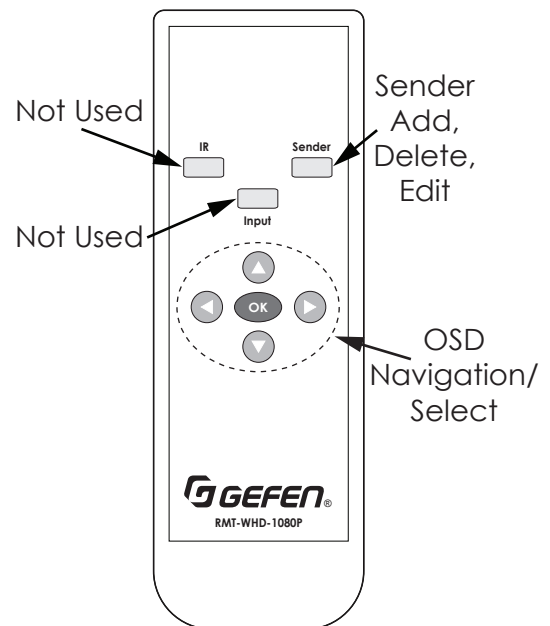
### RECEIVER



### TRANSMITTER



### IR REMOTE





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