VGA KVM | Over IP

EXT-VGAKVM-LAN

User Manual
Release A1

Gefen

Important Safety Instructions

GENERAL SAFETY INFORMATION

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this product near water.

6. Clean only with a dry cloth.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp. Do not expose this product to rain or moisture.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

15. Batteries that may be included with this product and/or accessories should never be exposed to open flame or excessive heat. Always dispose of used batteries according to the instructions.

Warranty Information

Gefen warrants the equipment it manufactures to be free from defects in material and workmanship.

If equipment fails because of such defects and Gefen is notified within two (2) years from the date of shipment, Gefen will, at its option, repair or replace the equipment, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications. Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for ninety (90) days from the day of reshipment to the Buyer.

This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.

1. Proof of sale may be required in order to claim warranty.
2. Customers outside the US are responsible for shipping charges to and from Gefen.
3. Copper cables are limited to a 30 day warranty and cables must be in their original condition.

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.

For the latest warranty coverage information, refer to the Warranty and Return Policy under the Support section of the Gefen Web site at www.gefen.com.

PRODUCT REGISTRATION

Please register your product online by visiting the Register Product page under the Support section of the Gefen Web site.

Contacting Gefen Technical Support

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20600 Nordhoff St.
Chatsworth, CA 91311

Telephone: (818) 772-9100
                              (800) 545-6900

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Email: support@gefen.com

Visit us on the Web: www.gefen.com

Technical Support Hours: 8:00 AM to 5:00 PM Monday - Friday, Pacific Time

VGA KVM over IP is a trademark of Gefen, LLC.

Important Notice
Gefen, LLC reserves the right to make changes in the hardware, packaging, and any
accompanying documentation without prior written notice.

Operating Notes

- CAT-5 or CAT-6 cables should not exceed 330 feet (100 meters) between the Sender / Receiver unit and the network.

- Shielded (STP) CAT-5 or CAT-6 is recommended. However, un-shielded (UTP) CAT-5 or CAT-6 is acceptable.

- If terminating network cables in the field, please adhere to the TIA/EIA568B specification. See the Network Cable Diagram for details.

- The Gefen VGA KVM over IP features the ability to generate compatible EDID and Hot Plug signals when working with different brands of source devices and monitors.

> ⚠ **IMPORTANT:** The use of a Gigabit switch is required when connecting the VGA KVM over IP to a network. When using *multicast mode*, the Gigabit switch must have "jumbo frame" capability.

The following table details the IP and IP port use of the VGA KVM over IP. Each "X" in the table, below, represents that no specified IP port is required.

	Type	Sender ⬌ Receiver (Host) (Client)	Description
Link Manager	TCP	6751 ⬅ X	msg_channel, ast_heartbeat
	UDP / MC	X ➜ 3246	ast_heartbeat multicast port Use the "multicast stream" multicast IP
	UDP / MC	3333 ➜ 3334 3334 ⬅ 3333	"Name Service" Use 225.1.0.0 multicast IP 3333 listen for query; 3334 for reply

	Type	Sender ⬌ Receiver (Host) (Client)	Description
Video over IP	UDP / MC	3344 ⬅ X	control channel
	TCP	3344 ⬅ X	control channel
	TCP	3240 ⬅ X	TCP unicast mode only
	UDP	X ➜ 3245	UDP unicast mode only (unicast mode default mode uses UDP, not TCP)
	UDP / MC	X ➜ 3245	multicast mode only

	Type	Sender ← → Receiver (Host) (Client)	Description
Serial over IP	TCP	X → 6752	type 1
	TCP	6752 ← X	type 2
	Type	Sender ← → Receiver (Host) (Client)	Description
IR over IP	TCP	18771 ← X	upstream IR over IP data
	UDP / MC	X → 18770	downstream IR over IP data
	TCP	18770 ← X	IR over IP data (TCP unicast mode only)

Features and Packing List

Features

- Extends VGA, USB, RS-232, bi-directional stereo analog audio, and IR over IP, using a Gigabit Local Area Network
- Supports resolutions up to 1920 x 1200 (WUXGA)
- USB 2.0 data rates up to 480 Mbps and backward-compatibility with USB 1.1
- Supports up to 16 Senders
- Supports just over 65,000 Receivers, depending on the network bandwidth and number of ports of your network switch
- Three-port Ethernet switch built into the Receiver unit
- Switch button on Receiver unit allows selection of multiple Senders
- Mode button on Sender for sharpness or motion optimization of image
- Field-upgradable firmware via web server interface
- Locking power supply connectors
- 1U tall, half-rack width enclosures are rack-mountable using EXT-RACK-1U
- Surface mounting brackets included

Packing List

The VGA KVM over IP ships with the items 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 VGA KVM over IP (Sender unit)
- 1 x VGA KVM over IP (Receiver unit)
- 1 x 6 ft. VGA cable (M-F)
- 1 x 6 ft. USB cable (A-B)
- 1 x 6 ft. DB-9 cable (M-F)
- 2 x Pair of mounting brackets with screws
- 2 x 5V DC power supplies
- 1 x Quick-Start Guide

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01 Getting Started

Sender Panel Layout

Front

ID	Name	Description
1	Power	This LED glows bright blue when the unit is connected to an AC outlet and the unit is powered ON.
2	Link	This LED glows bright green when the Sender unit and Receiver unit are connected using Ethernet cable.
3	Mode	Press this button to switch between Graphic Mode and Video Mode. Graphic Mode optimizes still images. Video Mode is best used for optimizing video. See Video Modes for details.
4	Reset	Press this button to reset the unit.

Back
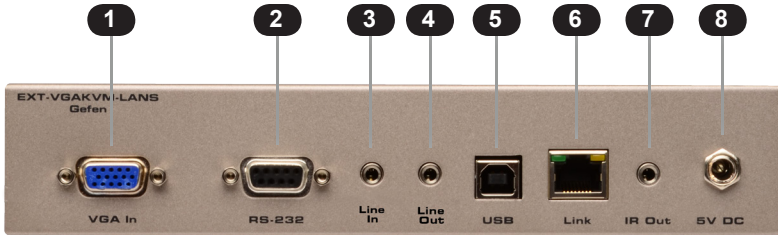
ID	Name	Description
1	VGA In	Connect the included locking VGA cable from this connector to the VGA source.
2	RS-232	Connect the included RS-232 cable from this port to an RS-232 device. See Using RS-232 for details.
3	Line In	Connect a 3.5mm mini-stereo cable from the Line Out jack on the multimedia PC to this jack.
4	Line Out	Connect a 3.5mm mini-stereo cable from this jack to the Line In jack of a multimedia PC.
5	USB	Connect a USB cable from the computer to this USB port.
6	Link	Connects the Sender unit to the network (or directly to the Receiver unit) using an Ethernet cable.
7	IR Out	Connect an IR Blaster cable (Gefen part no. EXT-2IREMIT) from this port to the VGA source to control the source from the viewing location.
8	5V DC	Connect the included 5V DC locking power supply to this power receptacle.

Bottom

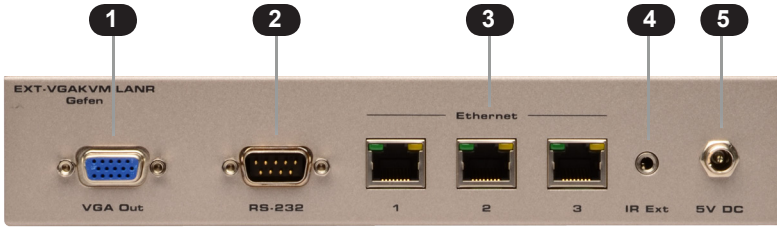| ID	Name	Description
1	Rotary switch	Used to set the video channel for the Sender unit. Each Sender unit can be set to a different channel. See Setting the Video Channel for details.

Receiver Panel Layout

Front

ID	Name	Description
1	Power	This LED glows bright blue when the unit is connected to an AC outlet and the unit is powered ON.
2	Link	This LED glows bright green when the Sender unit and Receiver unit are connected using CAT-5 / CAT-6 cable.
3	IR	This IR sensor receives signals from the source IR remote control.
4	Reset	Press this button to reset the unit.
5	Switch	Switches the communication channel when using multiple Receiver units on a network. See Setting the Video Channel for details.
6	Mic In	Connect a microphone to this jack. If the microphone has a 1/4" jack, use a 1/4"-to-3.5mm adapter to connect the microphone to the Receiver unit.
7	Line Out	Connect a 3.5mm mini-stereo cable to a pair of powered speakers.
8	USB	Connect up two USB devices to these USB ports.

## Back

ID	Name	Description
1	VGA Out	Connect a VGA cable from this connector to the display.
2	RS-232	Connect the included RS-232 cable from this port to an RS-232 device. See Using RS-232 for details.
3	Ethernet	Connects the Receiver unit to the network (or directly to the Sender unit) using an Ethernet cable. See the next page for installation instructions.
4	IR Ext	Connect an IR Extender cable (Gefen part nos. EXT-RMT-EXTIRC or EXT-RMT-EXTIRN) from this port to extend the IR control distance.
5	5V DC	Connect the included 5V DC locking power supply to this power receptacle.

Installation

The VGA KVM over IP Sender and Receiver units can either be connected over a Local Area Network or they can be directly connected to one another.

Connecting to a Local Area Network (LAN)

1. Connect a CAT-5e (or better) cable between the Link jack on the Sender unit and your LAN connection, via a switch or router.

2. Connect any one of the three Ethernet ports on the Receiver unit to the LAN. Although any of the Ethernet ports can be used, it is recommended to use Ethernet port 1 for connecting the Receiver unit to the LAN, in order to easily identify this as the "LAN cable".

3. Connect any additional IP-based devices or daisy-chain additional Receiver units to Ethernet ports 2 and 3.

Connect to router or switch

Sender unit

Connect to LAN

Connect to other Receivers / IP devices
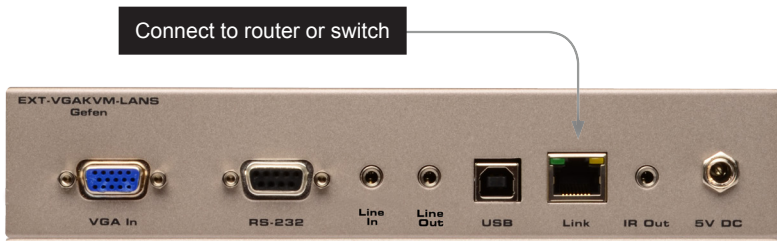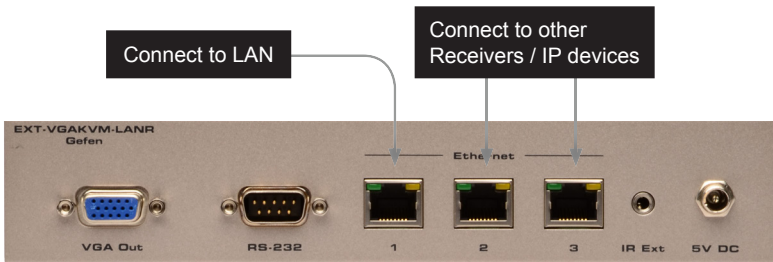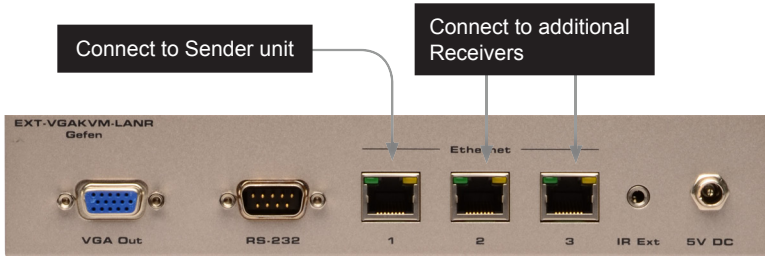

Receiver unit

Direct Connection

1. Connect a CAT-5e (or better) cable from the Link jack on the Sender unit to the Ethernet 1 jack on the Receiver unit. Although you can connect the CAT-5e cable to any of the three Ethernet ports, it is recommended that Ethernet 1 is used for the first connection. This leaves Ethernet port 2 and 3 open for connecting additional devices or when daisy-chaining Receiver units.

Connect to Receiver unit

Sender unit

Connect to Sender unit

Connect to additional Receivers
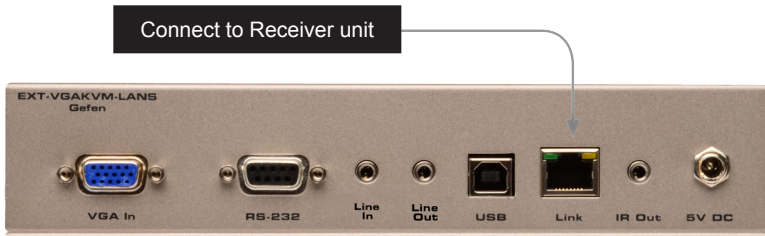
Receiver unit

> **NOTE:** When directly connecting the Sender and Receiver unit, the VGA KVM over IP must be set to *Auto IP mode*. See Configuring Auto IP Mode for instructions on setting *Auto IP mode*.

Supplementary Connections

► **Video**

1.   Use the included VGA cable to connect the VGA source to the VGA In port on the Sender unit.

2.   Connect a VGA cable from the display to the VGA Out port on the Receiver unit.

► **USB (see** USB Control **for more information on using USB devices)**

3.   Connect a USB cable from the computer to the USB port on the Sender unit.

4.   Connect up to two USB devices to the Receiver unit.

► **IR**

5.   Connect a Gefen IR Emitter (Gefen part no. EXT-2IREMIT) to the Sender unit and attach it to the IR sensor on the device to be controlled.

6.   Connect an IR Extender (Gefen part no. EXT-RMT-EXTIRC or EXT-RMT-EXTIRN) to the Receiver unit if the IR sensor will not be within line-of-site for proper IR control.

► **Audio (see** Audio Input and Output **for more information on using audio devices)**

7. Connect a 3.5mm mini-stereo cable from the Line In jack on the Sender unit to an audio source.

8. Connect a pair of powered speakers (or another audio output device) to the Line Out jack on the Receiver unit.

9. Connect a microphone to the Mic In jack on the Receiver unit.

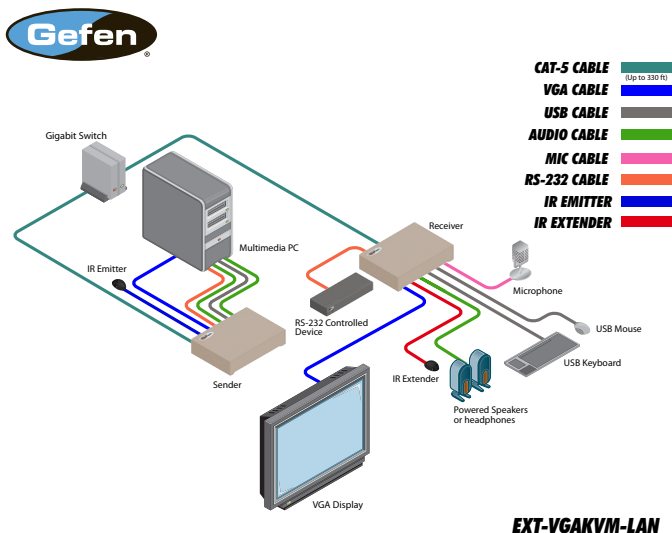10. Connect a pair of powered speakers (or another audio output device) to the Line Out jack on the Sender unit.

► **RS-232**

11. Connect the included RS-232 cable from the PC or automation system to the RS-232 port on the Sender unit.

12. Connect an RS-232 cable from the Receiver unit to the RS-232 device to be controlled.

► **Power**

13. Connect the included 5V DC locking power supplies to the Sender unit and Receiver unit. Do not overtighten the locking connectors. Connect the included AC power cords from the power supplies to available electrical outlets.

Sample Wiring Diagram

CAT-5 CABLE	(Up to 330 ft)
VGA CABLE	
USB CABLE	
AUDIO CABLE	
MIC CABLE	
RS-232 CABLE	
IR EMITTER	
IR EXTENDER	

Gigabit Switch

IR Emitter

Multimedia PC

Sender

RS-232 Controlled Device

VGA Display

Receiver

Microphone

USB Mouse

USB Keyboard

IR Extender

Powered Speakers or headphones

EXT-VGAKVM-LAN

VGA KVM | Over IP

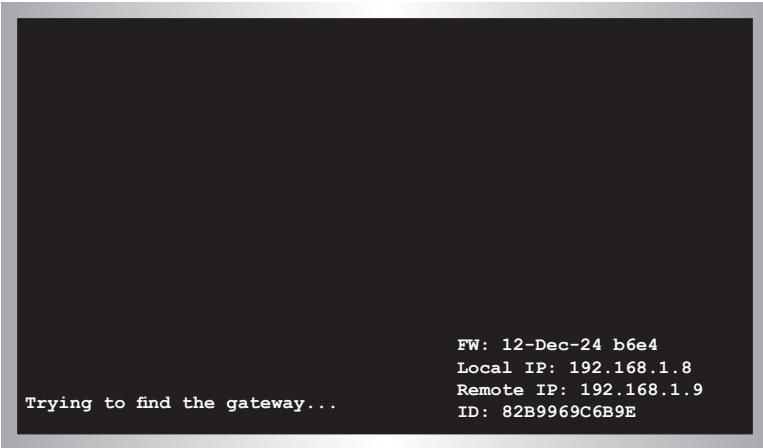## 02 Operating the VGA KVM over IP

The Linking Process

By default, the VGA KVM over IP is shipped in *DHCP mode*. DHCP mode should work in most cases, since the Sender and Receiver units are assigned an IP address by the DHCP server or router. After all the connections have been made, the VGA KVM over IP will attempt to establish a connection between the Sender and Receiver unit.

> **i** NOTE: When directly connecting the Sender and Receiver units, both the Sender and Receiver unit must be set to *Auto IP* mode. See Configuring Auto IP Mode for information.

During this time,, the Link LED on both the Sender and Receiver unit will begin to flash and the message "Trying to find the gateway" will be displayed on the screen.


```
                                    FW: 12-Dec-24 b6e4
                                    Local IP: 192.168.1.8
                                    Remote IP: 192.168.1.9
    Trying to find the gateway...   ID: 82B9969C6B9E
```

Once a successful connection is established, the Link LED on the Sender and Receiver unit(s) will glow bright green and the source signal will appear on the display.
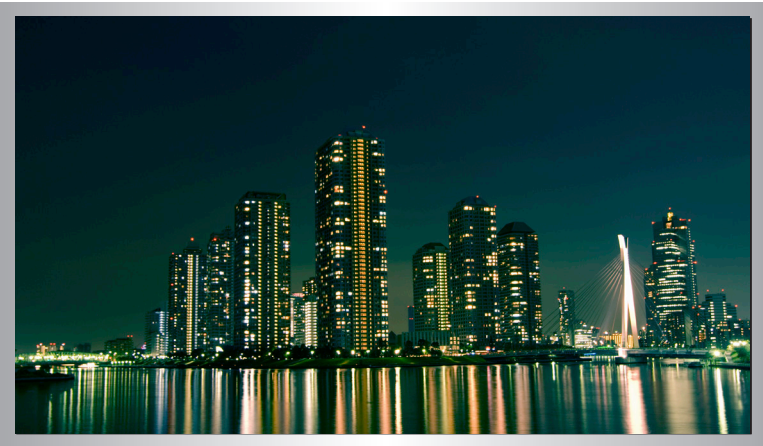
Network Configuration

If DHCP mode is not desired, the VGA KVM over IP can also be set to *Auto IP mode* or *Static IP mode*. In order to change the network options, both the Sender and Receiver unit contain a built-in Web interface. Changing the network settings may also be necessary when using multiple Sender and Receiver units.

Accessing the Web Interface

1. Connect an Ethernet cable from a computer to the network on which the VGA KVM over IP is connected.

2. Identify the IP address of both the Sender and Receiver unit. This can be done by viewing the display, during the linking process.

    If the Sender and Receiver units are already displaying a picture and the IP addresses are not known, switch the video channel on the Receiver unit to display the IP information. See Setting the Video Channel for information on how to switch the video channel.

Receiver (client) unit IP address

```
                                   FW: 12-Dec-24 b6e4
                                   Local IP: 192.168.1.8
                                   Remote IP: 192.168.1.9
                                   ID: 82B9969C6B9E
   Trying to find the gateway...
```

Sender (host) unit IP address

3. Launch a Web browser and type in the IP address of the Sender unit.

> **i** **NOTE:** When configuring the Sender and Receiver units, there is no particular order in which each unit needs to be configured.

4.   The following page will be displayed:

"h" identifies this page as the
Sender (host) unit.
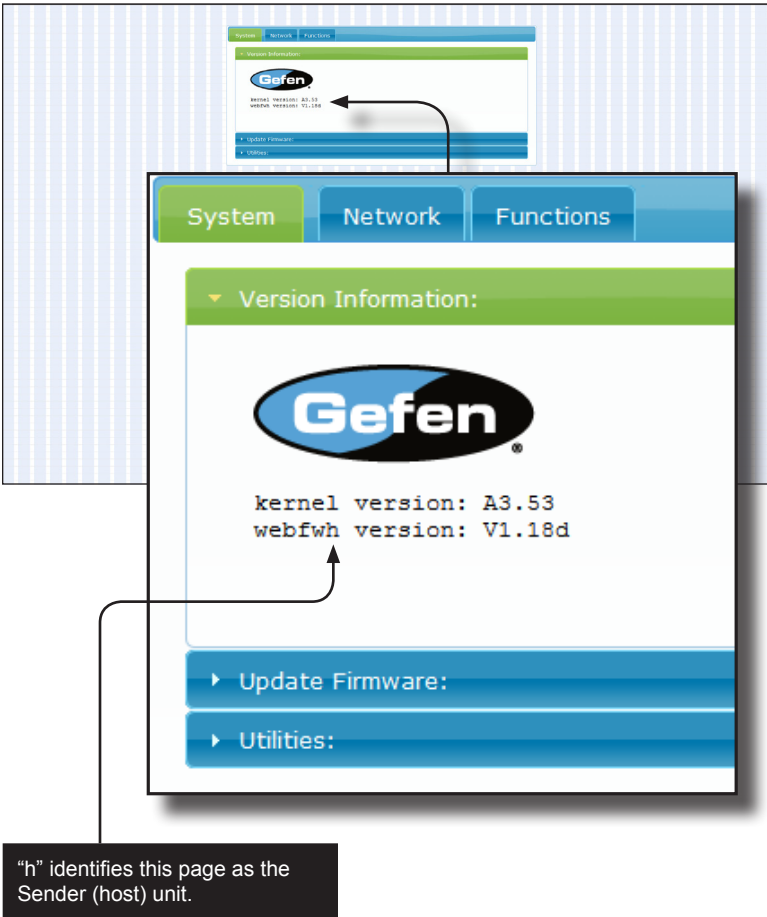
5.   Open another tab or window in the Web browser and enter the IP address of the
      Receiver (client) unit. The page for the Receiver unit will appear very similar to that
      of the Sender unit.

      In addition to the IP address, the Web page of the Sender unit is identified with an "h"
      (for "host"), under the Version Information section, as shown above. The Web page
      for the Receiver unit will be identified with a "c", for "client"

Configuring Auto IP Mode

Auto IP mode is used when there is no DHCP server (or router) available and each Sender and Receiver unit is connected to a switch. When set to Auto IP mode, the Sender and Receiver unit will self-assign unique IP addresses (within the range of `169.254.x.x`). Use this mode when the Sender and Receiver unit are directly connected.

1.   Access the Web interface of the Sender (host) unit by entering the IP address of the Sender unit in a Web browser.

2.   Once the Web page is displayed, click the Utilities bar to expand it.
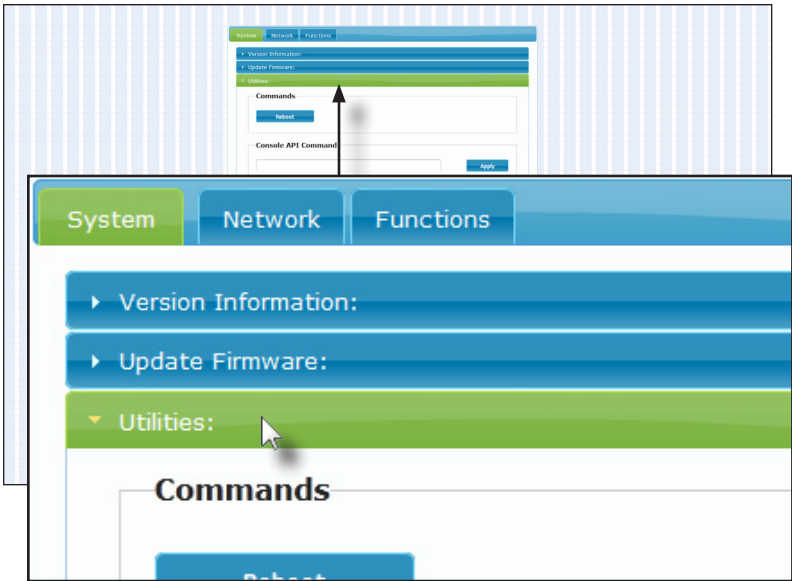
3.   Click the Console API Commmand text box.
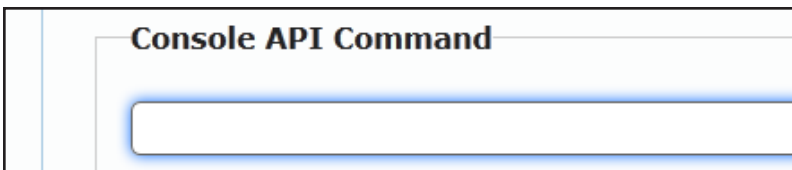
4.   Type the following command in the Console API Command text box:

     `astparam s ip_mode autoip; astparam save; reboot`

5.   Click the **Apply** button.

6.   The "Loading" message will appear, indicating that the commands are being executed.

"Loading" message indicates commands are being executed
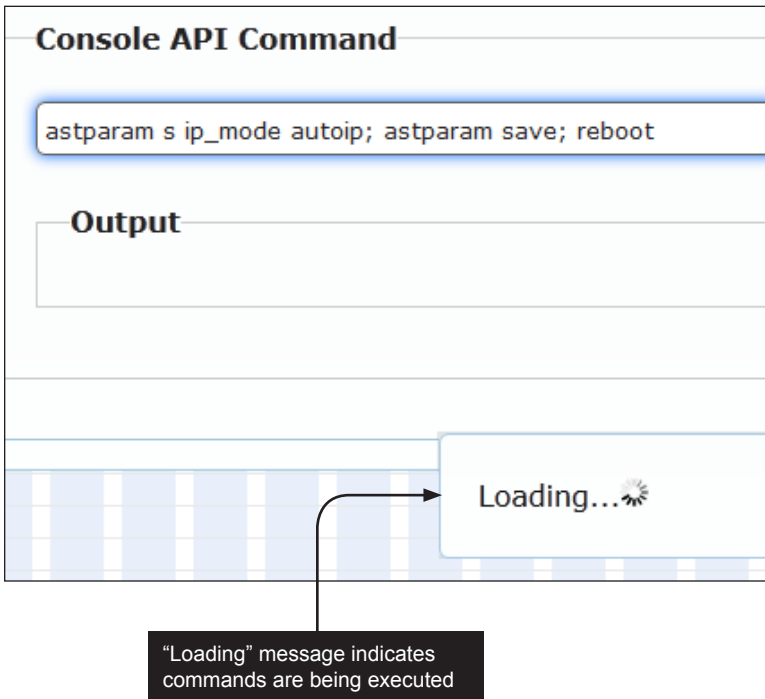
7.   After a few moments, the following message will appear at the top of the Web page:
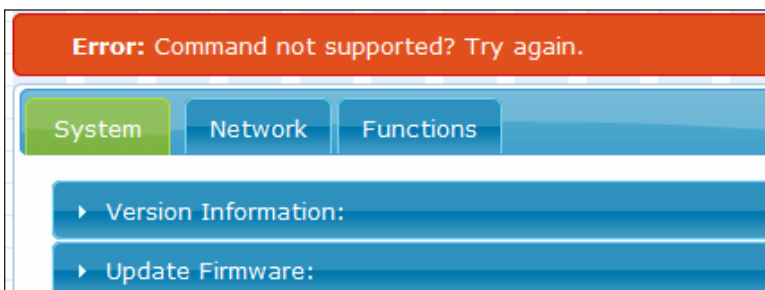
Although this message will be presented when there is an error in the command line, it is important to understand that this also occurs after the network mode has been changed. This is because the IP address has changed and the Web page can no longer access the current IP address of the Sender (or Receiver) unit.

8.   Once the process has completed, the new IP address will appear on the display, as shown below:

```
                                    FW: 12-Dec-24 b6e4
                                    Local IP: 192.168.1.8
     Trying to find the gateway...  Remote IP: 169.254.7.8
                                    ID: 82B9969C6B9E
```

New IP address

The new IP address of the Sender unit is no longer in the same subnet as the Receiver unit. Therefore, the Sender unit will not be able to communicate with the Receiver unit until the Receiver unit is also set to *Auto IP mode*.

9.   Repeat steps 1 through 7 for the Receiver unit.

10.   Once both units are configured for *Auto IP mode*, video communication will be restored.

> **NOTE:** In *Auto IP mode*, the subnet mask is automatically set to `255.255.0.0`.

Changing Network Settings on the Computer

We just finished configuring the Sender and Receiver units to *Auto IP mode*. In order to configure these units for *Static* IP *mode* (or to return to *DHCP mode*), we will need to configure each unit separately. However, because we are no longer using DHCP to assign IP addresses, we will need to modify our network settings to match those of the Sender and Receiver units. Let's continue from our previous example.

1.   First, we will identify the current IP settings for our Sender and Receiver unit.

      Once again, if the Sender and Receiver units are already displaying a picture, switch the channel on the Receiver unit to display the IP information.
      See for information on how to switch the video channel on the Receiver unit.

```
                                              FW: 12-Dec-24 b6e4
                                              Local IP: 169.254.7.11
                                              Remote IP: 169.254.7.8
           Trying to find the gateway...      ID: 82B9969C6B9E
```
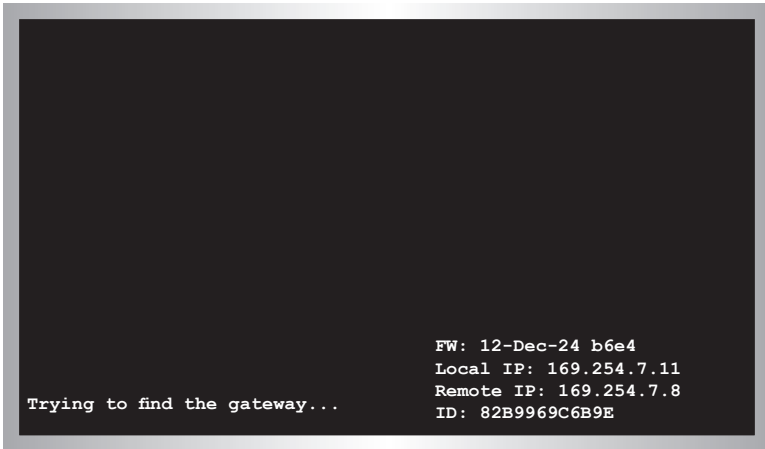
      As we can see in the illustration, above, the IP addresses for the Sender and Receiver unit are `169.254.7.8` and `169.254.7.11`, respectively. Therefore, we must change our computer's IP address so that it falls within the same subnet (e.g `169.254.7.1`) in order to gain access to the Web interface for both the Sender and Receiver units.

      We will arbitrarily begin with the Sender unit:

2.   Connect an Ethernet cable from a computer directly to the Sender unit.

3.   Access the Network Setting control panel in Windows and locate the LAN connection. Under Windows 7®, this can be done by clicking **Start** > **Control Panel** > **Network Sharing Center** > **Change Adapter Settings**.

4.   Double-click on the Local Area Connection icon to display the Local Area Connection Status dialog.

5.   Click the **Properties** button.
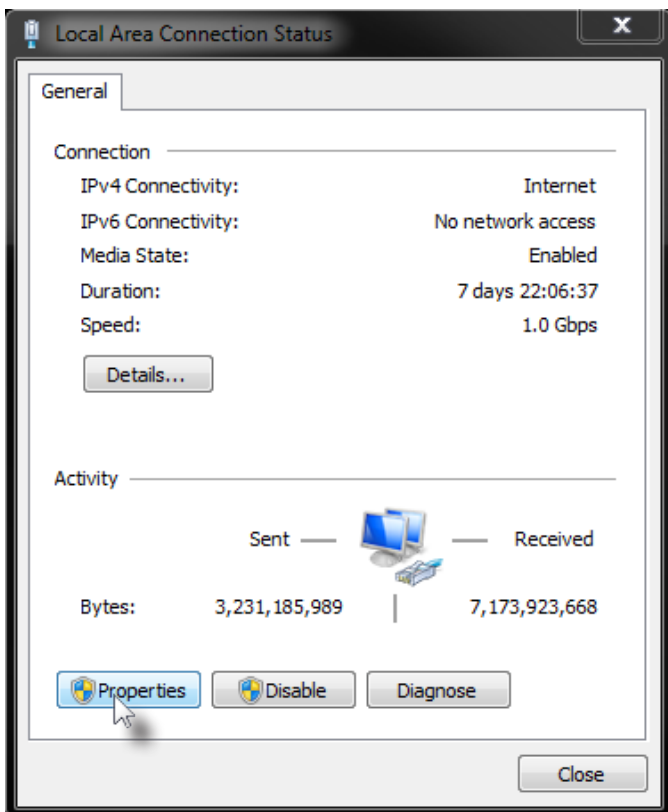
6.   Click on **Internet Protocol Version 4 (TCP/IPv4)**.
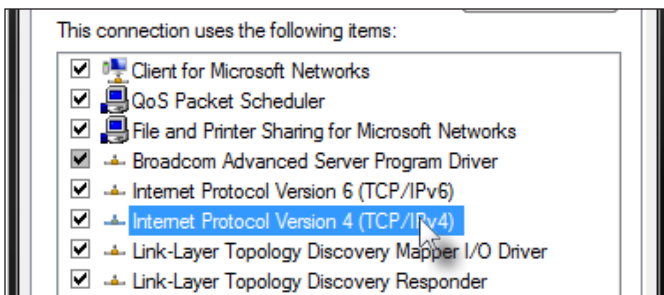
7.   Click the **Properties** button to display the **Internet Protocol Version 4 (TCP/IPv4) Properties** dialog.

> **STOP:** If the computer that is connected **does not** use *Obtain an IP address automatically* and *Obtain DNS server address automatically*, write down the current IP settings before making changes, in order to restore them later.

8.   Change the IP address field to an IP address that is within the range of the Sender unit. We will use an IP address of `169.254.7.1`, since it is unused.

Click the **Use the following IP address** radio button

Clear these boxes

Click the **Use the following DNS server address** radio button

9. Click the **OK** button, then close all Control Panel windows.

10. Launch a Web browser and type in the IP address for the Sender unit. In our example, the IP address for the Sender unit is `169.254.7.8`

11. The Sender unit page will now be displayed.
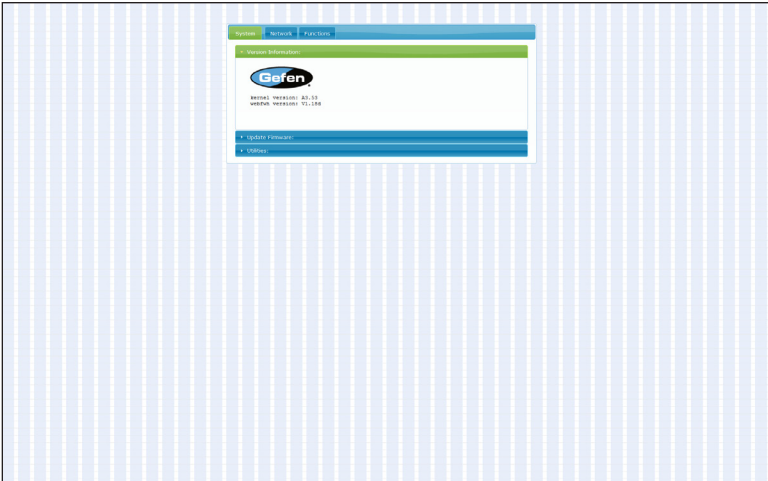
Because we have already configured the IP address for the computer that will be accessing the Web page for the Sender unit, we can also access the Receiver unit.

12. To access the Receiver unit, disconnect the network cable from the Receiver unit and connect the computer directly to the Receiver unit. Once the computer is connected, enter the IP address of the Receiver unit to access the Web interface on the Receiver unit. As long as the Sender and Receiver units are within the same address range, this procedure only needs to be performed once.

13. We can now proceed to change the network configuration to *Static IP mode* or *DHCP mode*.

See the next page for details on configuring Static IP Mode and *DHCP mode*.

Configuring Static IP Mode

1. Access the Web interface of the Sender (host) unit by entering the IP address of the Sender (or Receiver) unit in a Web browser. See Accessing the Web Interface.

2. Once the Web page is displayed, click the Utilities bar to expand it.

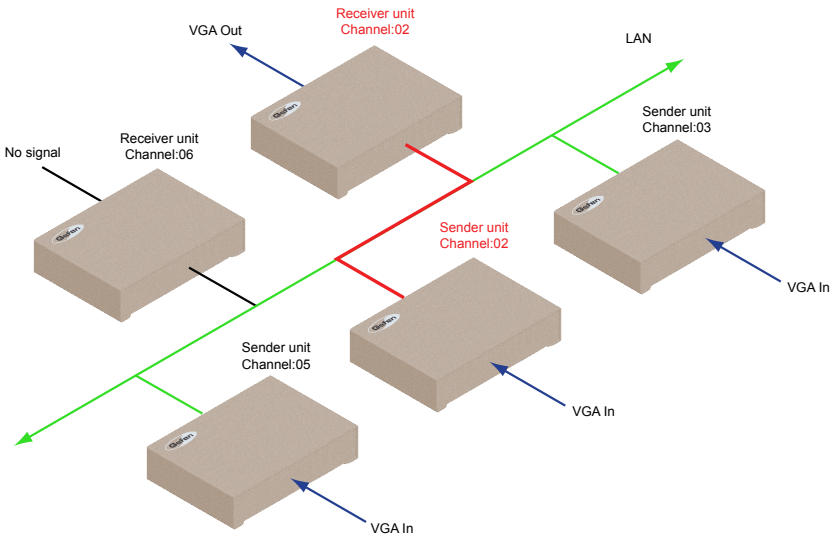3. Click the Console API Commmand text box and type the following command line (all on one line). Make sure to replace the IP address (`192.168.1.100`) and the net mask (`255.255.255.0`) with the desired values.

    ```
    astparam s ip_mode static; astparam s ipaddr 192.168.1.100;
    astparam s netmask 255.255.255.0; astparam save; reboot
    ```

4. Click the **Apply** button.

Configuring DHCP Mode

As stated earlier, the VGA KVM over IP ships in *DHCP mode*. In order to return to *DHCP mode*, use the following procedure:

1. Access the Web interface of the Sender (host) unit by entering the IP address of the Sender (or Receiver) unit in a Web browser. See Accessing the Web Interface.

2. Once the Web page is displayed, click the Utilities bar to expand it.

3. Click the Console API Commmand text box and type the following command line:

    ```
    astparam s ip_mode dhcp; astparam save; reboot
    ```

4. Click the **Apply** button.

Setting the Video Channel

In order for the Receiver unit to acquire the desired source (connected to the Sender unit), the Sender and Receiver unit(s) must be set to the same channel. It's very similar to changing the channel on a cable box or television. This applies when using both *multiple and single* Sender units. By default, the Sender and Receiver units are set to channel 0 (zero).

We will use the illustration below as an example and assign channel 02 to both a Sender and Receiver unit.

VGA Out

Receiver unit
Channel:02

LAN

No signal

Receiver unit
Channel:06

Sender unit
Channel:03

Sender unit
Channel:02

VGA In

Sender unit
Channel:05

VGA In

VGA In

1. On the bottom of each Sender unit (see), is a 16-position rotary switch. Alphanumeric characters, 0 through F, are printed on the black portion of the switch.
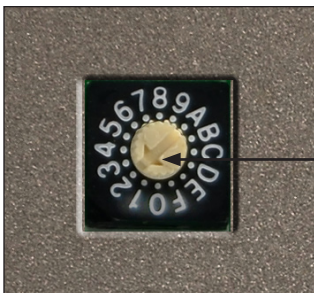
Arrow indicator

2. Use a small flat-head screwdriver to gently rotate the knob to the desired channel. The arrow indicator on the knob always indicates the current channel. For example, to simulate the illustration above, rotate the channel switch to the "2" position.

3. Reboot the Sender unit for the channel-change to take effect. Rebooting the Sender unit (or the Receiver unit) can be performed in one of three ways: 1) Disconnect and reconnect the power supply. 2) Click the **Reboot** button on the Web interface. 3) Type `reboot` in the **Console API Command** text box and click the **Apply** button.
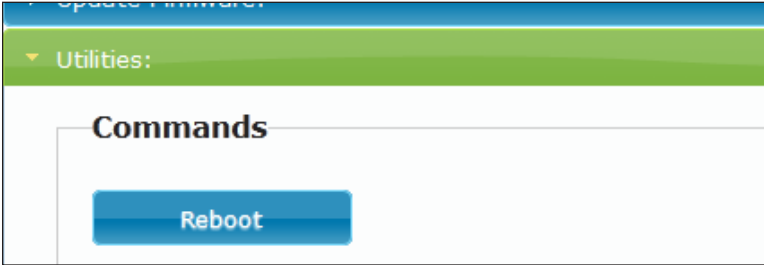
4. Press the **Switch** button on the front panel of the Receiver unit.

5. The current channel will be displayed. In this example, we will assume that the Receiver channel is currently set to channel 0. Because the Receiver unit is not set to the same channel as the Sender unit, the source signal is not displayed.

6. Once the current channel is displayed, consecutively press the **Switch** button on the front panel of the Receiver unit until "Channel 02" is displayed.

    If the channel is not changed within a specific amount of time, the current channel setting will disappear from the screen. If this is the case, press the **Switch** button once to display the current channel.

> **TIP:** The current channel of the Receiver unit can always be displayed, without changing the channel, by pressing the **Switch** button once.

7. After a few moments, the source signal will appear on the display.

We can see from our example that since both the Sender and Receiver unit have been set to channel 02, the source is being displayed. However, the other Receiver unit, in the illustration on page 23, is set to Channel 06. This Receiver unit will not receive any video data unless one of the remaining two Sender units is set to channel 06.

> **NOTE:** The VGA KVM over IP can be used with up to 16 Sender units to provide switching capability between each Receiver unit. Up to 256 Receiver units are supported. Each Receiver unit can be set to receive video data from any one of 16 Sender units.

Unicast and Multicast Modes

The VGA KVM over IP has two operating modes: *Unicast* and *multicast*. In *unicast mode*, only a single Receiver unit can display video using multiple (or a single) Sender unit on the same network. In *Multicast mode*, multiple Receiver units can receive signals from multiple (or a single) Sender unit on the same network. By default, the VGA KVM over IP is shipped in *unicast mode*.

Configuring Unicast Mode

> **NOTE:** As mentioned earlier, the VGA KVM over IP is shipped in *unicast mode*. If the units are configured in *multicast mode*, the following procedure will not need to be performed after unpacking and connecting the product.

To illustrate an example of how *unicast mode* works, we will use the following diagram. We have arbitrarily set up three Sender units and two Receiver units. For reference, we will identify the Sender units as 1 through 3 and the Receiver units A and B.
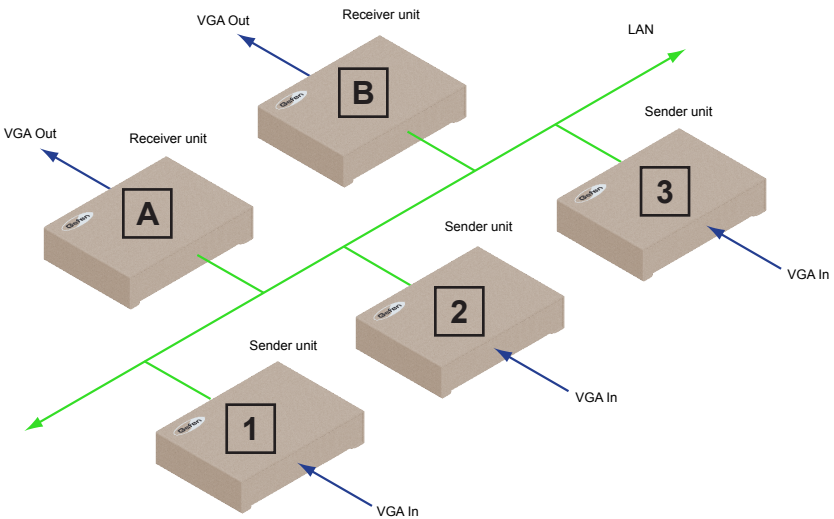
1.   Access the Web interface for each Sender and Receiver unit that will be using *unicast mode*. In this example, we will start with Receiver A.

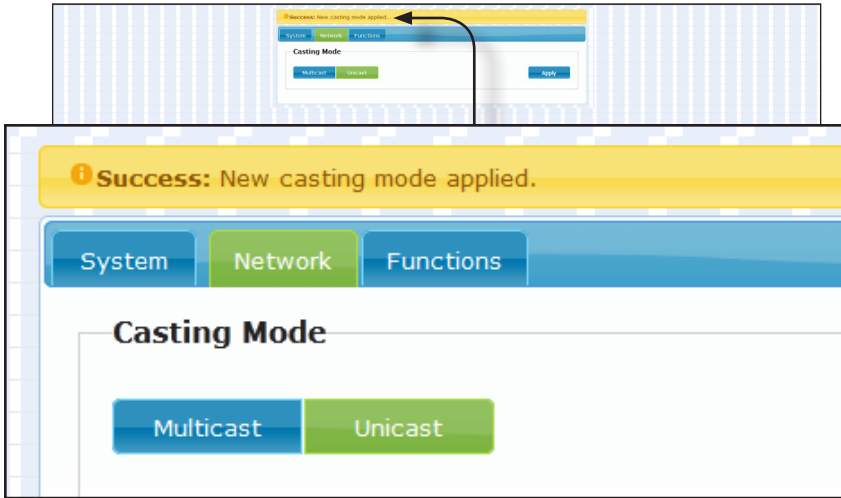> **TIP:** In *multicast mode*, the VGA KVM over IP behaves as an VGA KVM Splitter.

2.   Click the Network tab and click the **Unicast** button. When selected, the **Unicast** button will be highlighted in green.
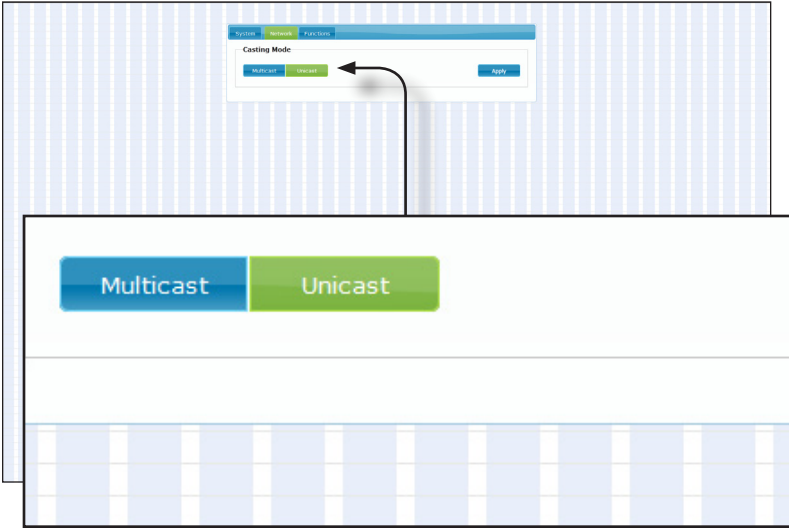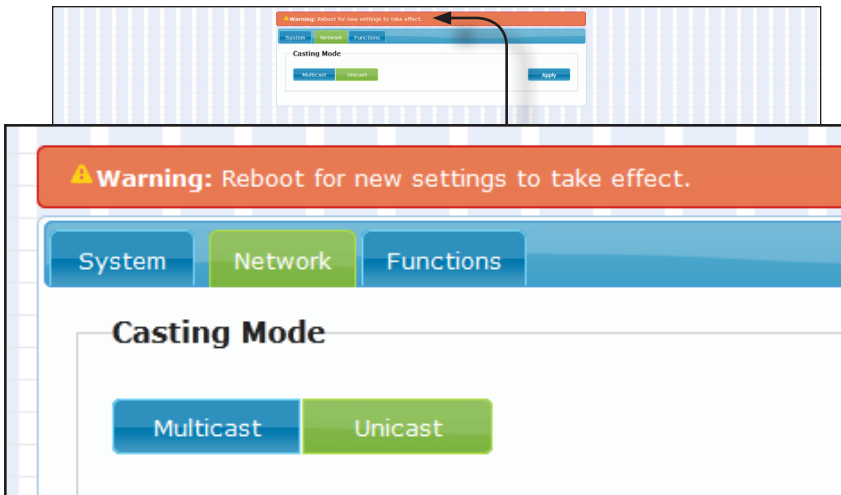

3.   Click the **Apply** button.
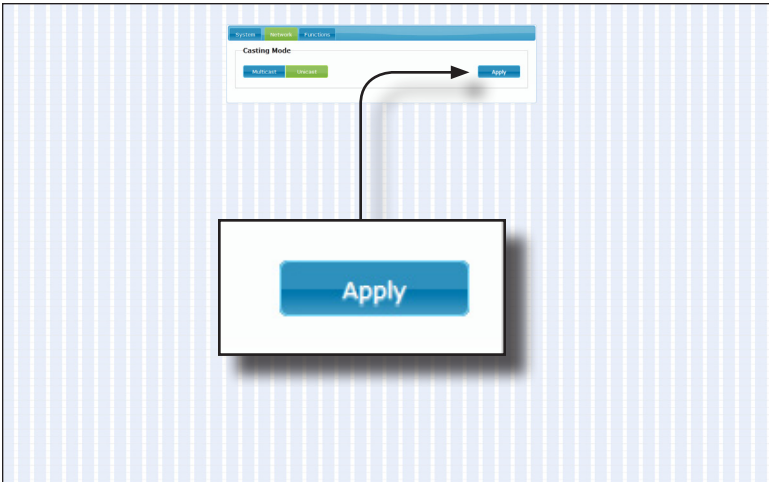
4.   A message will be displayed, indicating that the casting mode has been applied to the Receiver unit.


5.   After a few moments, another message will be displayed stating that the Receiver unit must be rebooted in order for the new settings to take effect.

6.   Reboot the Receiver unit by one of these methods: 1) Disconnect and reconnect the power supply. 2) Click the **Reboot** button on the Web interface. 3) Type `reboot` in the **Console API Command** text box and click the **Apply** button.

7.   Repeat steps 1 through 6 for each Sender and Receiver on the network.

Now that each device has been configured, we need to specify which channels will be used by each Sender and Receiver unit.

It is important to note that when using *unicast mode*, that only one Receiver can display video at a time from the selected channel. Let's illustrate this using our original diagram. We've added some numbers in red to denote which channels are being used by each Sender and Receiver. The channel numbers are arbitrary.
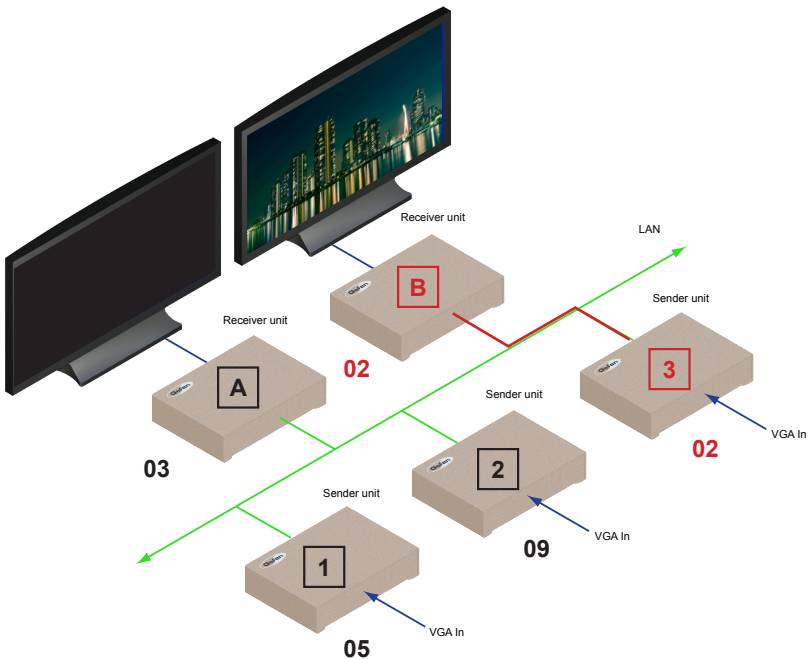
In this example above, Receiver unit B is set to channel 02 and Receiver A is set to channel 03. Sender unit 3 is also set to channel 02. As expected, the source signal (indicated by the red line) from Sender unit 3 appears on the display connected to Receiver unit B.

Switching between displays in Unicast mode

In order to control which display receives the source signal, press the **Switch** button on the Receiver unit to change the channel. For example, let's say we want to send the VGA source to Receiver unit A.
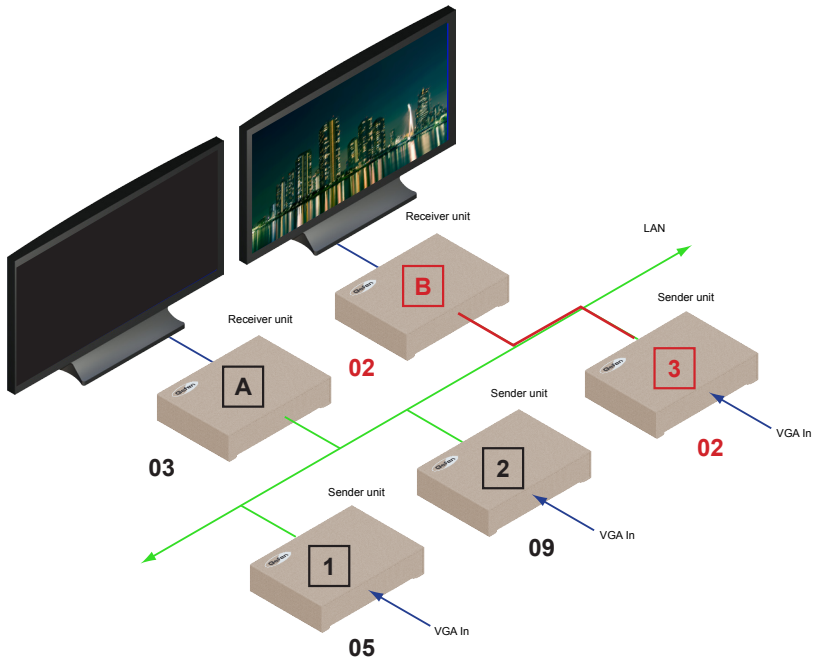
1.   Press the **Switch** button on Receiver unit A and set the channel to 02.

At this point, both Receiver unit A and Receiver unit B are set to channel 02. However, because the VGA KVM over IP is in *unicast mode*, only <u>one</u> Receiver can display the source signal (from a Sender unit) at a time. Since Receiver unit B was set to channel 02, first, Receiver unit B has priority and will continue to receive the source signal until its channel is changed.

Once Receiver A is set to channel 02, the message "Trying to find gateway" will be displayed, as shown on the next page.

> **TIP:** In *unicast mode*, the VGA KVM over IP behaves as an VGA KVM Switcher.

```
Channel:02




                                    FW: 12-Dec-24 b6e4
                                    Local IP: 192.168.1.8
                                    Remote IP: 192.168.1.7
    Trying to find the gateway...   ID: 82B9969C6B9E
```

2. To release Receiver unit B from receiving the VGA source signal, press the **Switch** button and change the channel on Receiver unit B to something other than channel 02. For this example, we'll set Receiver unit B to channel 03.

    Receiver unit A will now display the VGA source signal.
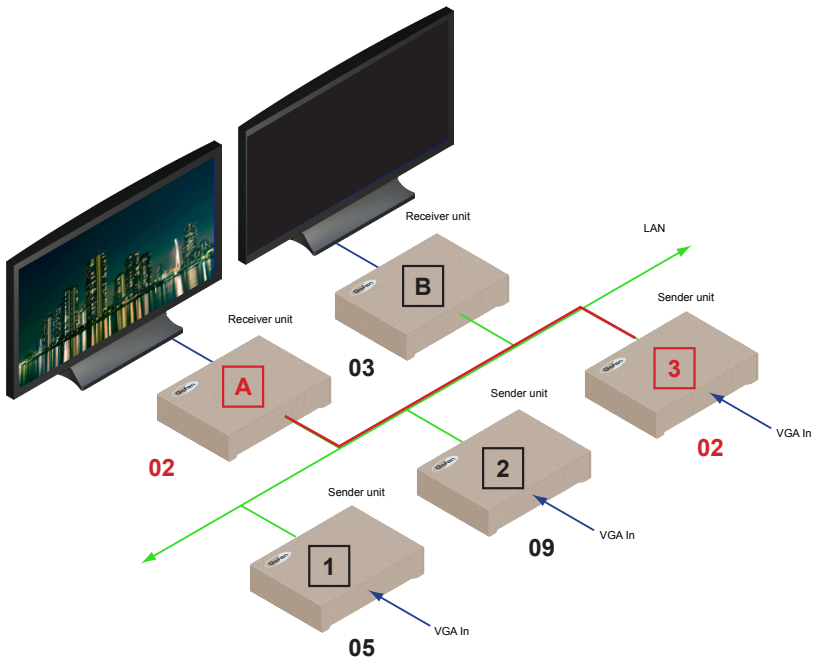
Configuring Multicast Mode

> **NOTE:** When using *multicast mode*, use a Gigabit switch with "Jumbo Frame" capability (enabled) to ensure the best video quality.

To illustrate an example of how *multicast mode* works, we will use the same diagram that was used in Configuring Unicast Mode. Once again, we have arbitrarily set up three Sender units and two Receiver units. For reference, we will identify the Sender units as 1 through 3 and the Receiver units A and B.
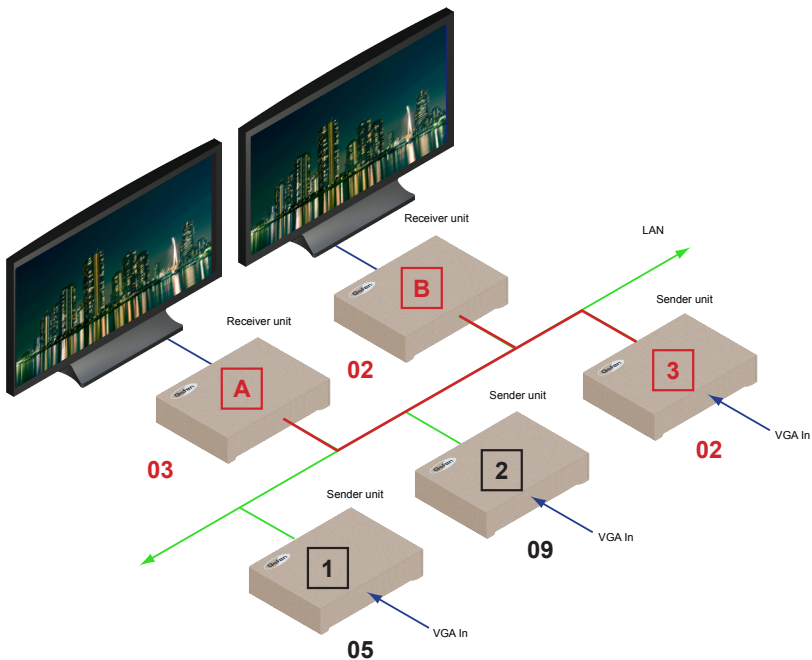
1. Access the Web interface for each Sender and Receiver unit that will be using *multicast mode*. In this example, we will start by configuring Receiver unit A.

2. Click the Network tab and click the **Multicast** button. When selected, the **Multicast** button will be highlighted in green (see Configuring Unicast Mode for a reference to the Web interface).

3. Click the **Apply** button.

4. A message will be displayed, indicating that the casting mode has been applied to the Receiver unit.

5. After a few moments, another message will be displayed stating that the Receiver unit must be rebooted in order for the new settings to take effect.

Using RS-232

The VGA KVM over IP supports RS-232 pass-through, allowing the control of remote RS-232 devices (near the Receiver unit) from the source (Sender unit) location. The RS-232 host (controller) and device (client) must be set to the same baud rate. In addition, the correct baud rate must be set on the Sender and Receiver units which are being used to control the RS-232 client.

In the example below, the *Gefen 4x1 HD Switcher w/ Audio Decoding* (Gefen part no. GTV-AUDDEC-N) has been connected to Receiver unit A. This is the RS-232 client. We want to control this product from Sender unit 3, using a laptop PC (RS-232 host). We have arbitrarily assigned channel 12 to both the Sender and associated Receiver unit.
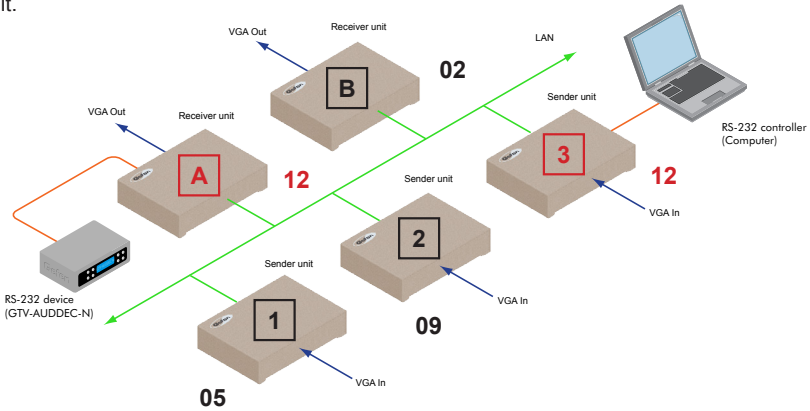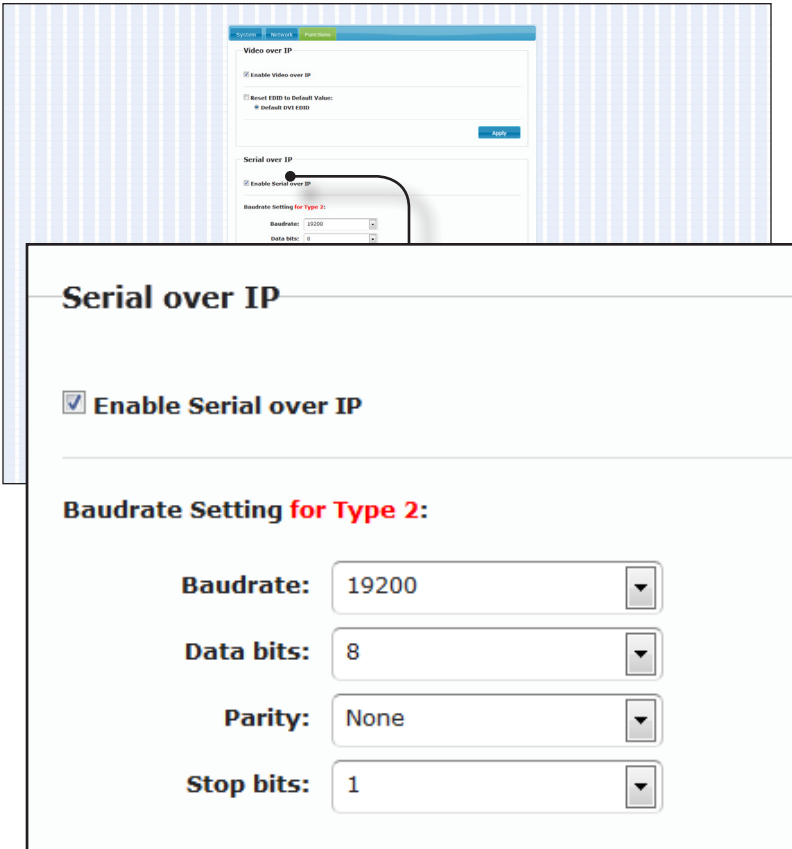
If we look in the user manual for the GTV-AUDDEC-N, we will see that we need to use the following settings in order to control it from the laptop PC:

Description	Setting
Baud rate	19200
Data bits	8
Parity	None
Stop bits	1
Hardware flow control	None

Therefore, we need to set Sender unit 3 and Receiver unit A to the same settings. This is done by accessing the Web interface on both the Sender unit and Receiver unit. In this example, we will begin by setting up Sender unit 3.

1. Access the Web interface for Sender unit 3.

2. Click the **Functions** tab and locate the **Serial over IP** section (shown on the next page).

3. Make sure that the **Enable Serial over IP** box is checked.

> **NOTE:** If the Enable Serial over IP is not checked, then RS-232 pass-through will be disabled.

4. Select the baud rate of the RS-232 controller by selecting it from the drop-down list in the **Baudrate** field.

5. Repeat this process for the **Data bits**, **Parity**, and **Stop bits**. The VGA KVM over IP does not support flow control.

6. Click the **Apply** button in the lower right-hand corner of the screen.
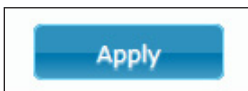
7. A message will be displayed, indicating that the new Serial over IP settings have been applied to the Sender unit.
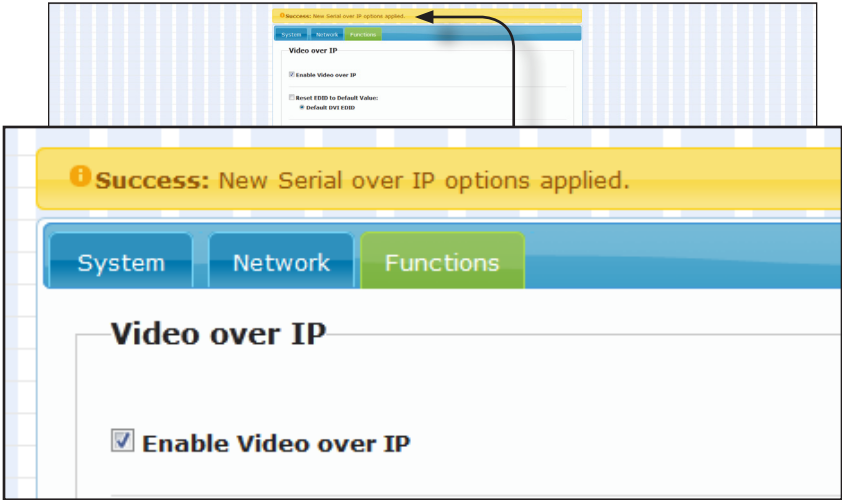
8. After a few moments, another message will be displayed stating that the Sender unit must be rebooted in order for the new settings to take effect.
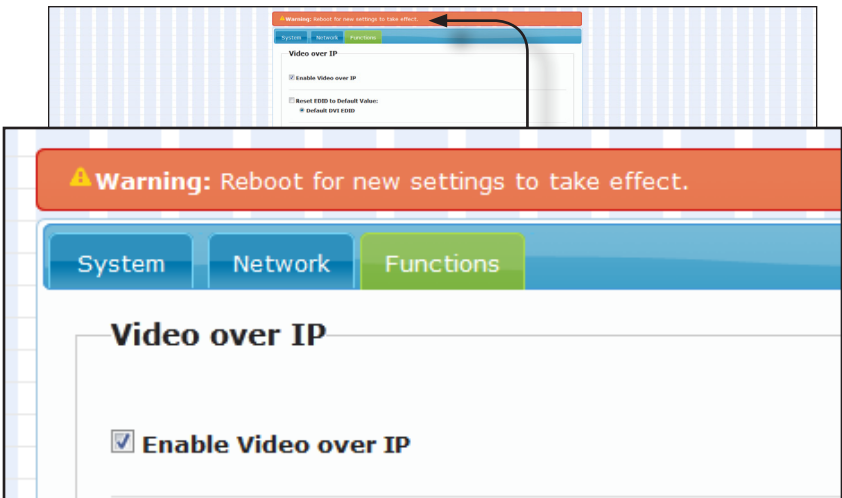
9. Reboot the Sender unit by one of these methods: 1) Disconnect and reconnect the power supply. 2) Click the **Reboot** button on the Web interface. 3) Type `reboot` in the **Console API Command** text box and click the **Apply** button.

10. Repeat steps 1 through 9 for each Sender and Receiver on the network that will be using RS-232.

    Note that the RS-232 feature behaves similar to video when using *unicast* or *multicast* modes:

► **Unicast Mode**

    When in *unicast mode*, only a single Receiver will be able to communicate with the RS-232 host (Computer) device, as shown below:
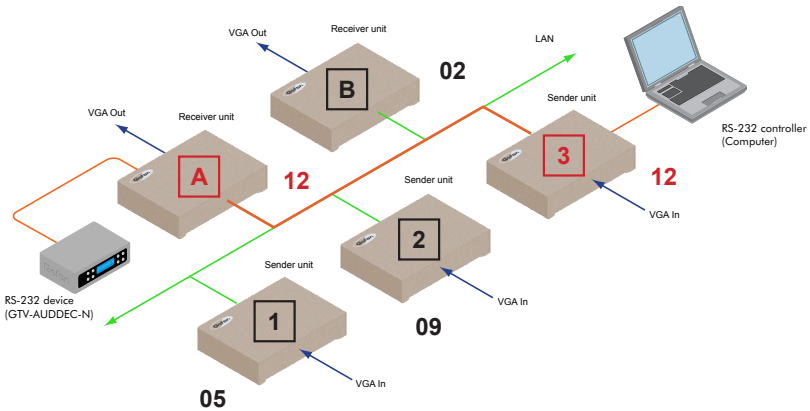
► **Multicast Mode**

    When using *multicast mode*, multiple Receiver units will be able to communicate with the RS-232 host (Computer) device.

    For instance, if we expand on our original example by connecting a Gefen 4x1 HD Switcher to Receiver A, B, and C (not shown), then we could control all three devices simultaneously.

USB Control

When connecting USB devices to the VGA KVM over IP, the functionality is similar to that of video and RS-232.

As an example, we will connect a computer to the Sender unit 2 and a mouse device to Receiver unit B. Since we are connecting a USB (mouse) device to only one of the Receiver units, it does not matter whether we are in *unicast* or *multicast* mode.

1.   Connect the USB host device to the Sender unit.
2.   Connect up to two USB devices to the Receiver unit(s).
3.   The mouse device can now be used to control the computer that is connected to Sender unit 2.
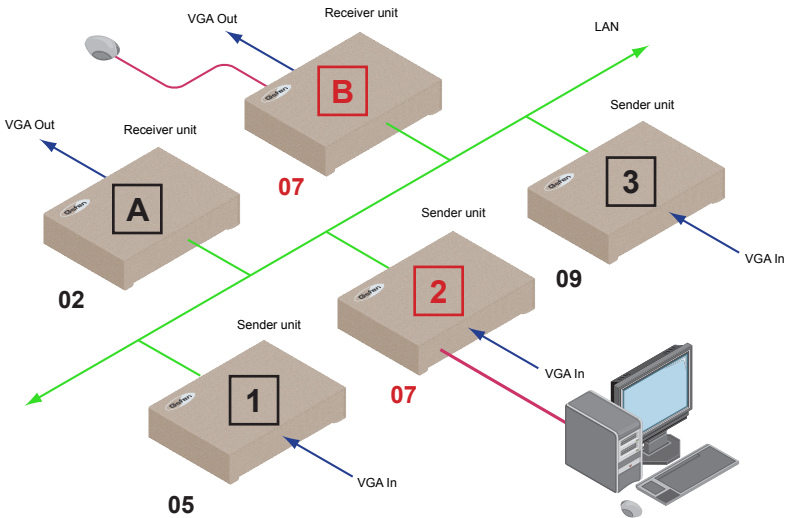
► **Unicast Mode**

In *unicast mode*, only a single Receiver unit will be able to communicate with a Sender unit. However, multiple USB devices can be connected to multiple Receiver units. Use the **Switch** button to change channels to the desired Receiver unit.

► **Multicast Mode**

In *multicast mode*, the USB host device can be controlled from multiple Receiver units at one time. When using *multicast mode*, the **Switch** button must be pressed on each Receiver unit in order to enable USB on each Receiver unit. In *multicast mode*, the VGA KVM over IP behaves like a USB hub.

Connecting multiple mouse / keyboard devices to each Receiver unit makes little sense if multiple users are attempting to control the same computer. However, if different USB devices are connected, each remote station (Receiver unit) can use a USB device without interference.

Audio Input and Output

To illustrate how audio works with the VGA KVM over IP, we will set up a microphone and some speakers. Since we already have a mouse device connected to our computer, we will continue using the setup illustrated on the previous page. The Sender and Receiver unit are set to *unicast mode*.

1.   Our computer has a **Mic In** jack, as part of the sound card. However, we want to be able to access this jack from the Receiver unit. Therefore, connect the microphone to the **Mic In** jack on the Receiver unit.

Connect microphone

2.   In order to get the audio from the microphone into the computer, connect a 3.5mm-to-3.5mm mini-stereo cable from the **Line Out** jack on the Sender unit to the **Line In** jack on the computer.

⚠️ **WARNING:** DO NOT connect the cable from the **Line Out** jack on the Sender unit to the **Mic In** jack on the computer. Doing so will result in audio "clipping" and may cause damage to the sound card.

Connect to **Line Out** on computer

Sender unit

Connect to **Line In** on computer
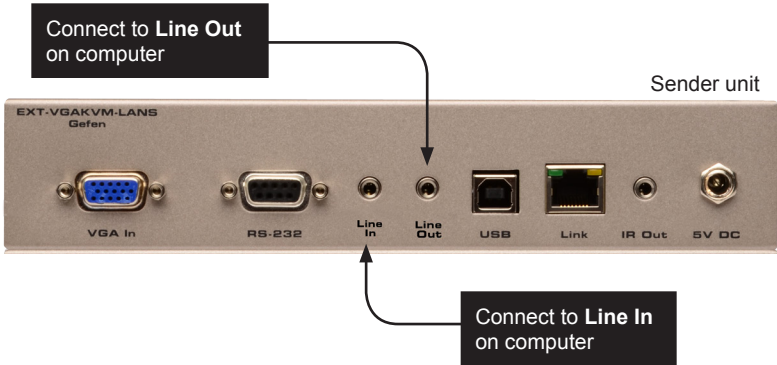
3.   Now let's connect another 3.5mm-to-3.5mm mini-stereo cable between the **Line Out** jack on the computer and the **Line In** jack on the Sender unit.

4.   Finally, we'll connect our computer speakers to the **Line Out** jack on the Receiver unit.

Connect to computer speakers

Let's take a look at our setup. All new audio connections that were made are highlighted in blue. We could also have connected a Blu-ray player, instead of the multimedia PC (indicated by the dark-blue dashed line).

Note that in the diagram, below, we have indicated (using the cyan-colored dashed line) that either the computer or an MP3 player (or other audio device) can be connected to the **Line In** jack on the Sender unit. Of course, if another device is connected to the **Line In** jack on the Sender unit (instead of the computer), then the audio signal coming from the microphone will not be heard.
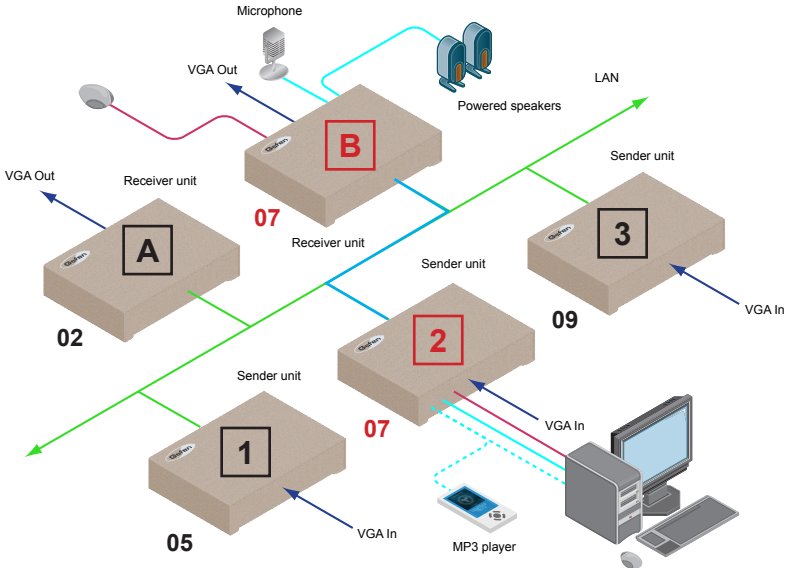
When using a microphone, the audio behavior will differ between *unicast* and *multicast* mode:

► **Unicast Mode**

In *unicast mode*, separate microphones can be connected to each Receiver unit. The audio signal coming from the microphone will be sent to the Sender unit on the same channel as the Receiver unit. If a microphone is not being used, an external audio device (e.g. iPod, etc), can be used to send audio from each Sender unit to each Receiver unit.

► **Multicast Mode**

The **Mic In** jack is disabled in *multicast mode*.   However, if an audio source is connected to the **Line In** jack on a Sender unit, the audio signal will be distributed to all Receiver units which are set to the same video channel. Each Receiver unit would have a separate pair of power speakers connected to the **Line Out** jack.

Disabling / Enabling Video

This can be useful when 'masking' video which prevents it from being displayed. This feature is available under the **Functions** tab on both the Sender (host) and Receiver (client) Web interface, as shown below.

Uncheck this box to disable video
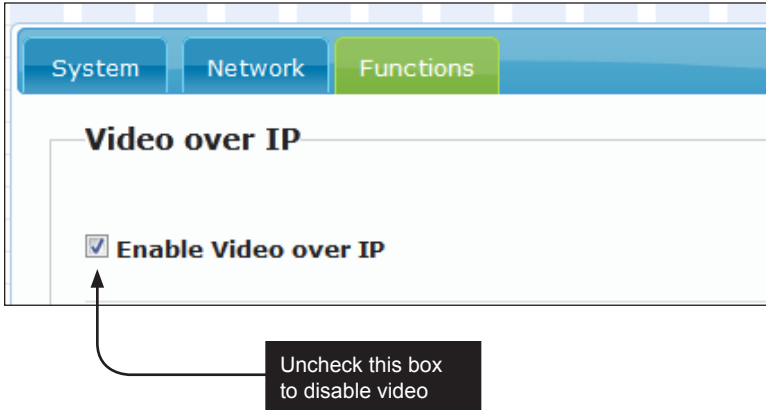
► **Unicast Mode**

In *unicast mode*, either the desired Receiver unit or the Sender unit can be disabled.

► **Multicast Mode**

In *multicast mode*, the behavior is the same as *unicast mode*.

Video Modes

The VGA KVM over IP provides two video modes: Video Mode and Graphic Mode. Consecutively pressing the **Mode** button on the Sender unit will toggle between Video Mode and Graphic Mode.

• If the VGA signal is a video source, press the **Mode** button on the front panel of the Sender unit until "Video Mode" is displayed in the foreground of the video image. Set the VGA KVM over IP to Video Mode to optimize the frame rate.
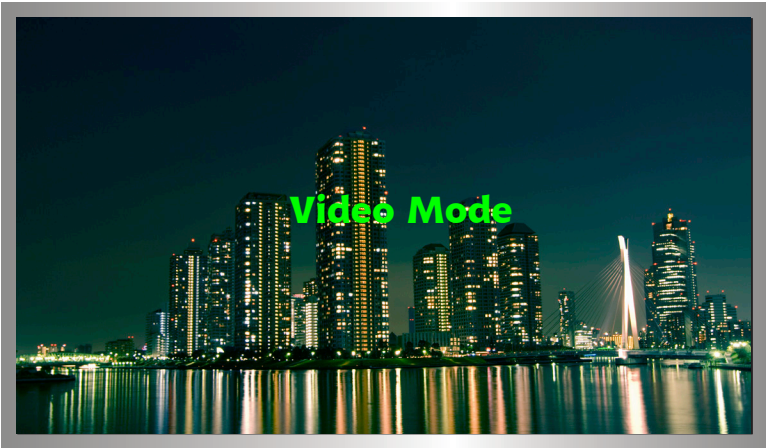
• If the VGA signal is a graphic source (e.g. images, pattern generator, etc.), press the **Mode** button on the front panel of the Sender unit until "Graphic Mode" is displayed in the foreground of the graphic image.   Set the VGA KVM over IP to Graphic Mode to maintain the sharpest image possible
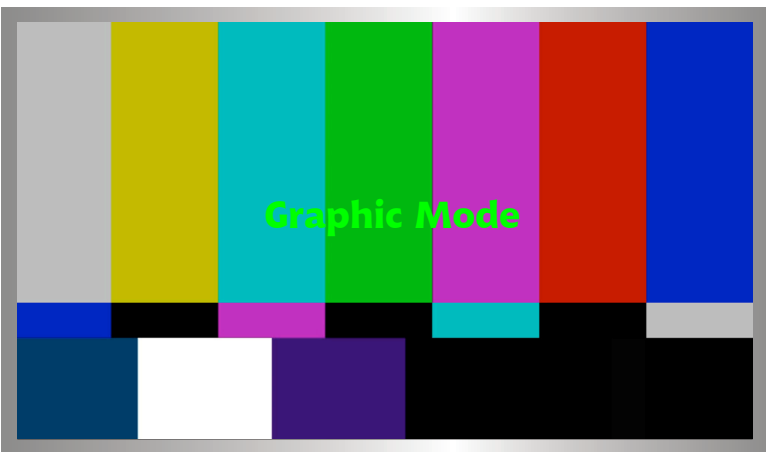
EDID Management

The VGA KVM over IP features EDID Management. Before the source can send video (and/or audio) data, the source device (connected to each Sender unit) reads the EDID (Extended Display Identification Data) from the displays which are connected to each Receiver unit. The EDID contains information about what type of audio/video data can be accepted from the source.

By default, the internal VGA EDID (stored in the Sender unit) is used. However, a downstream EDID (from a display, etc) can be retrieved and stored in the Sender unit.

Storing a Downstream EDID

For this example, we will use our original set up. We are currently using the default VGA EDID but now we want Display A to use the same EDID as Display B.
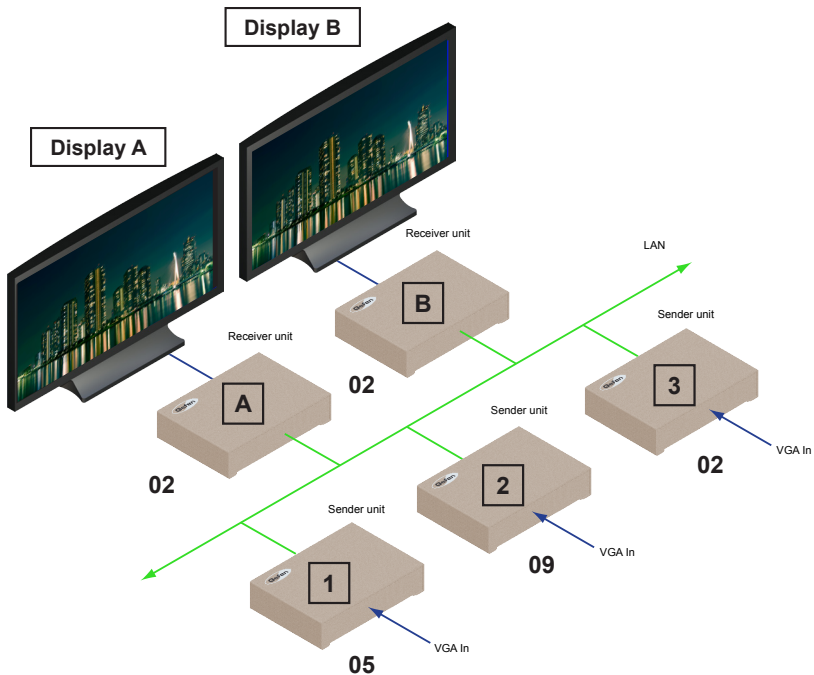
1.   Access the Web interface for the Sender unit.

2.   Make sure that the **Reset EDID to Default Value** is not checked. If the box is checked, then uncheck the box and click the **Apply** button. Reboot the Sender unit to save the changes.

EDID Management

Video over IP

☑ Enable Video over IP

☐ Reset EDID to Default Value:
   ⦿ Default DVI EDID

Make sure this
box is not checked

Sender unit

> **NOTE:** Selecting or deselecting any check box within the Web interface will not automatically enable or disable the feature. Always click the **Apply** button then reboot the unit to save the changes
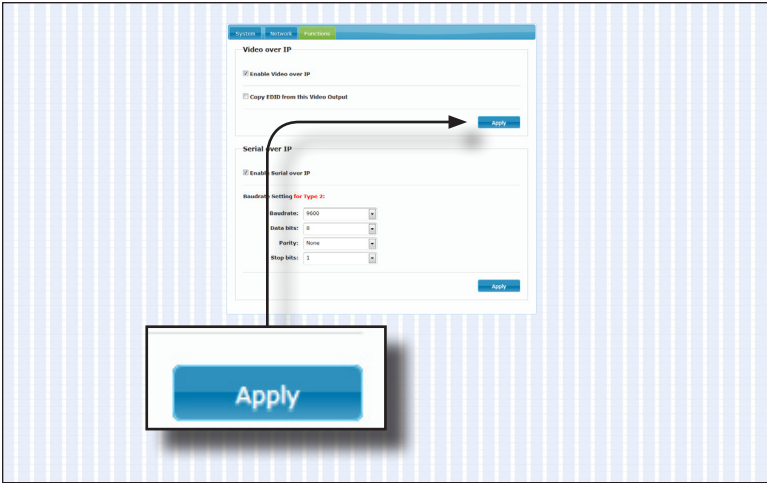
3.   Access the Web interface for the Receiver unit that is connected to Display B.

4.   Click the **Copy EDID from this Video Output** check box.

Video over IP

☑ Enable Video over IP

☑ Copy EDID from this Video Output

Check this box

Receiver unit

5.   Click the **Apply** button within the **Video over IP** section.

6.   Reboot the Receiver unit by one of these methods: 1) Disconnect and reconnect the power supply. 2) Click the **Reboot** button on the Web interface. 3) Type `reboot` in the **Console API Command** text box and click the **Apply** button.

      The EDID from Display B will now be used by the Sender unit (Sender 3). If any other Receiver units with displays are connected to the network, these displays will also use the EDID from Display B.
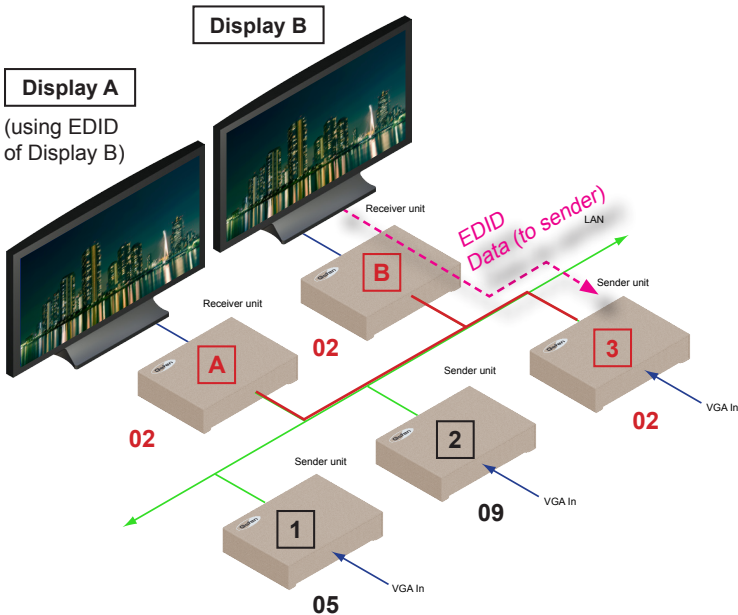
Restoring the Default EDID

Beginning with our last example (see diagram on previous page), we will restore the default VGA EDID used by the Sender unit (used when the unit is shipped).

1.   Access the Web interface for Receiver unit B which was used to transmit the EDID to the Sender unit.
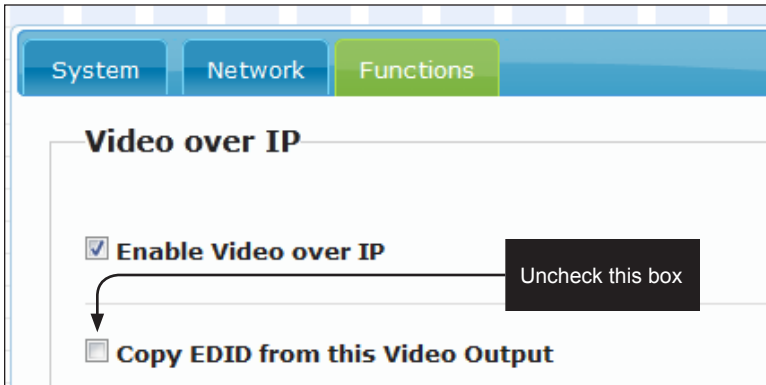
2.   Uncheck the **Copy EDID from this Video Output** check box, then click the **Apply** button within the **Video over IP** section.

3.   Reboot the Receiver unit.

      BEFORE CONTINUING: If other Receiver units are connected, repeat steps 1 -3.

4.   Access the Web interface for the Sender unit that is being used by the VGA source.
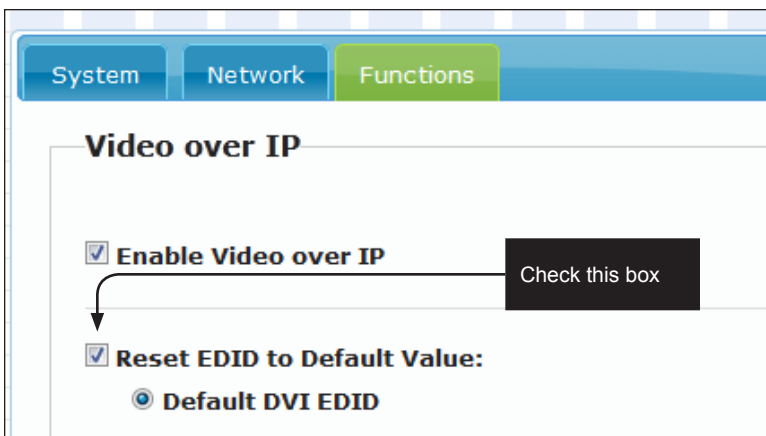
5.   Check the **Reset EDID to Default Value** check box.

6.   Click the **Apply** button within the **Video over IP** section.

7.   Reboot the Sender unit.

The default EDID (within the Sender unit) will now be used by read by each display. When each display reads the EDID of the VGA source, it will read the default VGA EDID stored in the Sender unit.
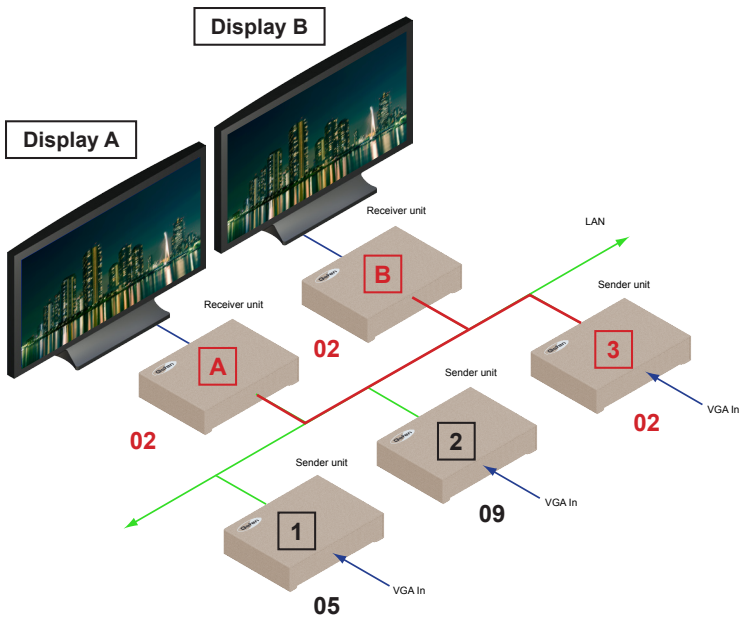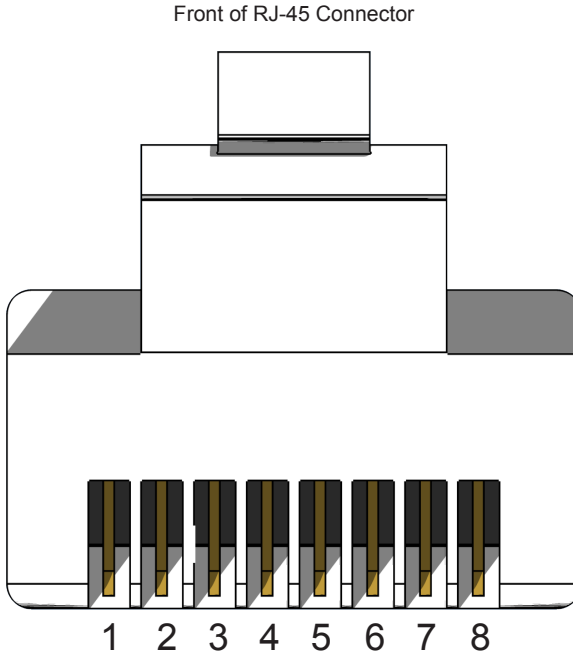
VGA KVM Over IP

03 Appendix

Network Cable Diagram

Front of RJ-45 Connector

1 2 3 4 5 6 7 8

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

CAT-5, CAT-5e, and CAT-6 cabling comes in stranded and solid core types. Gefen recommends using solid core cabling. CAT-6 cable is also recommended.

It is recommended to use one continuous run from one end to the other. Patch cable is not recommended.
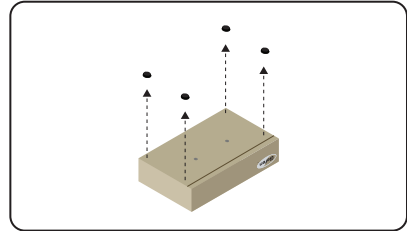
Rack Tray Installation

The following illustrations provide instructions for installing the Sender and/or Receiver unit(s) in the *Gefen 1U Rack Tray* (Gefen part no. EXT-RACK-1U).
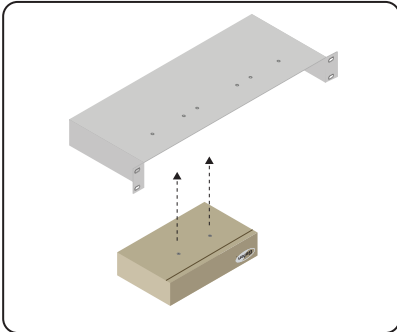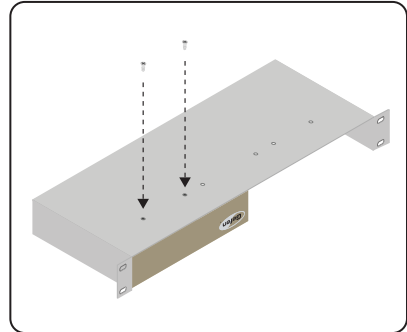
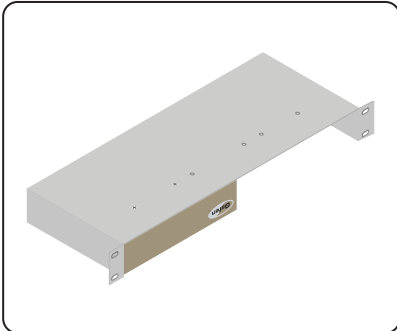**Step 1** Turn unit upside down.
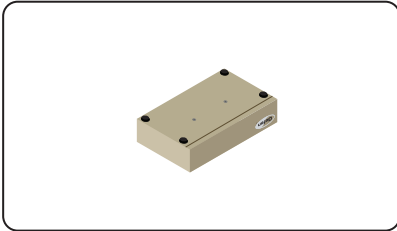
Step 2 Remove rubber feet.

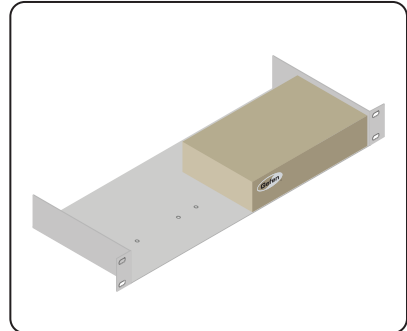**Step 3** Line up holes on unit and rack tray.

Step 4 Install countersink screws .

Step 5 Ensure the unit is installed securely.

Step 6 Unit has been installed into rack tray.

Specifications

Supported Formats	
Resolution (max.)	• 1920 x 1200 (WUXGA)

Electrical	
Maximum Pixel Clock	• 350 MHz
Link indicator (Sender / Receiver)	• 1 x LED, green
Power indicator (Sender / Receiver)	• 1 x LED, blue

| Connectors	
Video Input (Sender)	• 1 x VGA HD-15, female
Video Output (Receiver)	• 1 x VGA HD-15, female
Audio (Sender)	• 1 x 3.5mm mini-stereo (Line In) • 1 x 3.5mm mini-stereo (Mic Out)
Audio (Receiver)	• 1 x 3.5mm mini-stereo (Line Out) • 1 x 3.5mm mini-stereo (Mic In)
USB (Sender)	• 1 x Type B, female
USB (Receiver)	• 2 x Type A, female
Ethernet (Sender)	• 1 x RJ-45
Ethernet (Receiver)	• 3 x RJ-45, shielded
IR Emitter (Sender)	• 1 x 3.5mm mini-mono jack
IR Emitter (Receiver)	• 1 x 3.5mm mini-stereo jack
RS-232 (Sender)	• 1 x DB-9, female
RS-232 (Receiver)	• 1 x DB-9, male

Control	
Reset button (Sender)	• 1 x Push button, tact-type
Mode button (Sender)	• 1 x Push button, tact-type
Selector switch (Sender)	• 1 x 16-position, rotary-type
Switch button (Receiver)	• 1 x Push button, tact-type

Operational	
Power Input (Sender / Receiver)	• 1 x 5V DC, locking
Power Consumption (Sender / Receiver)	• 10W (max.)

Physical	
Dimensions (W x H x D) (Sender / Receiver)	• 8.4" x 1.7" x 4.5" (213mm x 43mm x 113mm)
Unit Weight (each unit)	• 2 lbs (0.9 kg)
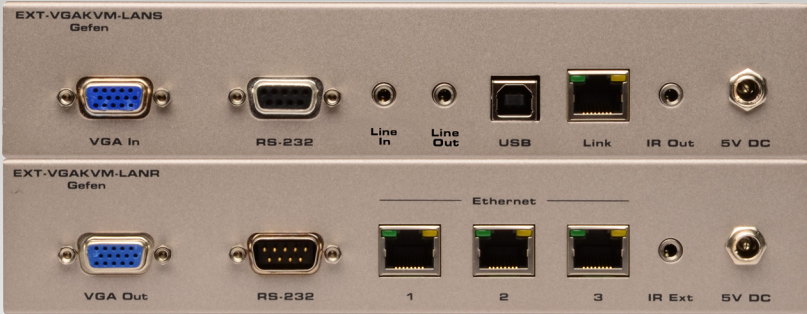
Stretch it, Switch it, Split it, Control it.
Gefen's got it. ®

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