

KDS-EN6, KDS-DEC6 Minimum Network Requirements

KDS-EN6 / KDS-DEC6 runs on standard 1 Gigabit Ethernet networks. This document outlines the minimum network requirements for deployment. For more information, refer to the *Kramer AV over IP Deployment Guide*, available at www.kramerav.com/downloads/KDS-EN6.

Network Switch

Use non-blocking Layer 3 managed network switches with:

- 1 Gigabit port for every connected KDS device.
- Multicast forwarding or filtering enabled.
- Jumbo Frames frame size up to 9216.
- IGMP Layer 2.

Network Switch Setting

Feature	Single Switch Networking	Cascade Networking	
		Core Switch	Extender Switch
Jumbo Frames	Supported frame size up to 9216		
IGMP Snooping	Enabled		
Multicast Forwarding or Filtering	Enabled		
IGMP Querier	Enabled	Enabled	N/A
IGMP Snooping Fast Leave	Enables	Disabled	Enabled

Cascade Network Deployment Notes

- Verify that trunk ports on a switch used to connect to other switches are properly configured.
- While computing trunk uplink bandwidth utilization, note that any multicast sources (encoders) connected to the original switch must send all their data to the master IGMP (Internet Group Management Protocol) querier / multicast router. If another switch is the master IGMP querier / multicast router, the multicast traffic must flow to that switch.



KRAMER



USER MANUAL

MODELS:

KDS-EN6

Video Encoder

KDS-DEC6

Video Decoder

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 14 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Video Products; GROUP 12: Digital Signage; GROUP 13: Audio; and GROUP 14: Collaboration.

Congratulations on purchasing your Kramer **KDS-EN6** Video Encoder and **KDS-DEC6** Video Decoder, which are ideal for the following typical applications:

- Real-time essential installations such as sports bars and interactive solutions.
- AV distribution systems with one or more sources and many displays in schools, universities, and public venues.
- Long-distance transmission of signals using existing wires and infrastructure in corporate offices or government applications.
- Advanced applications requiring recording, archiving, scaling and more.

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual



Go to www.kramerav.com/downloads/KDS-DEC6 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **KDS-EN6** / **KDS-DEC6** away from moisture, excessive sunlight and dust



This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

2.2 Safety Instructions



Caution: There are no operator serviceable parts inside the unit

Warning: Use only the Kramer Electronics power supply (purchased separately)

Warning: Disconnect the power and unplug the unit from the wall before installing

2.3 Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at www.kramerav.com/support/recycling/.

3 Overview

Kramer MegaTOOL® **KDS-EN6** Encoder and **KDS-DEC6** Decoder units provide AV over IP network and include 4K video, audio, IR, RS-232 and USB over IP with HDCP 2.2.

KDS-EN6 / KDS-DEC6 features:

- Video Support – HDMI™ 4K@60Hz (4:2:0), HDMI 4K@30Hz (4:4:4).
- Audio Support – HDMI/line in, 7.1 PCM, Dolby True-HD, and DTS-HD Master audio.
- Virtualization – IR, USB, RS-232 over IP.
- Network – Managed switch, 1G, multicast, jumbo frames, IGMP snooping layer 2.
- Power – PoE or external power supply.
- Control – Kramer Network, Kramer Control, Web UI, API.
- HDCP – 2.2 compliance.
- Flexible video wall setups.
- Size – MegaTOOLS® letting you mount two units side-by-side in a 1U rack space with the optional **RK-T2B** rack adapter.

3.1 Defining KDS-EN6

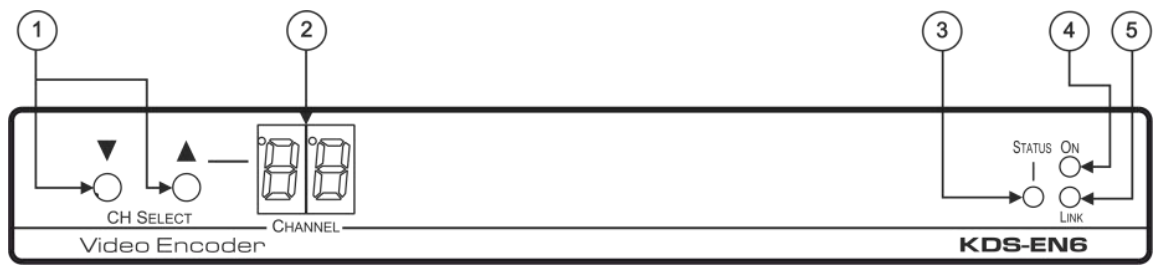


Figure 1: KDS-EN6 Video Encoder Front Panel

#	Feature	Function
1	CH SELECT Buttons	Press the up or down arrow buttons to select the channel ID
2	CHANNEL Display	Displays the selected channel. If the channel number exceeds 99, the 100 indicator turns on (for example, channel 124 appears as “°24”)
3	STATUS LED	Identifies a device in a system. When sending a P3K FIND-ME command to the system, the LED of the device to be identified flashes for 5 seconds
4	ON LED	Flashes during power up and lights when on
5	LINK LED	On when a KDS-EN6 to KDS-DEC6 link is established and is transmitting A/V signals

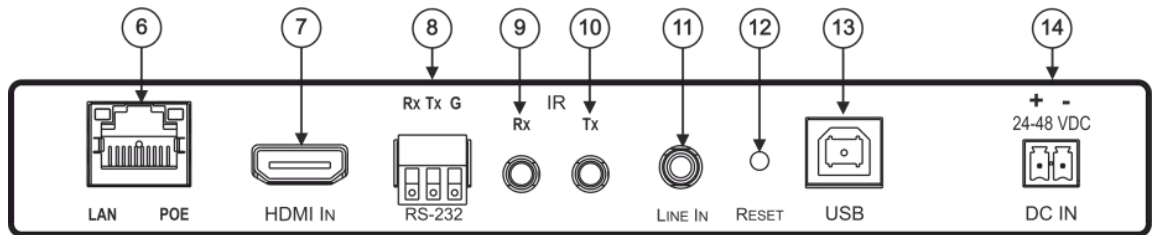


Figure 2: KDS-EN6 Video Encoder Rear Panel

#	Feature	Function
6	LAN/POE RJ-45 Connector	Connect the KDS-EN6 to the network using recommended Kramer cables. Note that this port supports power over Ethernet (PoE) LAN LED Green LED flashes during data transmission POE LED Orange LED lights when power is supplied
7	HDMI IN Connector	Connect an HDMI source
8	RS-232 (Rx,Tx,Gnd) Terminal Block Connectors	Connect to an RS-232 controller device (to control a device on the decoder side)
9	IR RX on a 3.5mm Mini Jack	Connect to a receiver
10	IR TX on a 3.5mm Mini Jack	Connect to an emitter
11	LINE In on a 3.5mm Mini Jack	Connect to an audio source
12	RESET Button	Press to reset KDS-EN6 to its default settings
13	USB Type B Port	Connect to a USB host, for example, a PC
14	DC IN 24~48VDC Power Terminal Block Connector	Connect to the Kramer power adapter (DC voltage range should be 24V to 48V), purchased separately (PN: 60-0009390)

3.2 Defining KDS-DEC6

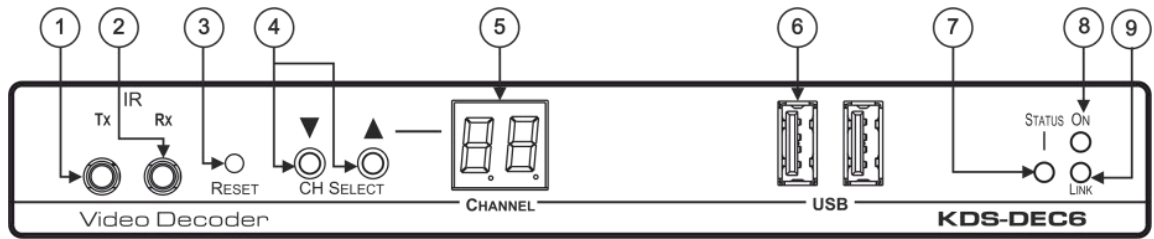


Figure 3: KDS-DEC6 Video Decoder Front Panel

#	Feature	Function
1	IR TX on a 3.5mm Mini Jack	Connect to an emitter
2	IR RX on a 3.5mm Mini Jack	Connect to a receiver
3	RESET Button	Press to reset KDS-DEC6 to its default settings
4	CH Select Buttons	Press the arrow buttons up or down to select the channel ID
5	CHANNEL Display	Displays the selected channel. If the channel number exceeds 99, the 100 indicator turns on (for example, channel 125 appears as "025")
6	USB Type A Ports (2)	Connect to a mouse and keyboard
7	STATUS LED	Identifies a device in a system. When sending a P3K FIND-ME command to the system, the LED of the device to be identified flashes for 5 seconds
8	ON LED	Flashes during power up and lights when on
9	LINK LED	On when a KDS-EN6 to KDS-DEC6 link is established and transmitting A/V signals

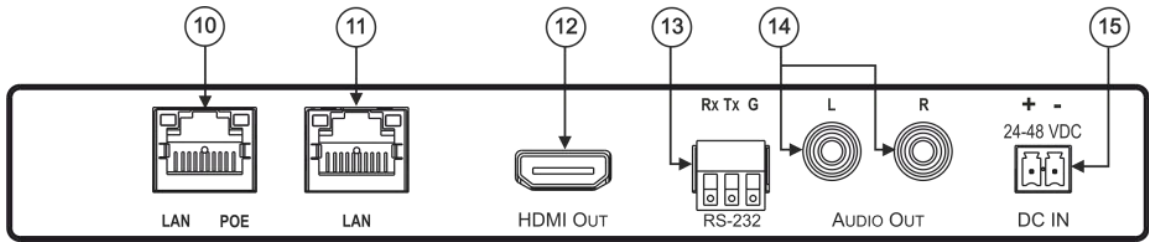



Figure 4: KDS-DEC6 Video Decoder Rear Panel

#	Feature	Function
10	LAN/POE RJ-45 Connector	Connect the KDS-EN6 to the network using the recommended Kramer cable. Note that this port supports power over Ethernet (PoE) LAN LED Green LED flashes during data transmission POE LED Orange LED lights when power is supplied
11	LAN RJ-45 Connector	Connect the KDS-DEC6 to the network or directly to the KDS-EN6 using the recommended Kramer cable.
	 Use the LAN port (that is not used for connecting to the network or directly to the encoder) to connect to the next KDS-DEC6 device in a daisy chain configuration	
12	HDMI Out Connector	Connect to an HDMI acceptor
13	RS-232 (Rx, Tx, Gnd) on Terminal Block Connectors	Connect to an RS-232 controlled device
14	L, R Audio on RCA Connectors	Connect to a powered speaker or an amplifier
15	DC IN 24~48VDC Power Terminal Block Connector	Connect to the Kramer power adapter (DC voltage range should be 24V to 48V), purchased separately (PN: 60-0009390)

4 Initial Setup

Before installing the **KDS-EN6/KDS-DEC6**:

- Set a static IP address or set it automatically via DHCP.
- Set the channel number.



If the channel number exceeds 99, the indicator on the display lights.

The **KDS-EN6** and **KDS-DEC6** can be powered either via PoE (using the RJ-45 LAN/POE port) if available or via a 24-48V DC power adapter.



If 24-48V DC power is connected, PoE is disabled automatically.

KDS-EN6 and **KDS-DEC6** IP address and channel number can be set using:

- The channel buttons on the **KDS-EN6 / KDS-DEC6**, see [Section 4.1](#).
- The embedded web pages, see [Section 4.2](#).

4.1 Initial Setup via Channel Buttons

The initial setup includes setting the following:

- IP address
- Channel number

4.1.1 Setting the IP Address

To set the **KDS-EN6 / KDS-DEC6** IP address via channel buttons:

1. Connect the **KDS-EN6 / KDS-DEC6** LAN/POE RJ-45 port to your network (if your network does not support PoE, connect a 24-48V DC power adapter). The ON LED lights green and the LINK flashes (indicating that no streaming activity is detected).
2. Press and hold ▼ for 3 seconds.
3. Press ▲ or ▼ to select DH (DHCP) or SC (static) IP address setup.

4. If you selected DHCP (for Static, go to the next step):
 - For **KDS-DEC6**, press and hold ▲ or ▼ for 3 seconds to save your selection.
The channel display flashes "--" 3 times and the device reboots.
 - For **KDS-EN6**, the channel display flashes "ID" 3 times.
Continue to set the channel number for the **KDS-EN6**.



When setting to DHCP we recommend that you contact your IT administrator for setting the system IP addresses.

5. If you selected Static, press and hold ▲ or ▼ for 3 seconds to save your selection.
The channel display flashes "IP" 3 times and the device reboots.
6. Press ▲ or ▼ to set the IP address.



You can only define the last three digits of the IP address when setting the IP address via the channel buttons. To change the entire IP address, go to [Section 4.2.1](#)).

7. Press and hold ▲ and ▼ for 3 seconds to save your selection.

4.1.2 Setting the Channel Number

The **KDS-DEC6** channel number is set by simply pressing the ▲ or ▼ buttons at any time.

The **KDS-EN6** channel number can be set **immediately after** the IP address is set (via either static or DHCP).

To set the channel number for the encoder:

1. Wait until the channel display flashes "ID" 3 times.
2. Press ▲ or ▼ to select the channel number.
3. Press and hold ▲ and ▼ for 3 seconds to save your selection.
The channel display flashes "--" 3 times and the device reboots.

4.1.3 Viewing the IP Address and Channel Number

You can view the current IP address and channel number any time.

To view the IP address and channel number:

1. Press and hold ▲ for 3 seconds.
2. The channel display shows “IP” for 3 seconds and then shows the IP address for 3 seconds followed by the channel number.

4.2 Initial Setup via Web Pages

Use the web pages to set the:

- IP address, see [Section 4.2.1](#).
- Channel numbers, see [Section 4.2.2](#).

4.2.1 Setting the IP Address via Web Pages

Using the embedded web pages you can change the entire IP address.

To set the IP address:

1. Connect the **KDS-EN6 / KDS-DEC6** Ethernet port to the Network and power the device (either by using the power adapter or via PoE).
2. Access the embedded Web pages (see [Section 6](#)).
3. In the Network tab (see [Section 6.3](#)) select the IP mode.
4. If you selected Static, type in the IP address.



When setting to DHCP we recommend that you contact your IT administrator for setting the system IP addresses.

5. Click **Apply** and reboot the device.

4.2.2 Setting the Channel Number via Web Pages

Use API commands to set channel numbers.



A **KDS-EN6** channel number usually remains constant during normal operation. However, a **KDS-DEC6** channel number must be modified according to the channel number of the currently linked encoder (for example, in a matrix configuration). This enables linking to different encoders in the network

To set the channel number:

1. Connect the **KDS-EN6 / KDS-DEC6** Ethernet port to the Network and power the device (either using the power adapter or via PoE).
2. Access the embedded Web pages (see [Section 6](#)).
3. In the System tab select Utilities (see [Section 6.1.3](#)).
4. In the Console API Command text box enter the following command:

For the **KDS-EN6**:

- `"astparam s multicast_ip 225.0.100.X; astparam s hostname_id 000X; astparam s reset_ch_on_boot n; astparam save;"`

where X=Channel number, for example:

for multicast_ip: 225.0.100.8 or 225.0.100.10

for hostname_id: 0008 or 0010

- Click **Apply**.
- Power cycle the device

For the **KDS-DEC6**:

- `"Switchto X"`
where X=Channel number
- Click **Apply**.



API commands can also be entered directly via Telnet. The default is Telnet port 24. Use "root" to log in. No password is required.

5 Connecting the KDS-EN6 and KDS-DEC6



Always switch off the power to each device before connecting it to your **KDS-DEC6**. After connecting your **KDS-DEC6**, connect its power and then switch on the power to each device.

Before connecting the **KDS-EN6** and **KDS-DEC6** note that:

- When connecting **KDS-EN6** to **KDS-DEC6** via the Ethernet, use a 1 Giga LAN switch and make sure that jumbo frame (over 8k) and IGMP snooping are enabled.
- The **BC-UNIKAT** cable length connecting **KDS-EN6/KDS-DEC6** to the network should not exceed 330 feet (100m).
- The **KDS-EN6** operates with a default EDID. If you need to copy the EDID from the acceptor, do so via the Web pages.

Following the initial setup (see [Section 4](#)), you can configure the **KDS-EN6** and **KDS-DEC6** devices in any of the following ways:

- **Unicast setup:** single encoder-decoder unicast connection, see [Section 5.1](#).
- **Multicast configuration setup:** a multicast setup can include any of the following configurations:
 - One encoder to many decoders, see [Section 5.2](#).
 - Many encoders to many decoders (matrix switcher configuration), see [Section 5.3](#).
 - Video wall configuration, see [Section 5.4](#).
- **KVM (Keyboard, Video, Mouse) setup:** many encoders to a single decoder see [Section 5.5](#).

5.1 KDS-DEC6/KDS-EN6 Unicast Installation

You can use one **KDS-EN6** device and one **KDS-DEC6** device to configure an encoder and decoder system (see [Figure 5](#)).

The encoder and decoder devices can be connected directly or via LAN.



Always switch off the power to each device before connecting it to your **KDS-DEC6/KDS-EN6**. After connecting your **KDS-DEC6/KDS-EN6**, connect its power and then switch on the power to each device.

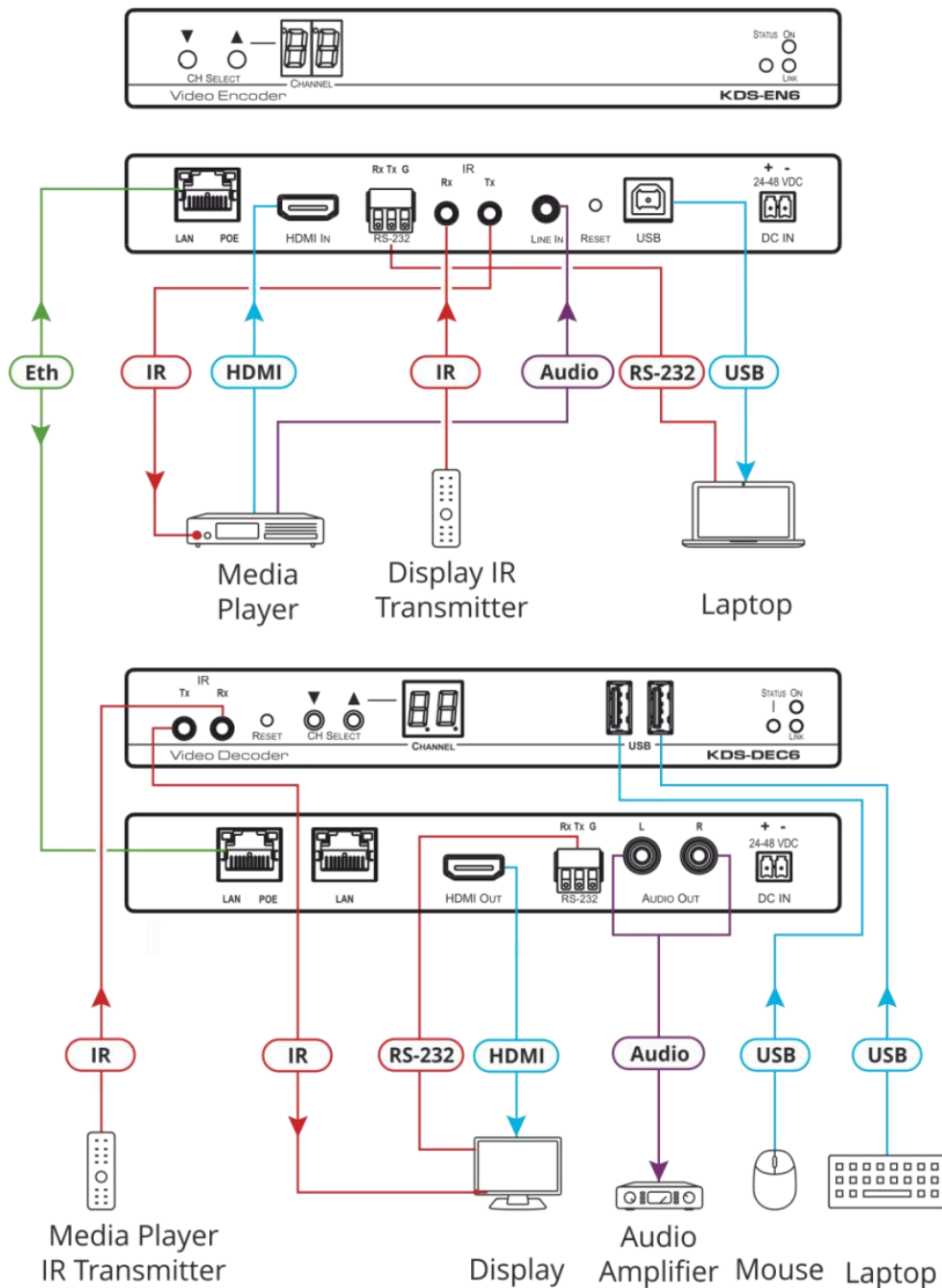


Figure 5: Connecting an Encoder and Decoder System



When connecting the encoder-decoder system over the network, connect the LAN-PoE RJ-45 port on the **KDS-EN6** to the Ethernet and on the other side connect the Ethernet to the LAN-PoE/Lan RJ-45 port on the **KDS-DEC6**.

To connect the encoder and decoder system as shown in the example in

[Figure 5](#):

1. On the **KDS-EN6**, connect an HDMI source (for example, a media player) to the HDMI IN connector.
2. On the **KDS-DEC6**, connect the HDMI OUT connector to an HDMI acceptor (for example, a display).
3. Connect the LAN RJ-45 connector on the **KDS-DEC6** directly to the LAN RJ-45 connector on the **KDS-EN6** using an Ethernet cable (or via LAN).
4. If you are not powering the device via PoE, connect the **KDS-DEC6** and the **KDS-EN6** to the 24-48V DC power adapter and connect the adapter to the mains electricity (not shown in [Figure 5](#)).
5. If required, connect a PC and/or controller to the RS-232 terminal block connector on the **KDS-EN6**.
6. If required, connect the USB ports:
 - On the **KDS-EN6** connect a PC to the USB type B port.
 - On the **KDS-DEC6** connect a mouse and a keyboard to the two USB type A ports.
7. If required, connect an unbalanced stereo audio source to the **KDS-EN6** (for example, the media player's audio signal) and an unbalanced stereo audio acceptor (for example, speakers) to the **KDS-DEC6**.



You do not have to use all the possible control options.

8. If required, control the media player connected to **KDS-EN6** from the decoder side via IR:

- On the **KDS-DEC6**, connect a Kramer External IR Sensor cable to the IR Rx 3.5mm mini jack.
- On the **KDS-EN6**, connect a Kramer IR Emitter cable to the IR Tx 3.5mm mini jack and attach the emitter to the IR receiver on the media player.

The media player's remote control sends a command while pointed at the External IR Sensor. The IR signal passes through the ETH cable and the IR Emitter to the media player. The media player responds to the command.

9. If required, control the display connected to **KDS-DEC6** from the encoder side via IR:

- On the **KDS-EN6**, connect a Kramer External IR Sensor cable to the IR Rx 3.5mm mini jack.
- On the **KDS-DEC6**, connect a Kramer IR Emitter cable to the IR Tx 3.5mm mini jack and attach the emitter to the IR receiver on the display.

The display remote control sends a command while pointed at the External IR Sensor. The IR signal passes through the ETH cable and the IR Emitter to the display. The display responds to the command.



IR signals can be passed only between linked devices.

10. If required, control the display connected to **KDS-EN6** from the decoder side via RS-232:

- Connect an RS-232 cable from the laptop to the RS-232 terminal block connector on the **KDS-DEC6**.
- On the **KDS-EN6**, connect the RS-232 terminal block connector to the RS-232 port on the display.

RS-232 bidirectional signals can be sent between the display and the laptop connected to the **KDS-EN6**.

5.2 One-to-Many Configuration

You can set one encoder to several decoders in one of the following ways:

- **One-to-many via LAN switcher:** one encoder is connected to the input of a LAN switch and its outputs are connected to the decoders, see [Section 5.2.1](#).
- **One-to-many via daisy chain:** one encoder is connected to a decoder and all the other decoders are daisy chained to the first decoder, see [Section 5.2.2](#).

5.2.1 One-to-Many via LAN Switcher

In this configuration, the source video is streamed via the LAN switch and appears on all the displays.

The one-to-many configuration consists of one encoder that connects to a LAN switch and several decoders that connect to the LAN switch output. A display is connected to the output of each decoder.

Configure the devices:

- Verify that the **KDS-EN6** and **KDS-DEC6** devices each are set with a unique IP address (see [Section 4](#)).
- Set all the devices to the same channel number.

5.2.1.1 Mounting the System

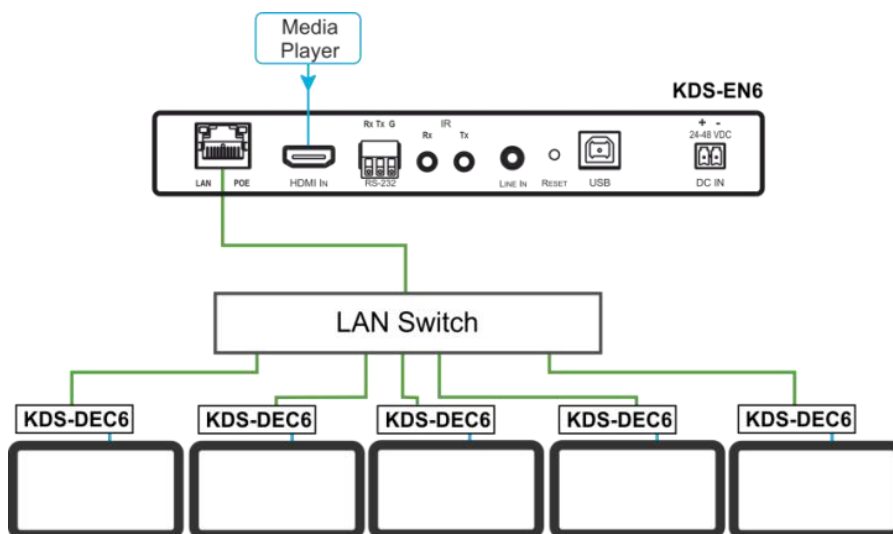


Figure 6: Connecting a One-to-Many System

5.2.2 One to Many via Daisy Chain

In this configuration, the source video is streamed via the encoder to the first decoder and the next decoders are daisy-chained to the first decoder via the second LAN port. A display is connected to the output of each decoder.

Configure the devices:

- Verify that the **KDS-EN6** and **KDS-DEC6** devices each are set with a unique IP address (see [Section 4](#)).
- Set all the devices to the same channel number.

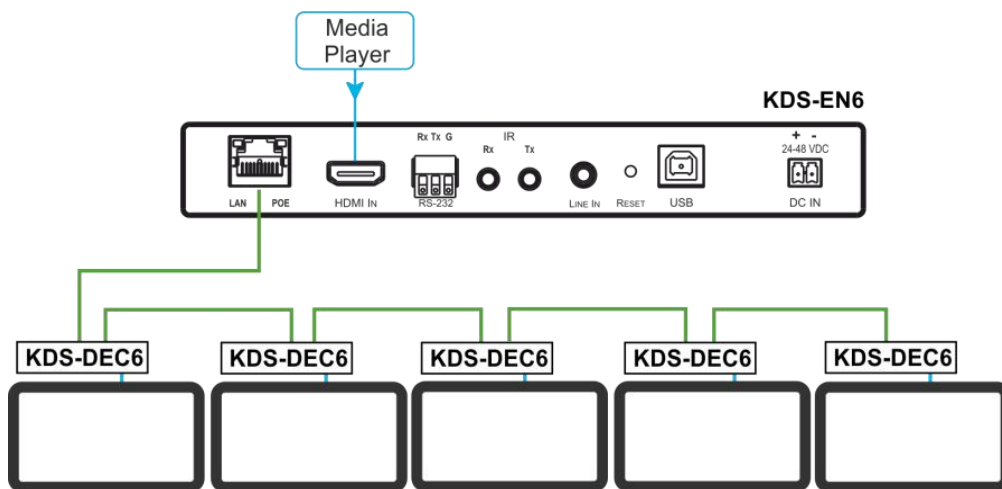


Figure 7: Connecting a Daisy-Chain System

5.3 Matrix Configuration

In this configuration, several source videos are streamed via the LAN switch and are routed to the linked decoders.

The many-to-many configuration consists of several encoders that connect to a LAN switch together with several decoders. A display is connected to the output of each decoder.

Configure the Devices:

- Verify that the **KDS-EN6** and **KDS-DEC6** devices each are set with a unique IP address (see [Section 4](#)).
- Set each encoder to a unique channel number and change the decoder

channel numbers according to the desired link to an encoder.

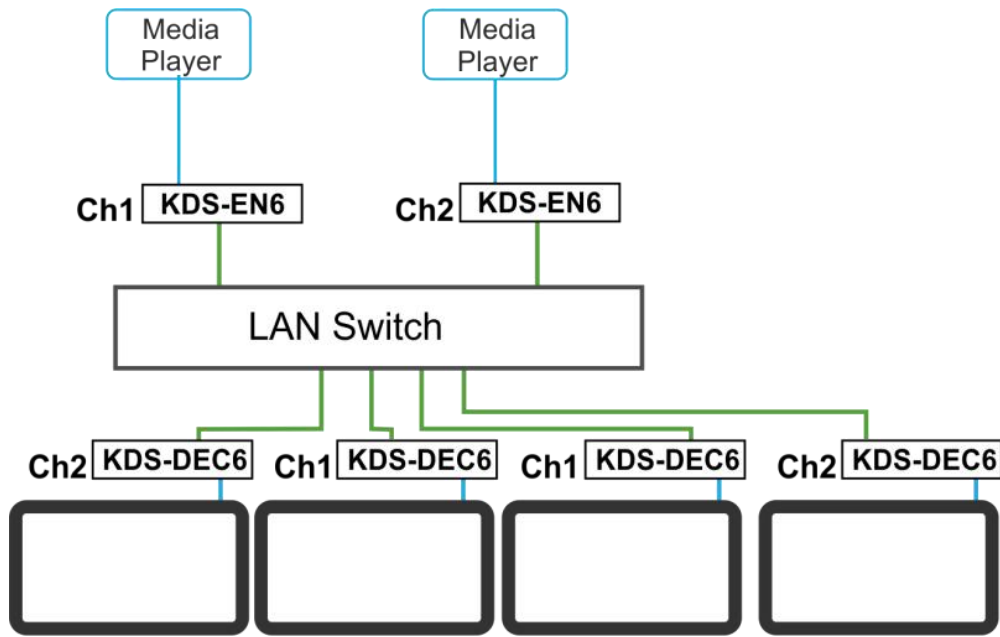


Figure 8: Connecting the KDS-EN6, KDS-DEC6 Video Encoder

5.4 Video Wall Setup

In the video wall setup, one encoder transmits a signal to a series of decoders creating a video wall configuration.

The video wall configuration consists of an encoder that connects to a LAN switch input and a series of decoders (connected to the LAN switch output) that together make up the video wall. Each screen on the video wall is connected to the HDMI output of one decoder.

The **KDS-EN6** and **KDS-DEC6** units are each defined by their location in the video wall layout. Each **KDS-EN6** is assigned a row number and defined by row number and position in the row. The position definition is unique and is usually defined once during the basic setup.

The PC controller can be connected via LAN to control the encoders and decoders that make up the video wall.

Video wall setup includes three basic steps:

- Mounting the video wall
- Setting up the devices

- Configuring the video wall

5.4.1 Mounting the Video Wall

Before mounting the video wall, verify that each device (encoder and decoders) has a unique IP address (see [Section 4.1.1](#)).



Always switch off the power to each of the peripheral devices before connecting it to your **KDS-DEC6** / **KDS-EN6**. After connecting your **KDS-DEC6** / **KDS-EN6**, connect its power and then switch on the power to each device.

To configure a video wall (for example, a 3x3 video wall):

1. Connect an HDMI source (for example, a media player) to the **KDS-EN6** HDMI IN connector.
2. Connect the **KDS-EN6** LAN/PoE RJ-45 port to the RJ-45 connector on a LAN switch.
3. Connect the RJ-45 ports on the LAN switch to nine **KDS-DEC6** units.
4. Connect the HDMI OUT connector on each **KDS-DEC6** device to a display (9 displays altogether).
5. Position the displays in a 3x3 video wall setup.
6. Check that all the system components are connected correctly.

7. Power the system.

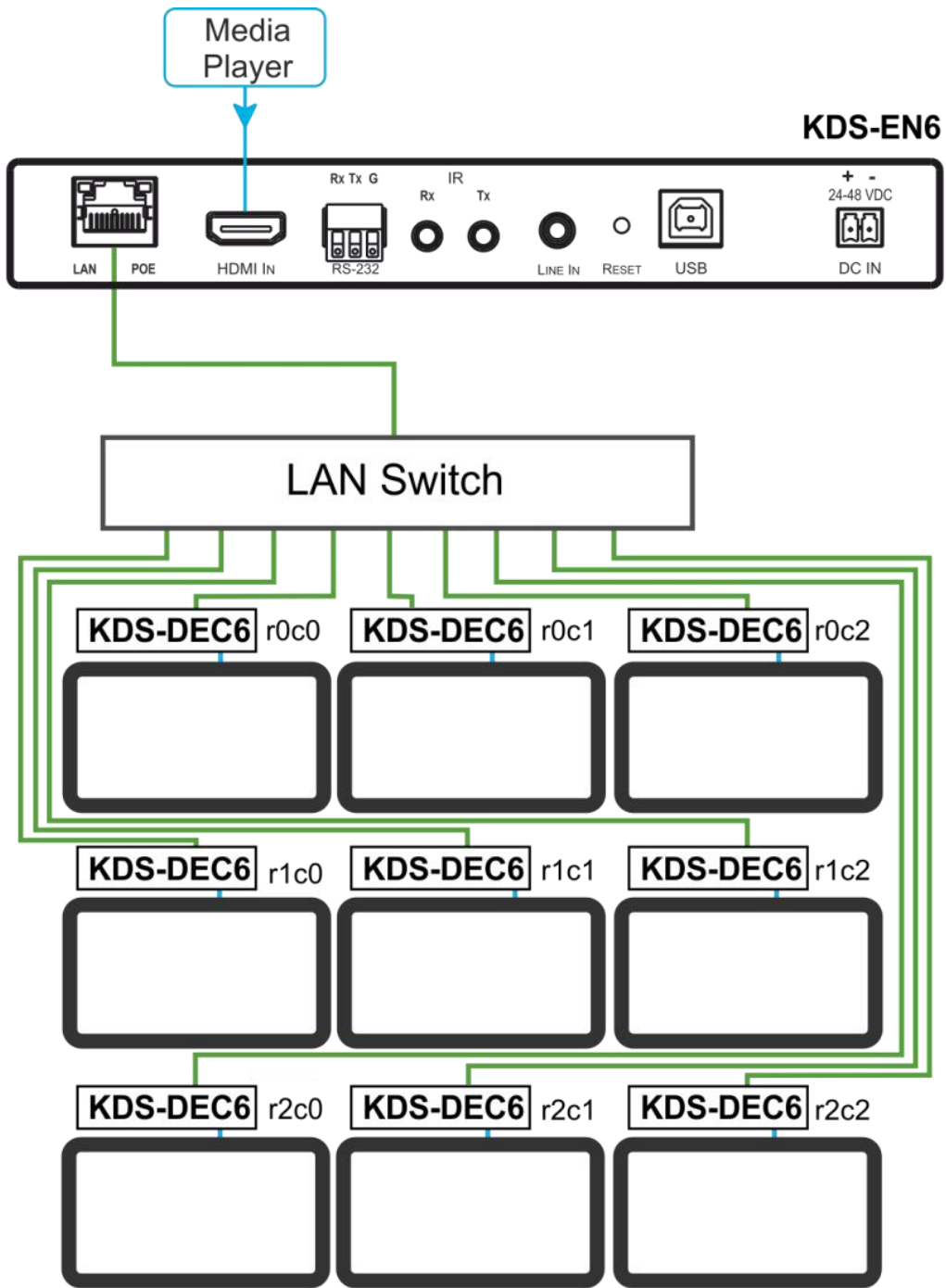


Figure 9: Video Wall Setup

5.4.2 Setting Up the Devices

To configure the video wall devices:

1. Open your Internet browser.
2. Type the actual IP address of the device in the address bar of your browser.
For example:



3. In the Functions tab, check Enable Video Wall (see [Section 6.4.1](#)).
4. In the Network tab, set the Casting Mode to Multicast (see [Section 6.3.2](#)).
5. Select the Video Wall tab.
6. In Basic Setup, set the Bezel and Gap Compensation (see [Section 6.2.1.1](#)).
7. Set the Wall Size and Position Layout.
8. Open the Apply To drop down box. Select the Client device to which you want to assign the position.



You do not have to open a new web page per device.

9. Repeat this procedure for all the video wall decoders in the video wall.

5.5 KVM Setup

In this configuration, on the decoder side, a keyboard and a mouse are connected to the USB ports and a display is connected to the HDMI output. On the encoder side, each encoder is connected to a PC via the USB and HDMI ports.

Configure the Devices:

- Verify that the **KDS-EN6** and **KDS-DEC6** devices each are set with a unique IP address (see [Section 4](#)).
- Set each encoder to a unique channel number and change the decoder channel numbers according to the desired link to an encoder.

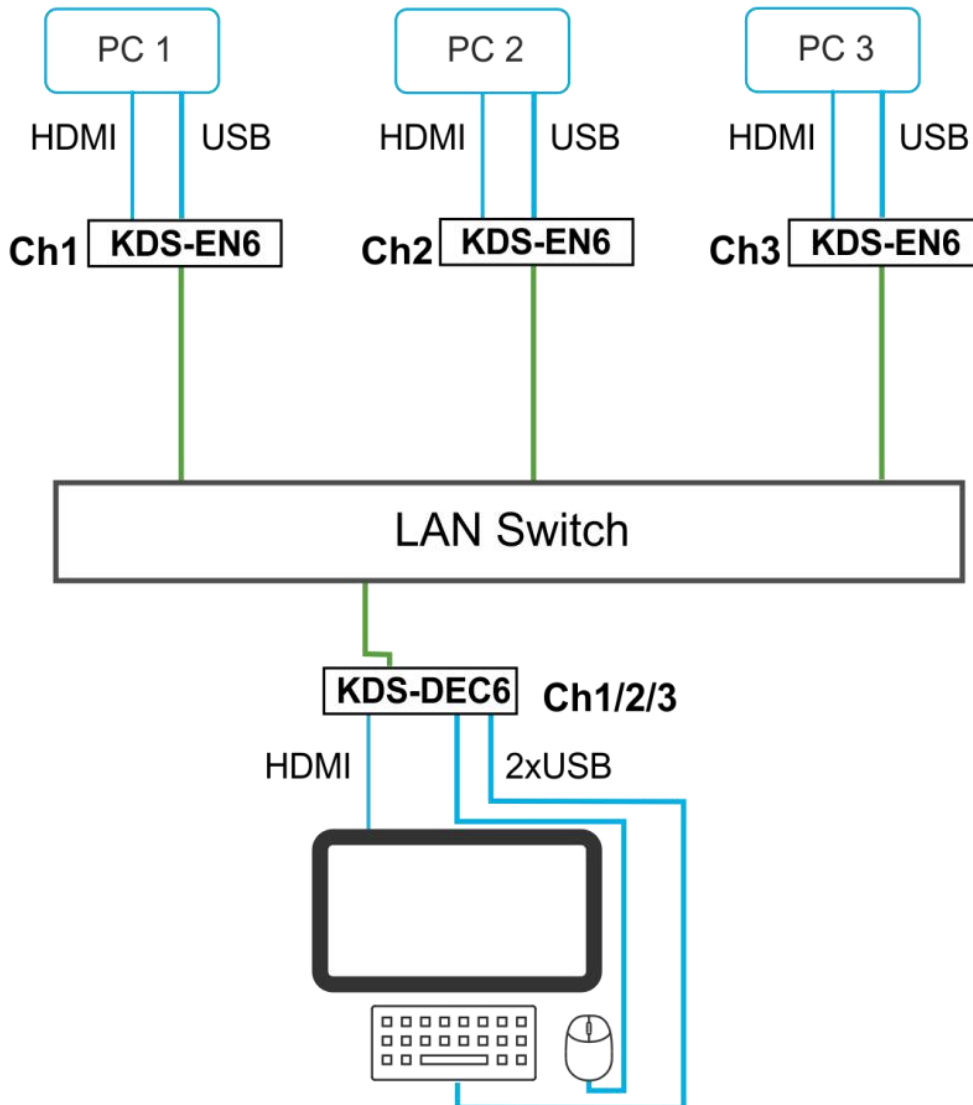


Figure 10: KVM Setup

6 Using the Embedded Web Pages

The **KDS-EN6 / KDS-DEC6** Web pages let you configure and control **KDS-EN6** and **KDS-DEC6** operation via the Ethernet. Connect the Ethernet port of the **KDS-EN6 / KDS-DEC6** to the web and type the IP address of **KDS-EN6 / KDS-DEC6** to access the web pages.

The **KDS-EN6 / KDS-DEC6** web pages enable performing the following:

- Modifying and viewing the system, see [Section 6.1](#).
- Setting up the video wall, see [Section 6.2](#).
- Setting up the network, see [Section 6.3](#).
- Setting up operation functions, see [Section 6.4](#).



Note that the computer IP address should be set to same domain name as HD over IP, such as 169.254.1.11, and that subnet mask set to 255.255.0.0.

6.1 Modifying and Viewing the System

The System tab enables performing the following:

- Viewing system version information, see [Section 6.1.1](#).
- Updating the firmware, see [Section 6.1.2](#).
- Setting system utilities, see [Section 6.1.3](#).
- Resetting to factory default, see [Section 6.1.3.1](#).
- Viewing system statistics, see [Section 6.1.4](#).

6.1.1 Viewing System Version Information

Click the Version Information line to view the version detail information:

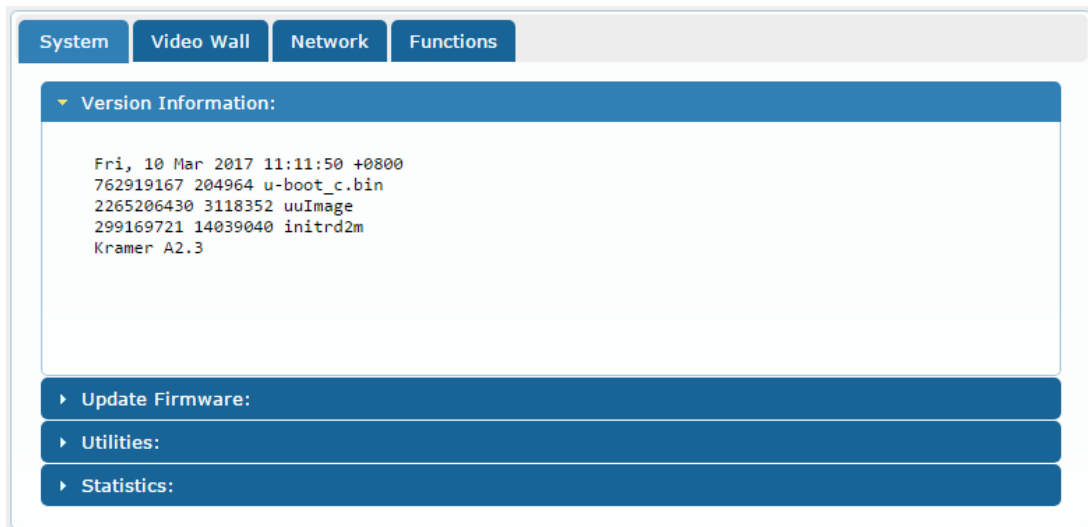


Figure 11: The System Tab – Version Information

6.1.2 Updating the Firmware

To update the firmware:

1. In the System tab, select **Update Firmware**.

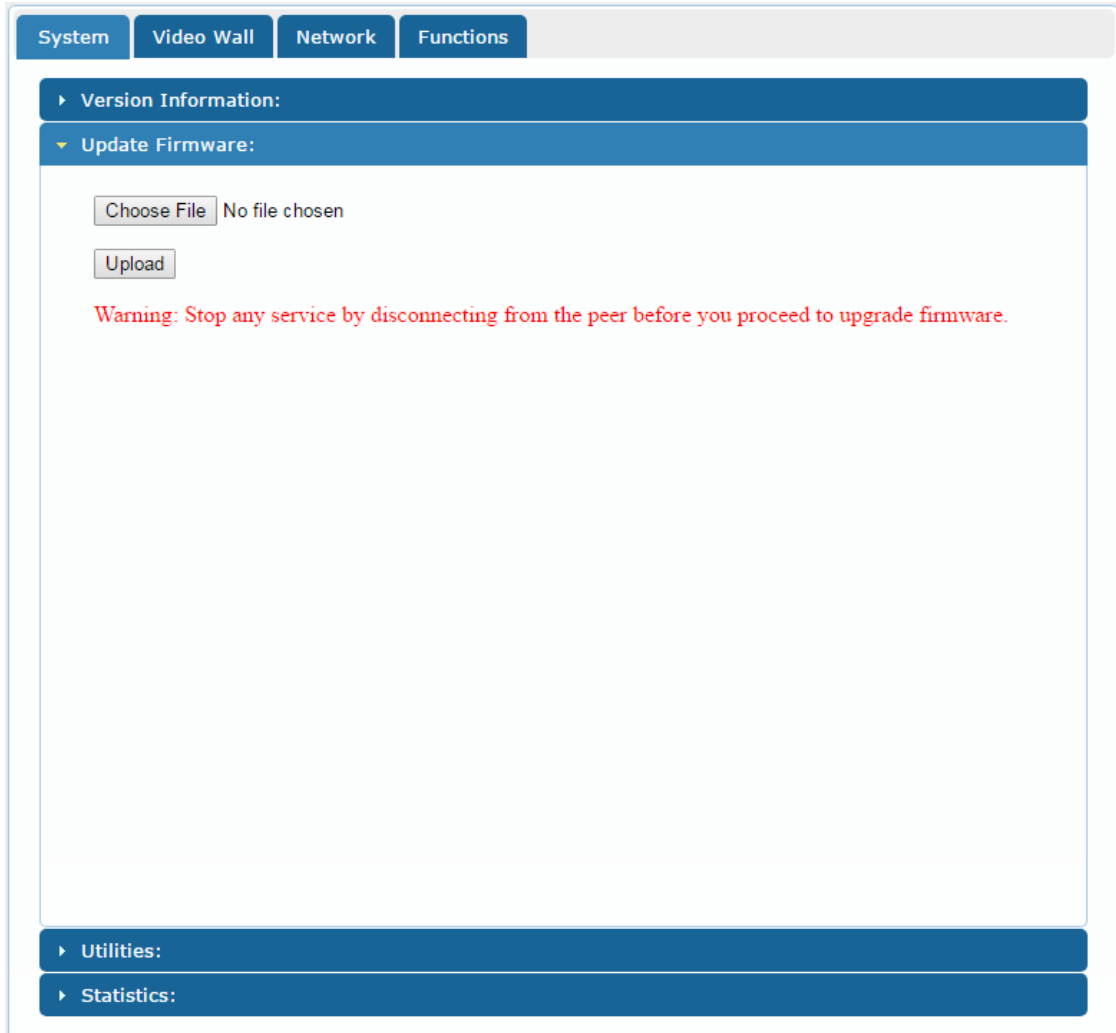


Figure 12: The System Tab – Firmware upgrade

2. Click **Choose File**, select firmware file version from the list and click **OK**.

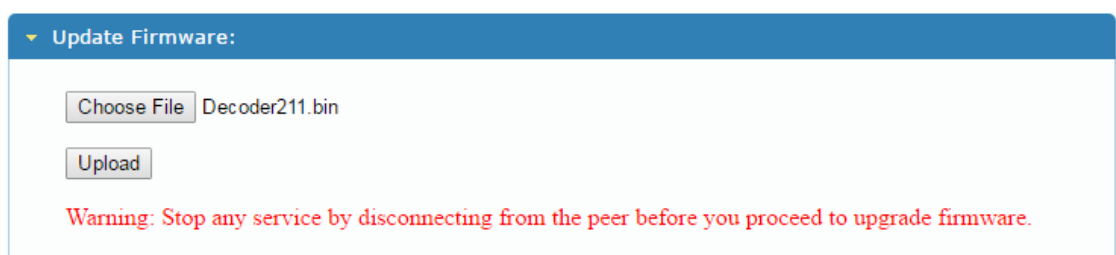


Figure 13: The System Tab – selecting the Firmware File



To cancel this operation click **Choose File** again to open the file window and click **Cancel**.

3. Click **Upload** and wait for the completion of the update process to finish.

6.1.3 Setting System Utilities

To update the firmware:

1. In the System tab, select **Utilities**.

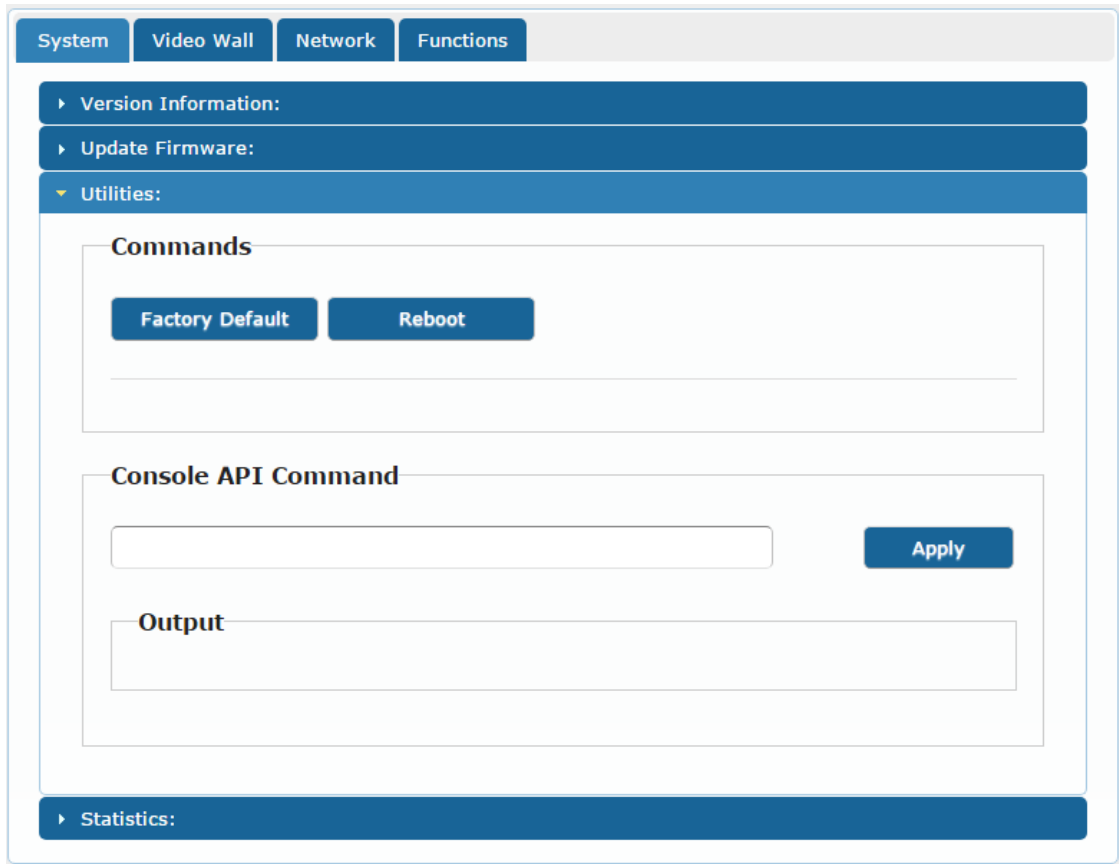


Figure 14: The System Tab – Utilities for KDS-DEC6

2. Perform the following actions:
 - Click **Factory Default** to reset to factory default values (see [Section 6.1.3.1](#)).
 - Click **Reboot** to reboot the system.
 - Type an API command via **Console API Commands** text box and click **Apply** to send the command to a peripheral device, and see the reply in the **Output** box.

For the **KDS-EN6** you can also reset the EDID to a selected default value and then click **Apply**.

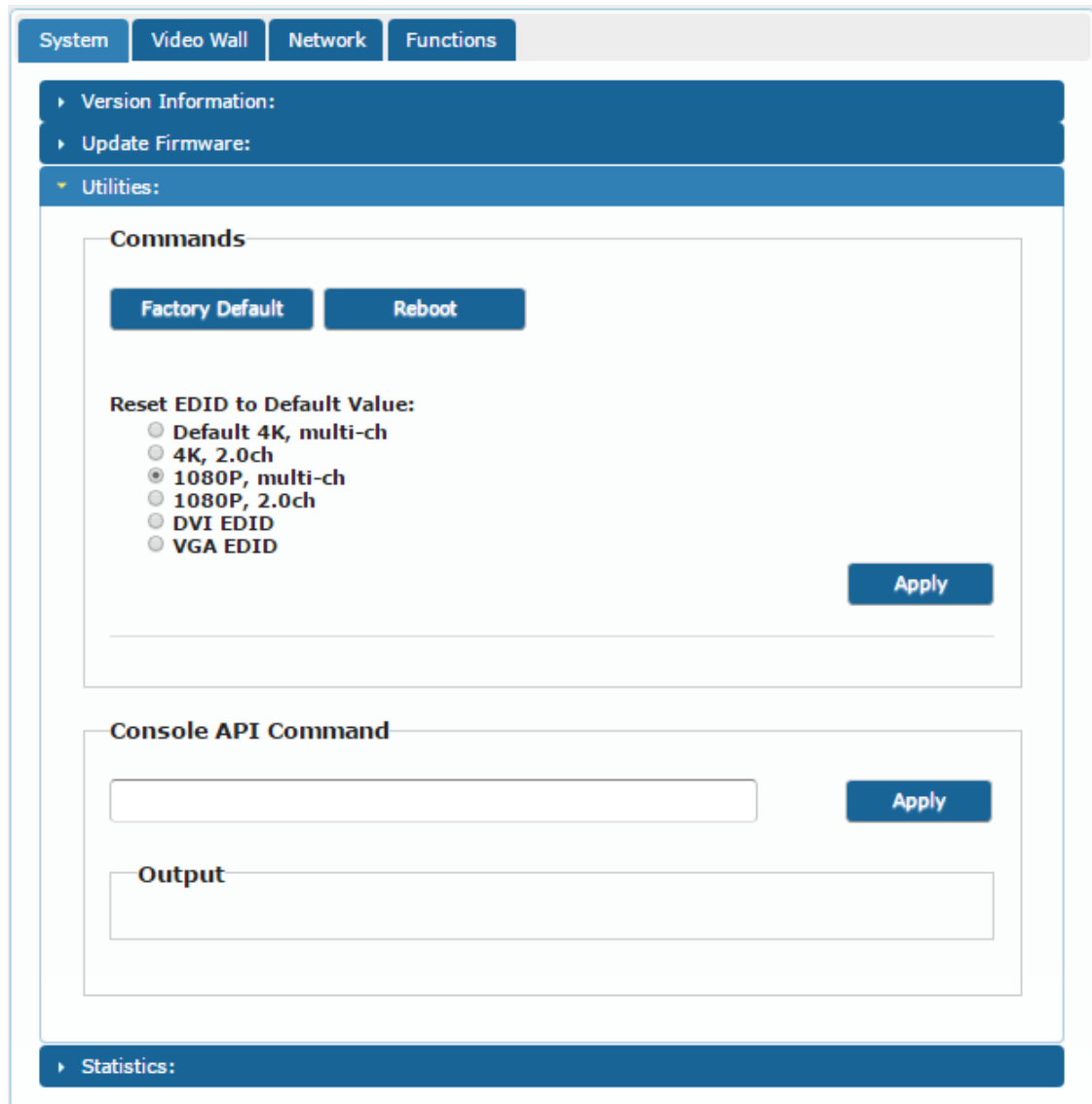


Figure 15: The System Tab – Utilities Window for KDS-EN6

6.1.3.1 Resetting to Factory Default

Click **Factory Default** to reset the device to its default values (see [Figure 15](#)).

Following a factory reset, the current IP address returns to its default value. You cannot access the Web pages using the last known IP address. The default IP

address can be found on the connected display or by using IP address detection software, such as Kramer K-Upload.



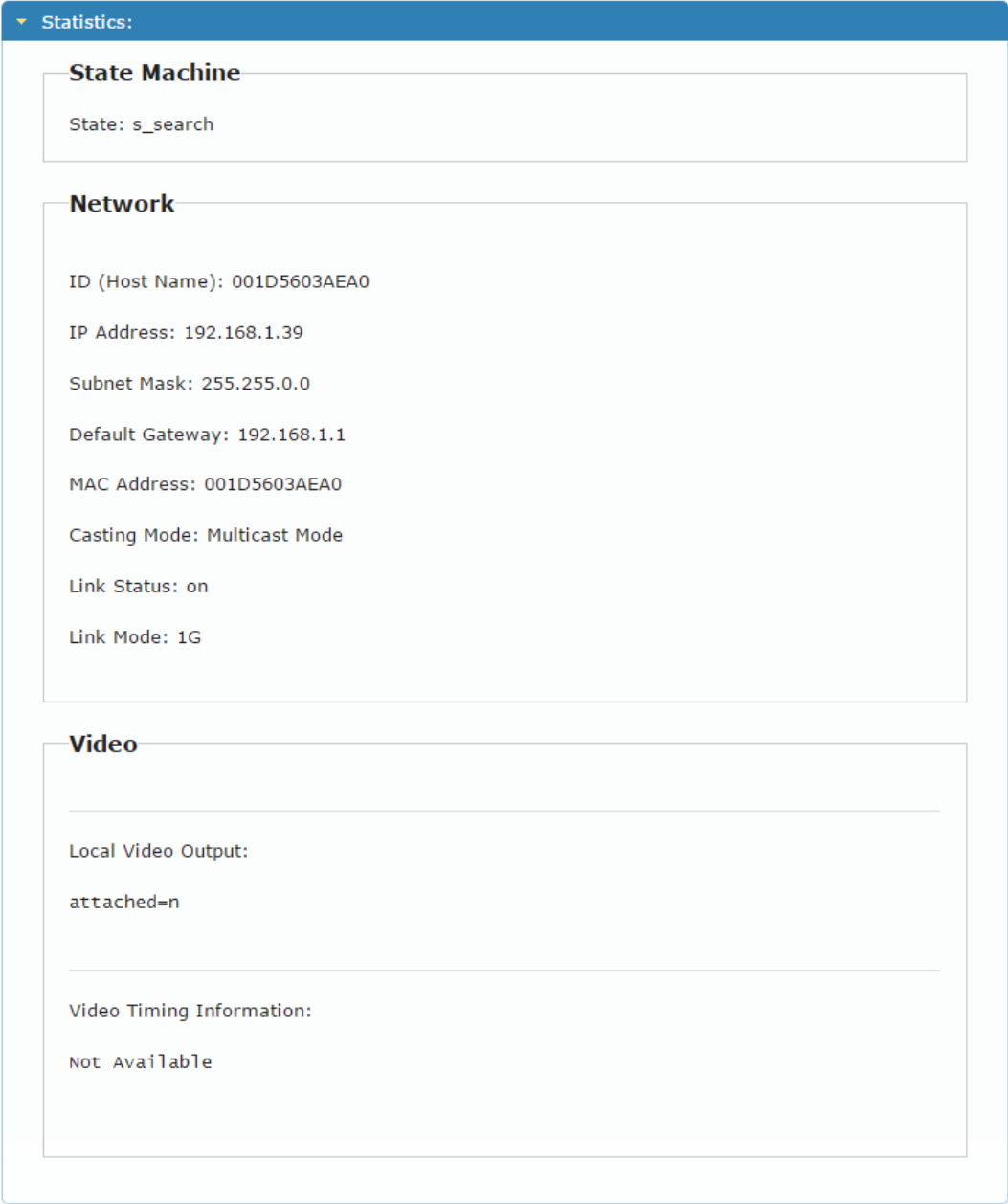
Following a factory reset, set the casting mode to multicast if changed.



Factory reset does not reset the EDID.

6.1.4 Viewing System Statistics

System statistics include the **KDS-EN6 / KDS-DEC6** machine status, network, video information including EDID information (only for the encoder) and display information.



The screenshot displays the 'Statistics' section of a web interface, organized into three distinct panels:

- State Machine:** Shows the current state as 's_search'.
- Network:** Provides detailed network configuration including:
 - ID (Host Name): 001D5603AEA0
 - IP Address: 192.168.1.39
 - Subnet Mask: 255.255.0.0
 - Default Gateway: 192.168.1.1
 - MAC Address: 001D5603AEA0
 - Casting Mode: Multicast Mode
 - Link Status: on
 - Link Mode: 1G
- Video:** Displays video output and timing information:
 - Local Video Output: attached=n
 - Video Timing Information: Not Available

Figure 16: The System Tab – Utilities, Machine State and Network Information

For **KDS-EN6**, the EDID information also appears:

Video

EDID Used:

```
00 ff ff ff | ff ff ff 00 | 59 24 03 00 | 01 00 00 00 |
05 19 01 03 | 80 3d 23 78 | 2a 5f b1 a2 | 57 4f a2 28 |
0f 50 54 bf | ef 80 71 40 | 81 00 81 c0 | 81 80 95 00 |
a9 c0 b3 00 | d1 00 04 74 | 00 30 f2 70 | 5a 80 b0 58 |
8a 00 60 59 | 21 00 00 1e | 00 00 00 fd | 00 18 4b 1e |
5a 1e 00 0a | 20 20 20 20 | 20 20 00 00 | 00 fc 00 47 |
65 6e 65 72 | 69 63 5f 34 | 4b 0a 20 20 | 00 00 00 ff |
00 30 0a 20 | 20 20 20 20 | 20 20 20 20 | 20 20 01 3f |
02 03 39 c3 | 4b 90 04 1f | 13 03 12 20 | 0f 1e 24 26 |
35 09 7f 04 | 0f 7f 04 15 | 07 50 3d 1f | c0 5f 54 01 |
57 06 00 67 | 54 00 83 5f | 00 00 6e 03 | 0c 00 10 00 |
80 3c 20 10 | 80 01 02 03 | 04 02 3a 80 | d0 72 38 2d |
40 10 2c 45 | 80 60 59 21 | 00 00 1e 01 | 1d 00 72 51 |
d0 1e 20 6e | 28 55 00 60 | 59 21 00 00 | 1e 02 3a 80 |
18 71 38 2d | 40 58 2c 45 | 00 60 59 21 | 00 00 1e 00 |
00 00 00 00 | 00 00 00 00 | 00 00 00 00 | 00 00 00 9d |
```

Local Video Output:

attached=n

Video Timing Information:

Timing Table: Serial Number[0x0000] [1920]X[1080] [60]Hz
Pixel Rate: 148500KHz, Htotal: 2200, Vtotal: 1125
Hbp: 148, Vbp: 36, Hsw: 44, Vsw: 5
Progressive, HPos, VPos

Color Depth: [0]
HDCP: [off]
HDCP Convert: Disable
Capture Windows: [1920]X[1080] [60]Hz
Compress Windows: [1920]X[1080] [60]Hz
Active Windows: [1920]X[1080] [60]Hz
CRT Windows: [1920]X[1080]
Scan Mode: Progressive
Signal Type: HDMI 16:9

Figure 17: The System Tab – Utilities, Video Information

6.2 Setting the Video Wall

A video wall consists of several screens that are tiled together to form a single large display. Each display in the video wall is connected to a **KDS-DEC6** device and needs to be configured according to its specific location on the video wall. The position definition is unique and is usually defined once during the basic setup.

You can setup the **KDS-EN6 / KDS-DEC6** video wall, via the Video Wall tab, for each device (encoder or decoder) from the Web page of any one of the video wall encoder/decoder devices.

6.2.1 Basic Setup

Use the basic setup to configure the video wall.

To configure the video wall:

1. In the Video Wall tab, select **Basic Setup**.

The screenshot displays the 'Basic Setup' configuration page for a video wall. It is organized into three main sections:

- Bezel and Gap Compensation:** This section includes four input fields for OW, OH, VW, and VH, each with the value '1'. To the right is a diagram of a single monitor panel with dashed lines indicating the dimensions: OW (Overall Width), OH (Overall Height), VW (Viewable Width), and VH (Viewable Height). Below the diagram is the text 'UNIT: 0.1mm'.
- Wall Size and Position Layout:** This section contains four dropdown menus: 'Vertical Monitor Count' (empty), 'Horizontal Monitor Count' (set to 16), 'Row Position' (empty), and 'Column Position' (set to 0). To the right is a diagram showing a grid of monitor panels. Dotted lines indicate the 'Horizontal Monitor Count' and 'Vertical Monitor Count'. Below the diagram is the text 'UNIT: Panel'.
- Preferences:** This section has two dropdown menus: 'Stretch Type' (set to 'Fit In') and 'Clockwise Rotate' (set to 0).

At the bottom of the configuration area, there is an 'Apply To' dropdown menu set to 'This', an 'Apply' button, and a 'Show OSD' checkbox. A blue bar at the very bottom of the page contains a link to 'Advanced Setup'.

Figure 18: The System Tab – Video Wall, Basic Setup

2. Set the following:
 - Set the bezel and gap compensation in 0.1mm units (this is usually the same for all the video wall displays), see [Section 6.2.1.1](#).
 - Set the Vertical Monitor Count (the number of rows) and the Horizontal Monitor Count (the number of columns) to define the size of the video wall, see [Section 6.2.1.2](#).
 - Set the row position and column position of a specific decoder in the video wall layout, see [Section 6.2.1.2](#).
 - If required, set the stretch type (Fit In or Stretch Out), see [Section 6.2.1.3](#).
 - If required, rotate the image, see [Section 6.2.1.3](#)
 - Enable OSD for the selected device, see [Section 6.2.1.3](#).
3. When the basic setup is complete, select the device to which the setup applies (this, any other device or all the devices) and click **Apply**.

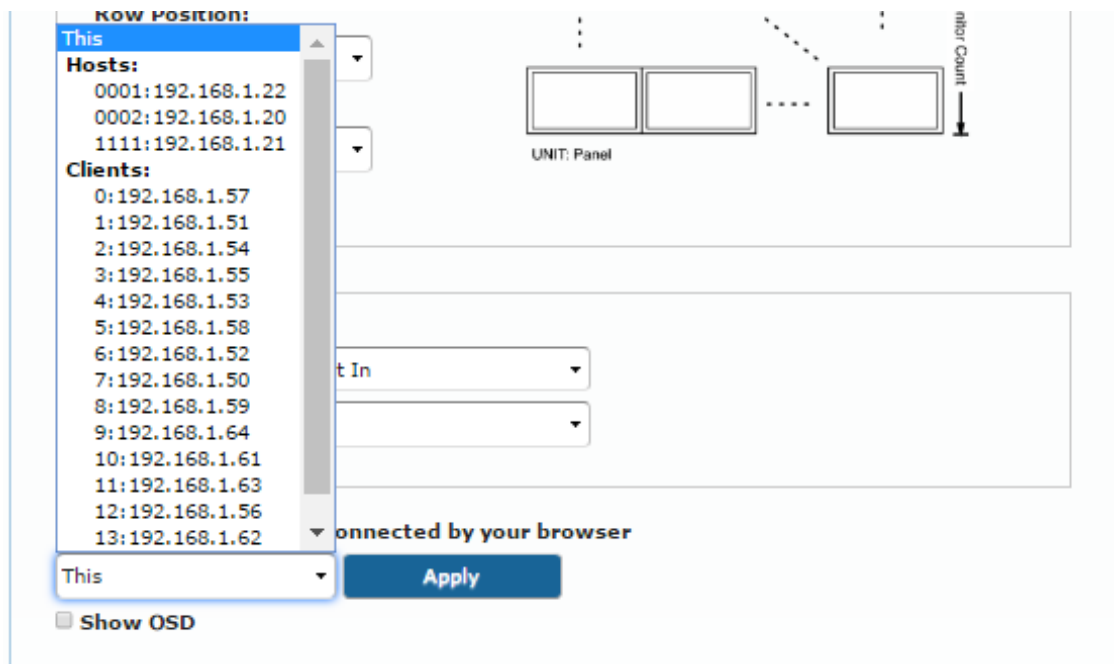


Figure 19: The System Tab – Video Wall, Applying the Basic Setup to a Device

4. Repeat the basic setup for each device in the video wall.

6.2.1.1 Setting the Bezel and Gap Compensation

Set the display and screen sizes (width and height) for bezel and gap compensation. If you do not need this calculated, set all values to 0.



When setting bezel and gap compensation, a value of 1 equals 0.1mm. You can only enter whole numbers.

#	Function
OW	Set the display outside width
OH	Set the display outside height
VW	Set the screen viewable width
VH	Set the screen viewable height

6.2.1.2 Wall Size and Position Layout

Define the wall size and layout:

#	Function
Vertical Monitor Count	Set the number of vertical displays in the video wall
Horizontal Monitor Count	Set the number of horizontal displays in video wall
Row Position	Set the row in which the specific display is positioned
Column Position	Set the column in which the specific display is positioned.



Each specific display is defined by the IP address of the **KDS-DEC6** device to which it is connected.

6.2.1.3 Preferences

Set the video wall preferences:

#	Function
Stretch type	Select Stretch Out to keep the aspect ratio of the original video source. Select Fit In to auto adjust aspect ratio to fit the screen
Clockwise Rotate	Rotate the video to 0, 180 or 270 degrees
Show OSD	Check to show the position number of the display on screen. The position number can help you to identify the screen position in the video wall

6.2.2 Advanced Setup

The basic setup is usually sufficient for setting the video wall layout. However, you can choose a specific device/column/row in the video wall layout.



Figure 20: Video Wall Tab – Advanced Setup, Selecting a specific Device, Column or Row

To set a Specific device, column or row:

1. In the Video Wall tab, select **Advanced Setup**.
2. Perform the following changes:
 - Reset it to the basic setup (as defined in [Section 6.2.1](#)).
 - Set the stretch type and rotation.
 - Change the screen layout (the number of columns and rows).
 - Change the position of the device/column/row.
 - Shift the image vertically or horizontally
 - Scale the image up horizontally and vertically.

- Send an API command

Step 2: Control Options

Reset to Basic Setup:

Stretch Type:

Clockwise Rotate:

Screen Layout (Row x Column): X

Row Position:

Column Position:

Horizontal Shift:

Vertical Shift:

Horizontal Scale Up (N pixels/column_count):

Vertical Scale Up (N pixels/row_count):

Console API Command:

Figure 21: Video Wall Tab – Advanced Setup Configuration

3. Click **Apply** to any change you make.

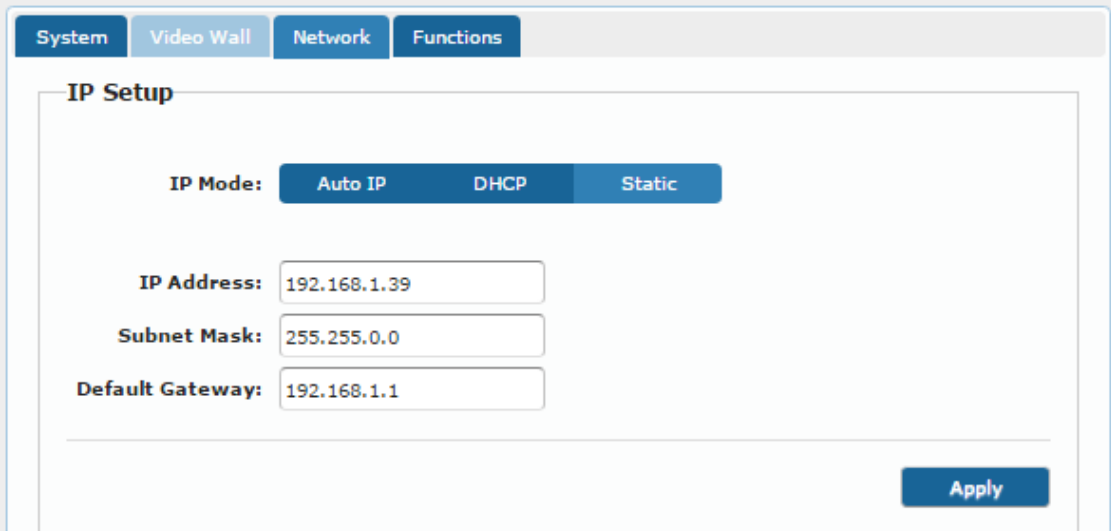
6.3 Setting Up the Network

The Network tab enables you to set the IP mode and address and set the casting mode.

6.3.1 IP Setup

The network parameters (IP address, subnet mask and default gateway can be set via one of the three different IP modes:

- **Auto IP:** the IP address is assigned randomly
- **DHCP:** the DHCP server assigns the IP address
- **Static:** type the IP Address manually



The screenshot shows a web interface with a navigation bar at the top containing four tabs: 'System', 'Video Wall', 'Network', and 'Functions'. The 'Network' tab is selected. Below the navigation bar, the page is titled 'IP Setup'. Under this title, there are three radio button options for 'IP Mode': 'Auto IP', 'DHCP', and 'Static'. The 'Static' option is selected. Below the radio buttons, there are three text input fields: 'IP Address' with the value '192.168.1.39', 'Subnet Mask' with the value '255.255.0.0', and 'Default Gateway' with the value '192.168.1.1'. At the bottom right of the form, there is a blue 'Apply' button.

Figure 22: Network Tab – IP Setup

6.3.2 Casting Mode

Set the Casting mode to **Multicast** or **Unicast**. A **Multicast** transmission sends IP packets to a group of hosts on a network. A Unicast stream transmits IP packets to a single destination IP address



KDS-EN6 and **KDS-DEC6** should be set to the same Casting Mode.

We recommend that you set the system to multicast mode for it is applicable to both one-to-multi or multi-to-multi applications.

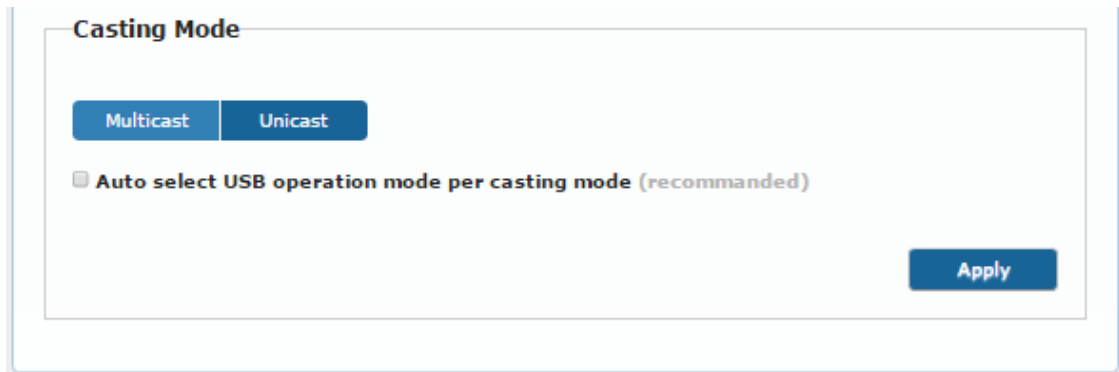


Figure 23: The Network Tab – Casting Mode

Check **Auto select USB operation mode per casting mode** for USB operation to follow the casting mode.

6.4 Setting the Operation Functions

Use the function tabs to set the encoder/decoder system functionality before activation.

Set the functionality of:

- Video signal over IP, see [Section 6.4.1](#).
- USB over IP, see [Section 6.4.2](#).
- Serial signal over IP, see [Section 6.4.3](#).

6.4.1 Video over IP Behavior

Set the video behavior over IP.



Setup is slightly different for the encoder and decoder.

For both encoder/decoder check **Enable Video over IP** and/or **Enable Video Wall**, if required.

6.4.1.1 KDS-DEC6 Setup

Perform the following and then click **Apply**:

- Select this specific device from which the encoder copies the EDID.
When checked, **KDS-DEC6** sends the display EDID to **KDS-EN6**. The new EDID is saved to **KDS-EN6** and remains even if **KDS-DEC6** is disabled.
- Set the scaler output mode: Pass-Through, Auto Detect, Full HD 1080p60, Full HD 1080p50, Ultra HD 2160p30 or Ultra HD 2160p25.
- Set the time out for video loss and define screen behavior after video signal loss: Set the time for the system to keep the latest video image after video loss detection. When enabled, **KDS-DEC6** turns off the display following video signal loss.

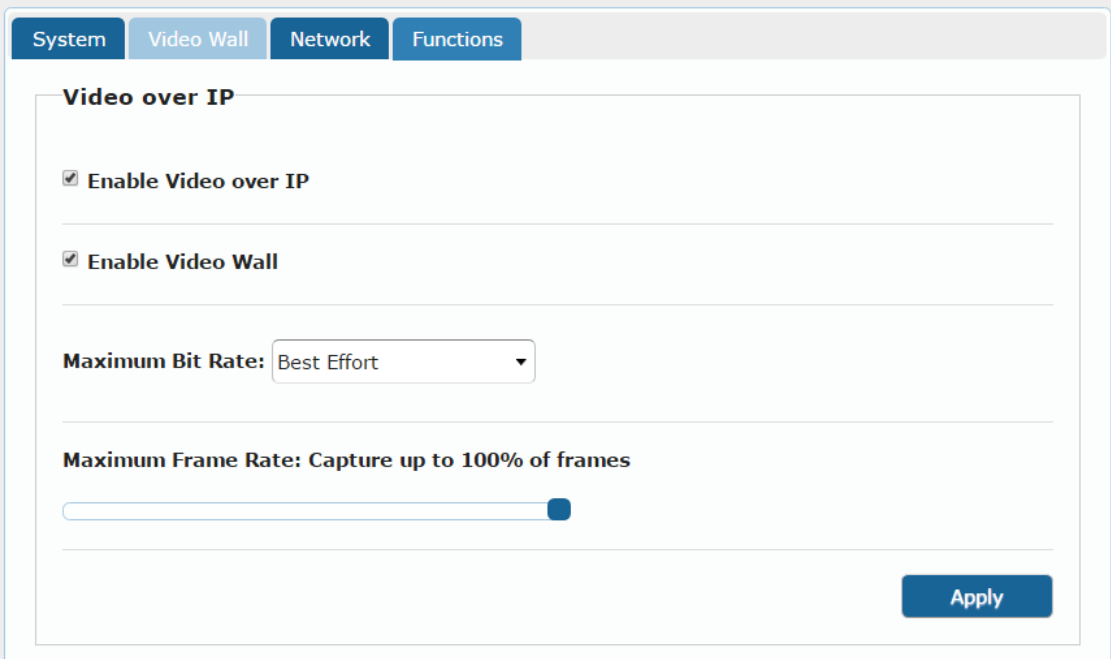
The screenshot shows a web interface for configuring KDS-DEC6s. At the top, there are four tabs: System, Video Wall, Network, and Functions. The Functions tab is selected. Below the tabs, the section is titled "Video over IP". There are three checkboxes: "Enable Video over IP" (checked), "Enable Video Wall" (checked), and "Copy EDID from this Video Output (Default disabled under multicast mode)" (unchecked). Below these are two dropdown menus: "Scaler Output Mode" (set to "Pass-Through") and "Timeout for Detecting Video Lost" (set to "10 seconds"). At the bottom right, there is a blue "Apply" button.

Figure 24: Functions Tab – Video over IP for KDS-DEC6s

6.4.1.2 KDS-EN6 Setup

Perform the following and then click **Apply**:

- Select the maximum bit rate if there is a total throughput limit on the network. Note that limiting the maximum bit rate may affect video quality.
- Set the maximum frame rate. If the frame rate is too low the video will not appear continuous.

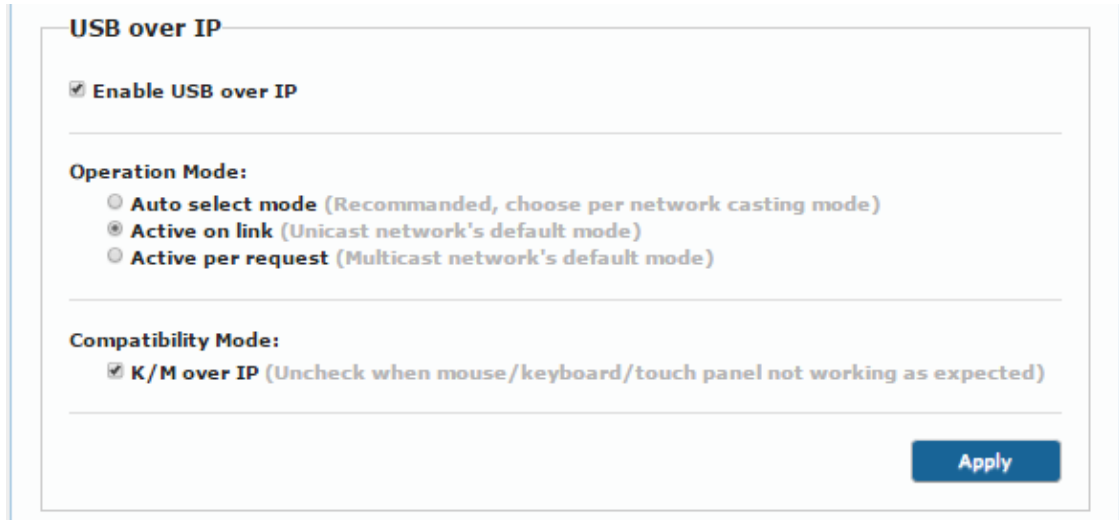


The screenshot shows a web interface with four tabs: System, Video Wall, Network, and Functions. The 'Functions' tab is active. Under the heading 'Video over IP', there are two checked checkboxes: 'Enable Video over IP' and 'Enable Video Wall'. Below these is a dropdown menu for 'Maximum Bit Rate' set to 'Best Effort'. Further down is a slider for 'Maximum Frame Rate: Capture up to 100% of frames', which is currently set to 100%. An 'Apply' button is located in the bottom right corner of the settings area.

Figure 25: The Functions Tab – Video over IP for KDS-EN6

6.4.2 USB over IP

Set the USB over IP behavior of the encoders/decoders before activating the system.



USB over IP

Enable USB over IP

Operation Mode:

Auto select mode (Recommended, choose per network casting mode)

Active on link (Unicast network's default mode)

Active per request (Multicast network's default mode)

Compatibility Mode:

K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)

Apply

Figure 26: The Functions Tab – USB over IP for KDS-DEC6

Check **Enable USB over IP** to enable USB transmission over the Ethernet cable and then Set the:

- Operation Mode, select one of the following operation modes:
 - **Auto select** – the operation mode is automatically selected according to the network casting mode selection (see [Section 6.3.2](#)).
 - **Active on Link** – (unicast network default) in the unicast mode, once a connection (link) is established, USB connectivity is enabled.
 - **Active per request** – (multicast network default) in the multicast mode, whoever moves the mouse gets the token. When not active, another USB device can take the token and become active.
- Compatibility Mode, check the following:
 - K/M over IP – uncheck if mouse, keyboard or touch panel are not working

as expected.



In order to manually enable/disable keyboard or mouse devices connected to the USB ports, the following commands can be used after unchecking this option and restarting the device:

```
ast_send_event -1 e_start_usb
```

```
ast_send_event -1 e_stop_usb
```

For more information refer to the *KDS-EN6, KDS-DEC6 API Guide* available at www.kramerav.com/downloads/KDS-DEC6.

- Mouse not responding well – (**KDS-EN6** only) check if the cursor moves slowly or unexpectedly.

The screenshot shows a web interface titled "USB over IP". At the top, there is a checked checkbox labeled "Enable USB over IP". Below this, there are two sections: "Operation Mode:" and "Compatibility Mode:". Under "Operation Mode:", there are three radio button options: "Auto select mode (Recommended, choose per network casting mode)", "Active on link (Unicast network's default mode)", and "Active per request (Multicast network's default mode)". Under "Compatibility Mode:", there are two checkbox options: "Mouse not responding well (Check when USB mouse responding is slow and queer)" which is unchecked, and "K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)" which is checked. An "Apply" button is located at the bottom right of the form.

Figure 27: The Functions Tab – USB over IP for KDS-EN6

6.4.3 Serial over IP

Set the serial over IP behavior:

Serial over IP

Enable Serial over IP

Operation Mode:

Type 1 (Need extra control instruction. For advanced usage.)

Type 2 (Recommended. Dumb redirection.)

Type 2 guest mode

Baudrate Setting for Type 2:

Baudrate: 115200

Data bits: 8

Parity: None

Stop bits: 1

Apply

Figure 28: The Functions Tab – RS-232 over IP

Set the following:

- **Enable Serial over IP:** check to enable serial transmission over the Ethernet cable. When unchecked, serial transmission via network is disabled.



Setting this function differently for devices in the system may affect the video quality.

- Operation Mode, select an operation mode: Type 1, Type 2 or type 2 guest mode:
 - Type 1 – (dynamic baud rate) **KDS-DEC6** RS-232 baud rate is configurable via special RS-232 commands. Redirection is controlled by the PC RS-232 connected to the **KDS-EN6**. Use a fixed baud rate (115200,8,none,1) The connection can be dynamically changed.
Applies to: HDMI Multicast TV Broadcast system that requires display control.
 - Type 2 – (static baud rate) RS-232 redirection is automatically established between encoders and decoders. There is no need to explicitly issue commands for establishing redirection.
The FW code automatically links the host and clients all together using a preconfigured baud rate setting (default is 115200,8,n,1). Normally, this

static baud rate setting is preconfigured on manufacturing. The baud rate setting can be changed by "Console API".

Applies to: a multicast system with touch panels on the client sides that need communication with the PC on the host side.

- Type 2 Guest mode: designed for controlling UART port 1 through a controller (for example, PC) that is connected to the network. Both Type1 and Type2 are supported.
- Baud Rate Setting: set RS-232 format in this area. **KDS-EN6** and **KDS-DEC6** should have the same baud rate format.

Go to [Section 7.1](#) for detailed instructions on how to setup serial communication over IP.

7 Operating the KDS-EN6 and KDS-DEC6

After connecting your **KDS-EN6/ KDS-DEC6** units, we recommend that you validate your connection setup, network discovery, and the quality of your audio and video sources before you continue.

7.1 Setting Up RS-232 over IP

RS-232 signals pass via the system to and/or from the peripheral devices that are connected to the decoders via a controller that is connected on the encoder side.

Select the connection type according to your requirements (see [Section 6.4.3](#)).

7.1.1 Type 1 Setup

In the Type 1 setup, RS-232 redirection is set and controlled by an RS-232 command.

In the following example, a system of two encoders and two decoders is connected via a LAN switch. A laptop is connected to **KDS-EN6** 1 and a display is connected to each of the two **KDS-DEC6** devices. The baud rate of the displays is different to that of **KDS-EN6** 1.

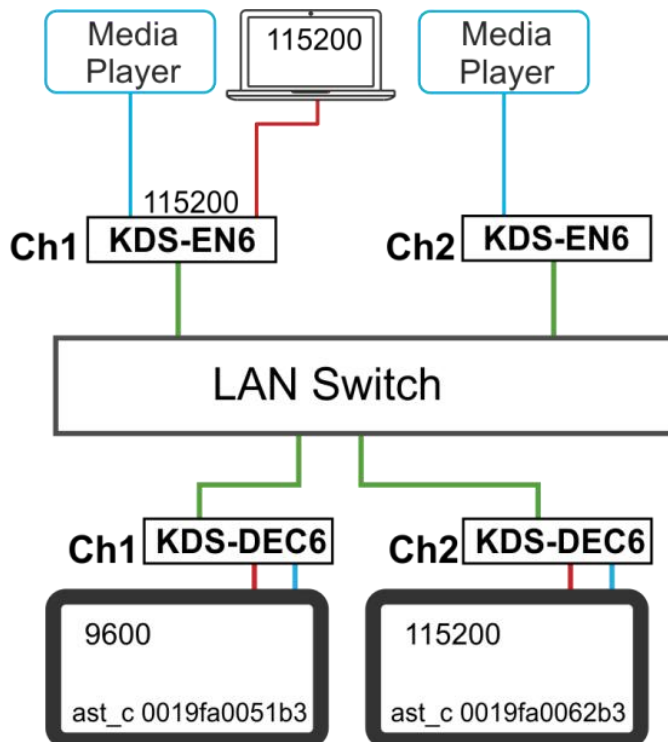


Figure 29: Serial over IP – RS-232 over IP

Note that:

- The RS-232 settings of the encoders should always be 115200-8n1.
- The RS-232 setting of the RS-232 controller (the laptop) should always be 115200-8n1.

To send an RS-232 command from the PC to the display on KDS-DEC6 1:

1. Verify that both encoders and decoders enable serial over IP and are set to Type 1 operation mode.

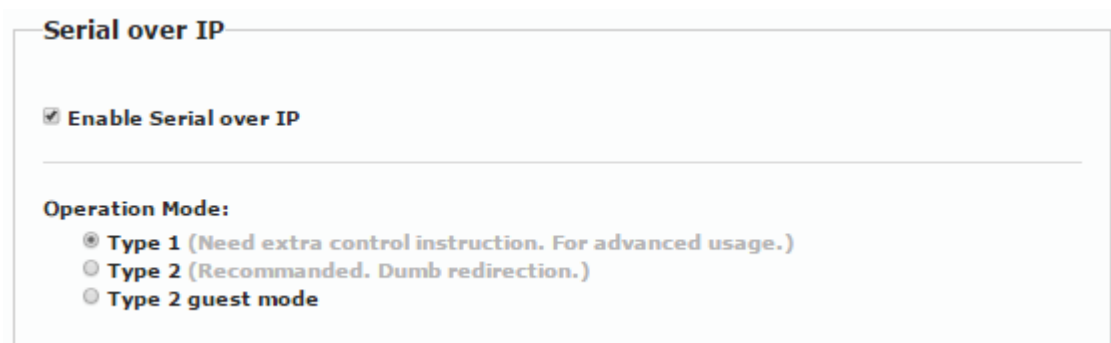


Figure 30: Serial over IP – Type 1 Operation Mode

2. On your PC, open HyperTerminal and press **Ctrl+N**.
3. Type the **KDS-DEC6 1** open command:
"ast_c 0019fa0051b3 9600-8n1" (the MAC address of the device and the RS-232 settings of the display).
4. Press **Enter**.
KDS-EN6 1 RS-232 signal is redirected to **KDS-DEC6 1** and you can control the display on **KDS-DEC6 1** via your PC.

```
>ast_c 0019fa0051b3 115200-8n1
Finding client (ast3-client0019fa0051b3.local)...Connecting...
====<Start of ast3-client0019fa0051b3.local>====
_
```

5. To stop redirection, press **Ctrl+N**.

7.1.2 Type 2 Setup

In the Type 2 setup, RS-232 redirection is performed automatically you just need to verify the following:

- The encoders and decoders in the system are all linked.
- RS-232 can be passed over IP.

In the following example, a system of two encoder and two decoders is connected via a LAN switch. A laptop is connected to **KDS-EN6** and a touch panel is connected to each of the two **KDS-DEC6** devices. The baud rates of the touch panels are set to the same common lowest value for each device on the system.

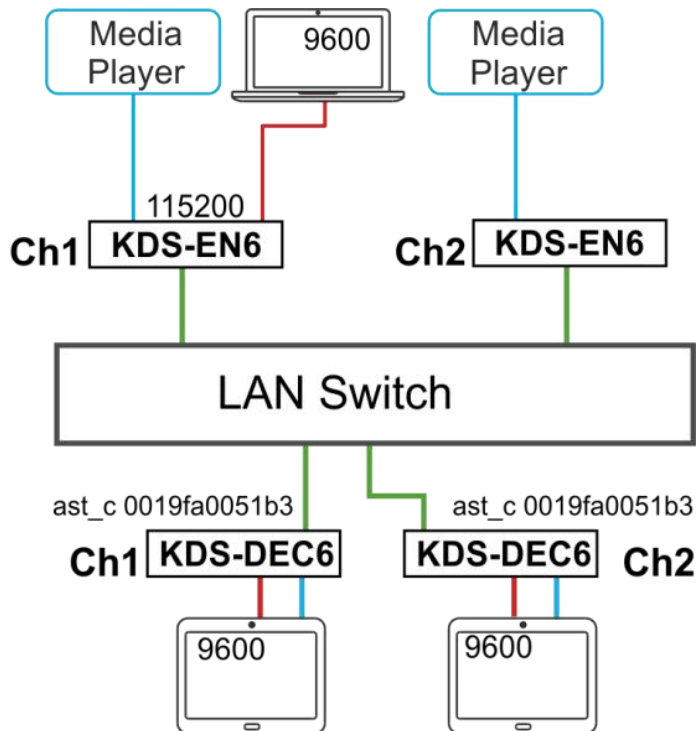


Figure 31: Serial over IP – Type 2 connection

To detect an RS-232 signal sent from a touch panel to the PC:

1. Verify that both encoders and decoders enable serial over IP and are set to Type 2 operation mode.
2. Set all encoders and decoders to the common lowest baud rate value.
For example, if the encoder is set to 115200 but the touch panels' baud

rates are 9600, set the baud rate to 9600 for all the devices in the system that requires RS-232 communication.

The screenshot shows a configuration window titled "Serial over IP". At the top, there is a checked checkbox labeled "Enable Serial over IP". Below this, the "Operation Mode:" section contains three radio button options: "Type 1 (Need extra control instruction. For advanced usage.)", "Type 2 (Recommended. Dumb redirection.)", and "Type 2 guest mode". The "Type 2" option is selected. Underneath, the "Baudrate Setting for Type 2:" section includes four dropdown menus: "Baudrate" (set to 115200), "Data bits" (set to 8), "Parity" (set to None), and "Stop bits" (set to 1). An "Apply" button is located in the bottom right corner of the window.

Figure 32: Serial over IP – Type 2 Operation Mode

3. On your PC, open HyperTerminal and set the PC baud rate to 9600.

7.1.3 Guest Type 2 Mode Setup

Use guest type 2 for RS-232 communication with the peripheral devices on the encoders-decoders system via a controller that is connected to the network.

In this example, two encoders and two decoders are connected to a LAN switch and a laptop is connected to the network.

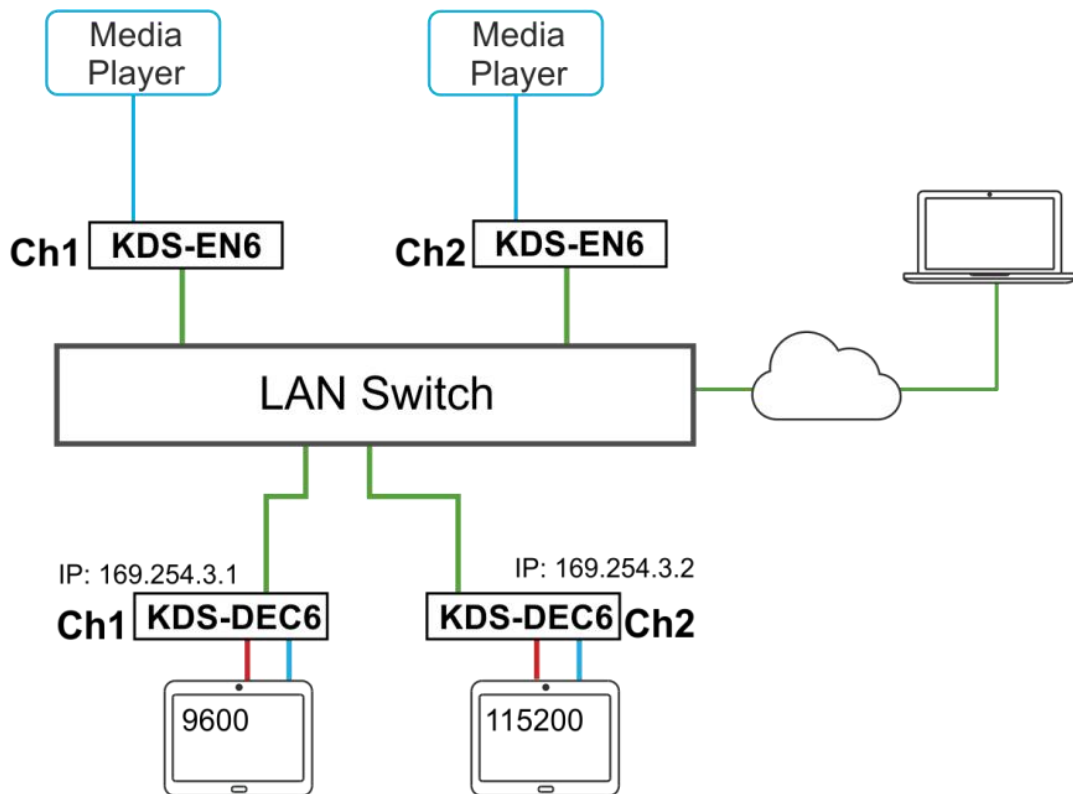


Figure 33: Serial over IP – Type 2 Guest connection

To send an RS-232 command from the PC to the display on KDS-DEC6 2:

1. Verify that both encoders and decoders enable serial over IP and are set to Type 2 Guest operation mode.

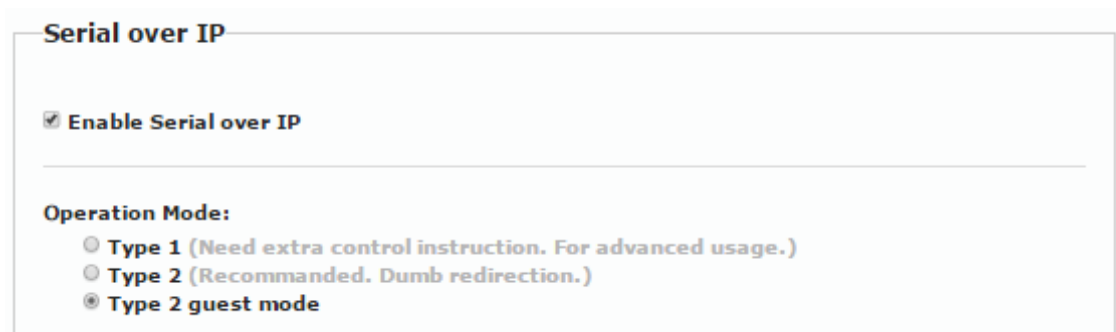


Figure 34: Serial over IP – Type 2 Guest Operation Mode

2. On your PC open the HyperTerminal and then press **Ctrl+N**.
3. Set the baud rate to 115200-8n1.
4. Use the Telnet utility to connect to the box's port 6752 (169.254.3.2.6752).

The laptop can pass RS-232 data to **KDS-DEC6 2**.

7.2 Setting Up USB over IP

For detailed instructions, see [Section 6.4.2](#) and [Section 5.5](#).

7.3 Setting Up IR over IP

You can control the peripheral devices remotely using IR over IP. For example you can control the media player from the display side by pointing the media player IR remote controller toward the IR receiver connected on the **KDS-DEC6** side, see [Figure 5](#).



The IR signal can only be extended between linked units.

7.4 Fast Video Switching

To optimize switching time, verify that:

- All the encoders and decoders in the system have the same firmware version.
- The current video streaming source and the new video streaming source have:
 - The same resolution, refresh rate, and scanning mode (interlace/progressive mode)
 - Switching from HDMI to HDMI or HDMI to DVI
 - The same HDCP mode
 - The same HDMI info frame and “Video quality table”

7.5 Resetting the KDS-EN6/ KDS-DEC6 to Factory Default Values

You can reset the devices to their factory default values via the embedded Web pages (see [Section 6.1.3.1](#)) or by using the channel buttons on the device:

1. Power down the device.
2. Press and hold the down button for 10 seconds while powering the device.
3. The device powers up and after 5 to 8 seconds resets back to factory default values.

8 Technical Specifications

	KDS-EN6	KDS-DEC6
Inputs:	1 HDMI connector, 1 unbalanced stereo audio on a 3.5mm mini jack (line in) 1 RS-232 on terminal block connectors 1 USB (type B) port 1 IR on 3.5mm mini jacks (Rx)	1 Ethernet (LAN / PoE) on an RJ-45 connector 1 IR on 3.5mm mini jacks Rx
Outputs:	1 Ethernet (LAN / PoE) on an RJ-45 connector 1 IR on 3.5mm mini jacks (Tx)	1 HDMI connector 2 left and right unbalanced stereo audio on RCA connectors 1 RS-232 on terminal block connectors 2 USB (type A) ports 1 IR on 3.5mm mini jacks (Tx) 1 Ethernet on an RJ-45 connector (daisy-chain LAN),
Network:	10M/100M/1000M	
Network Switch:	1G Multicast, IGMP Snooping Non-blocking, Layer 2	
Streaming:	Unicast and multicast through RTSP (Real Time Streaming Protocol)	
Controls:	Reset button, up and down channel buttons, channel 7-segment display, STATUS, LINK and ON LEDs	
IR:	Wide-band 20kHz~60kHz bidirectional IR transmission	
Management:	API, Kramer Control, Kramer AV services (Powered by Kramer Network)	
Video Encoding/Decoding:		
Compression Standard:	MJPEG	
HDCP	HDCP 2.2	
Scaling and Cropping:	Built in scaling and cropping for flexible display of source content on the decoder output	
Bit Rates:	4K Peak: 850Mbps; 4K Average: 350Mbps; 1080p Average: 250Mbps	
Resolution:	4096x2160@60Hz, 3840x2160@60Hz, 1920x1200@60Hz, 1920x1080@60Hz, 1864x1050@60Hz, 1856x1392@60Hz, 1792x1344@60Hz, 1728x1080@60Hz, 1704x960@60Hz, 1680x1050@60Hz, 1600x1200@60Hz, 1600x1050@60Hz, 1600x900@60Hz, 1536x960@60Hz, 1440x900@60Hz, 1440x576@60Hz, 1440x480@60Hz, 1400x1050@60Hz, 1366x768@60Hz, 1360x768@60Hz, 1280x1024@60Hz, 1280x960@60Hz, 1280x800@60Hz, 1280x768@60Hz, 1280x720@60Hz, 1224x768@60Hz, 1152x864@60Hz, 1152x720@60Hz, 1024x768@60Hz, 1064x600@60Hz, 1024x384@60Hz, 960x600@60Hz, 848x480@60Hz, 800x600@60Hz, 768x480@60Hz, 720x576@60Hz, 720x480@60Hz, and 640x480@60Hz, 640x400@60Hz, 640x350@60Hz	

	KDS-EN6	KDS-DEC6
Audio Encoding/Decoding:		
Compression Standard (Analog In/Out):	AAC-LC	
Channels (HDMI embedded Audio):	PCM 2, 5.1, 7.1 Channel, Dolby Digital 5.1 Channel, Dolby Digital Plus, Dolby Digital True-HD, DTS 5.1 Channel, DTS-ES, DTS-HD High Resolution, DTS-HD Master Audio	
Video Latency:	30–60ms	
Power Options:	PoE, External power supply	
Power Consumption:	48V DC, 140mA max.	48V DC, 185mA max.
Operating Temperature:	0° to +40°C (32° to 104°F)	
Storage Temperature:	-40° to +70°C (-40° to 158°F)	
Humidity:	10% to 90%, RHL non-condensing	
Dimensions:	19cm × 10.3cm × 2.3cm (7.48" × 4.06" × 0.91") W, D, H	
Shipping Dimensions:	34.5cm × 16.5cm × 5.2cm (13.58" × 6.5" × 2.05") W, D, H	
Weight:	0.55kg (1.2lbs) approx.	
Shipping Weight:	0.782kg (1.7lbs) approx.	
Options:	IR Cable (PN: 3500-900617); External DC Power Supply (PN: 60-0009390)	
Specifications are subject to change without notice at www.kramerav.com		

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P/N: 2900-300655



Rev: 3



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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