

## USER MANUAL

### MODEL:

**KDS-EN5, KDS-DEC5**  
**H.264 Encoder and Decoder**



# Contents

<b>Introduction</b>	<b>1</b>
Getting Started	1
Overview	2
Typical Applications	2
<b>Defining KDS-EN5, KDS-DEC5 H.264 Encoder and Decoder</b>	<b>4</b>
<b>Installing KDS-EN5, KDS-DEC5</b>	<b>5</b>
<b>Connecting KDS-EN5, KDS-DEC5</b>	<b>6</b>
<b>Operating KDS-EN5, KDS-DEC5</b>	<b>8</b>
<b>Configuring Settings</b>	<b>9</b>
Configuring Streaming/Encoding Settings	10
Configuring Decoding Settings	14
Configuring Network Settings	15
Locating Device	16
Configuring RS-232 over IP Settings	17
Changing the Device DNS Name	18
Upgrading the Firmware	19
Changing Password	20
Configuring Video Wall	21
Defining an Idle Image	22
Verifying Device Information	23
<b>Technical Specifications</b>	<b>24</b>
Default Communication Parameters	25
Resetting the Unit	26
<b>Protocol 3000</b>	<b>27</b>
Understanding Protocol 3000	28
Kramer Protocol 3000 Syntax	28
Protocol 3000 Commands	30

# 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 the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

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## 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-EN5](http://www.kramerav.com/downloads/KDS-EN5) to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

## Achieving 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-EN5**, **KDS-DEC5** 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.

## Safety Instructions

-  **Caution:** There are no operator serviceable parts inside the unit.
- Warning:** Use only the Kramer Electronics power supply that is provided with the unit.
- Warning:** Disconnect the power and unplug the unit from the wall before installing.

## 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](http://www.kramerav.com/support/recycling).

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## Overview

Congratulations on purchasing your Kramer **KDS-EN5, KDS-DEC5 H.264 Encoder and Decoder**. **KDS-EN5, KDS-DEC5** are an H.264 encoder/decoder pair for HDMI™ signals of up to 4K@30Hz (4:4:4). They provide high-quality and fully-featured end-to-end video and audio over IP. **KDS-EN5** and **KDS-DEC5** include AVC support for H.264/MPEG-4 and AAC codec, open encoding that enables decoding through VLC® player software and unicast or multicast streaming through TS and RTSP transport protocols.

## Benefits and Features

- High Resolution Video Encoding and Compression – supporting up to 4K@30Hz (4:4:4) resolution.
- Maximum Compatibility – Fully standard and compliant H.264/MPEG-4 AVC (Advanced Video Codec) and AAC (Advanced Audio Code) codecs, enable compatibility with other software and hardware encoders. Open encoding enables software decoding through VLC® player software.
- Versatile Powering Options - Powered by PoE (when using a Network switch that supports PoE) or by external 12V power adapter.
- Standard Ethernet Network Operation – 10/100/1000Mb. Managed switch: 1G, multicast, IGMP snooping, layer 2. Configurable DHCP, Static or Auto IP. For specific Network configuration, please contact Kramer Customer Support.
- Selectable Streaming Mode – Unicast or multicast through RTSP (Real Time Streaming Protocol).
- Convenient Unit Control and Configuration – Distance control via user-friendly embedded web pages via the Ethernet, Protocol 3000 API, and RS-232 serial commands transmitted by a PC, touch screen system or other serial controller.
- Cost-Effective Maintenance - Power and link status indicators facilitate easy local maintenance and troubleshooting. Firmware upgrade via embedded web pages or K-Upload ensures lasting, field-proven deployment.
- Simple System Management — Remote system management support to enable quick and efficient remote system and device life-cycle management.

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## Typical Applications

**KDS-EN5, KDS-DEC5** is ideal for the following typical applications:

- Digital signage

- Video walls
- Education
- Smart city CCTV
- Large AV Matrixes

# Defining KDS-EN5, KDS-DEC5 H.264 Encoder and Decoder

This section defines KDS-EN5, KDS-DEC5.

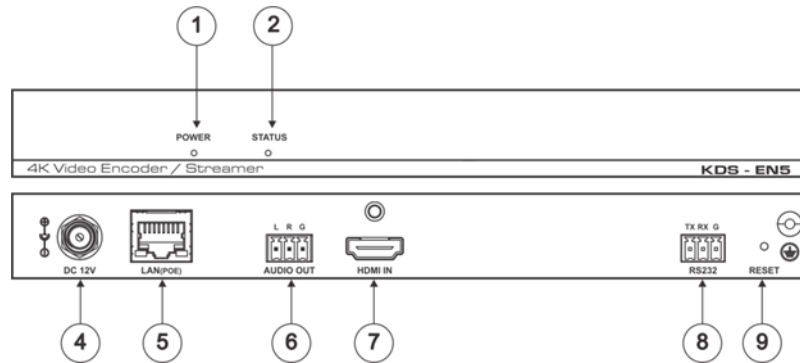


Figure 1: KDS-EN5 Video Streamer Encoder

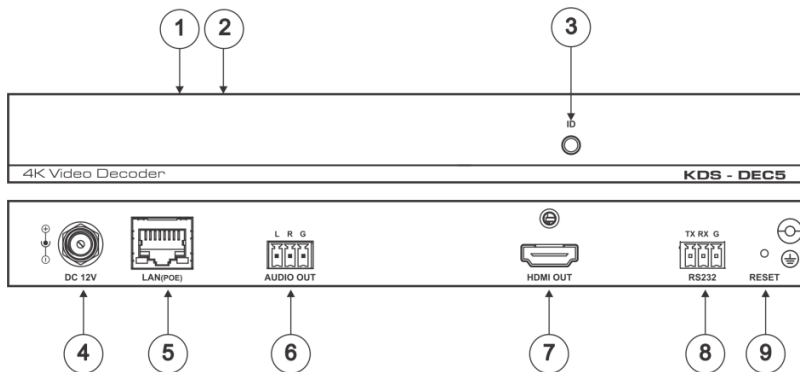


Figure 2: KDS-DEC5 Video Streamer Decoder

#	Feature	Function
①	POWER LED Indicator	Lights when the unit is powered on.
②	STATUS LED Indicator	<b>KDS-EN5</b> – Lights when synced with a decoder. <b>KDS-DEC5</b> – Blinks slowly when not synced with an encoder. Lights when synced with an encoder.
③	ID Button ( <b>KDS-DEC5</b> )	Press to display the encoder and decoder information, such as device IP address and ID, on the display.
④	DC 12V Connector	Connect to a 12V power adapter (optional – when power is not supplied by PoE).
⑤	LAN (POE) RJ-45 Connector	Connect to a PC via a LAN to control the unit, to stream video to the unit and to provide power via PoE.
⑥	AUDIO OUT 3-pin Terminal Block	Connect to an unbalanced audio acceptor.
⑦	HDMI IN ( <b>KDS-EN5</b> ) / OUT ( <b>KDS-DEC5</b> ) Connector	Connect to an HDMI source/acceptor.
⑧	RS-232 3-pin Terminal Block Connector	Connect to an external device (e.g. a camera or display screen) that can be controlled via RS-232 (over IP).
⑨	RESET Button	Press and hold for about 15 seconds to reset to factory default settings.

# Installing KDS-EN5, KDS-DEC5

This section provides instructions for mounting **KDS-EN5, KDS-DEC5**. Before installing, verify that the environment is within the recommended range:

- Operation 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.



**When installing, avoid hazards by taking care that:**

- It is located within recommended environmental conditions. Operating ambient temperature of a closed or multi-unit rack assembly may exceed ambient room temperature.
- Once mounted, there is enough air flow around **KDS-EN5, KDS-DEC5**.
- **KDS-EN5, KDS-DEC5** is placed upright in the correct horizontal position.



Always mount **KDS-EN5, KDS-DEC5** before connecting any cables or power.

**You can install KDS-EN5, KDS-DEC5 using one of the following methods:**

- Attach the rubber feet and place the unit on a flat surface.
- Fasten a bracket (included) on each side of the unit and attach it to a flat surface. For more information go to [www.kramerav.com/downloads/KDS-EN5](http://www.kramerav.com/downloads/KDS-EN5).

# Connecting KDS-EN5, KDS-DEC5

 Always switch off the power to each device before connecting it to your KDS-EN5, KDS-DEC5. After connecting your KDS-EN5, KDS-DEC5, connect its power and then switch on the power to each device.

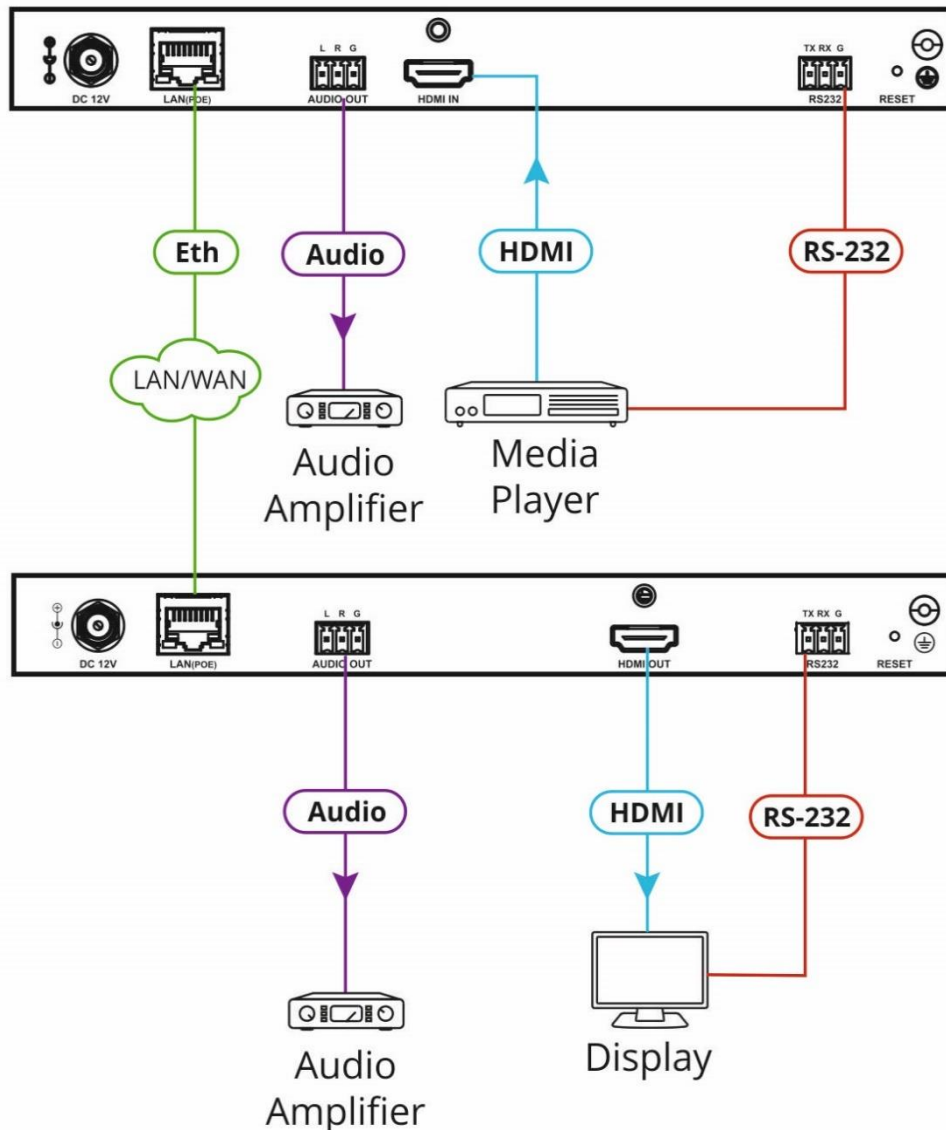


Figure 3: Connecting to the KDS-EN5, KDS-DEC5 Rear Panel

To connect KDS-EN5, KDS-DEC5 as illustrated in [Figure 3](#):

1. Connect the LAN (POE) RJ-45 Connector (5) on each unit to the LAN OR  
Connect the units directly via the LAN (POE) RJ-45 Connector (5) on each unit using an Ethernet cable.
2. On KDS-EN5, connect an HDMI video source (for example, Blu-ray player) to:
  - HDMI IN Connector (7).
  - RS-232 3-pin Terminal Block Connector (8) for controlling the source via the



IP controller SW / API.S.

3. On **KDS-DEC5**, connect the HDMI acceptor (for example, TV) to:
  - HDMI OUT Connector ⑦.
  - RS-232 3-pin Terminal Block Connector ⑧ for controlling the acceptor via the IP controller SW / API.S.
4. Connect the video source
5. If desired, connect an audio amplifier to the AUDIO OUT 3-pin Terminal Block ⑥ on one or both units.
6. If PoE is not available, connect a 12V power supply (not included) to the DC 12V Connector ④.

# Operating KDS-EN5, KDS-DEC5

Configure and control your KDS-EN5, KDS-DEC5 using any of the following methods:

- Via the Ethernet using built-in, user-friendly web pages (see [Configuring Settings](#) on page [9](#)).
- Kramer Network Enterprise Management Platform (version 2.2 or higher – go to [www.kramerav.com/product/Kramer Network](http://www.kramerav.com/product/Kramer%20Network) for more information).
- Protocol 3000 commands (see [Protocol 3000 Commands](#) on page [30](#)).

# Configuring Settings

The embedded web pages enable you to configure **KDS-EN5**, **KDS-DEC5** via Ethernet. The encoder and decoder each have their own web pages that are accessed using a web browser on a connected computer.

**KDS-EN5, KDS-DEC5** web pages enable performing the following:

- [Configuring Streaming/Encoding Settings](#) on page [10](#).
- [Configuring Decoding Settings](#) on page [14](#).
- [Configuring Network Settings](#) on page [15](#).
- [Locating Device](#) on page [16](#).
- [Configuring RS-232 over IP Settings](#) on page [17](#).
- [Changing the Device DNS Name](#) on page [18](#).
- [Upgrading the Firmware](#) on page [19](#).
- [Changing Password](#) on page [20](#).
- [Configuring Video Wall](#) on page [21](#).
- [Defining an Idle Image](#) on page [22](#).
- [Verifying Device Information](#) on page [23](#).

**To browse KDS-EN5, KDS-DEC5 web pages:**

1. Type the IP address of the device in the address bar of your internet browser (default encoder address = 192.168.1.39, default decoder address = 192.168.1.40).

The Login page appears.

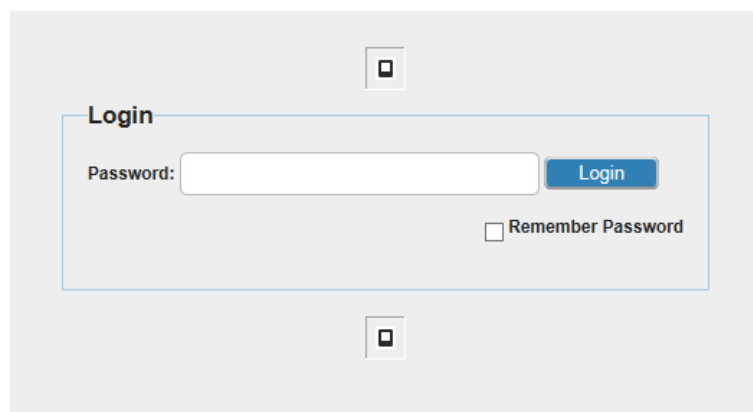


Figure 4: Embedded Web Pages Login Page

- 2. Enter the password (default = admin) and click **Login**.  
The embedded web pages appear with the System page open.

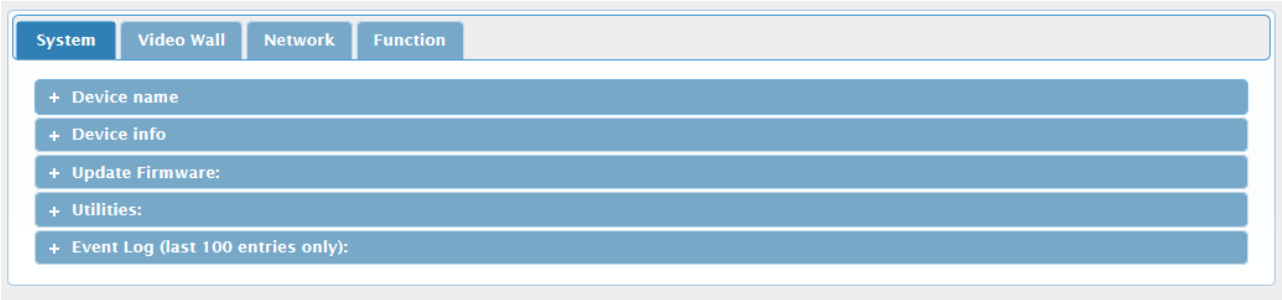


Figure 5: Embedded Web Pages – System Page

- 3. Navigate to the desired tab by clicking the web page from the main menu and the tab from the submenu.



After changing a setting, click **Apply** to save the setting.  
A message appears in the upper right corner of the web page indicating if the change was successful or not.

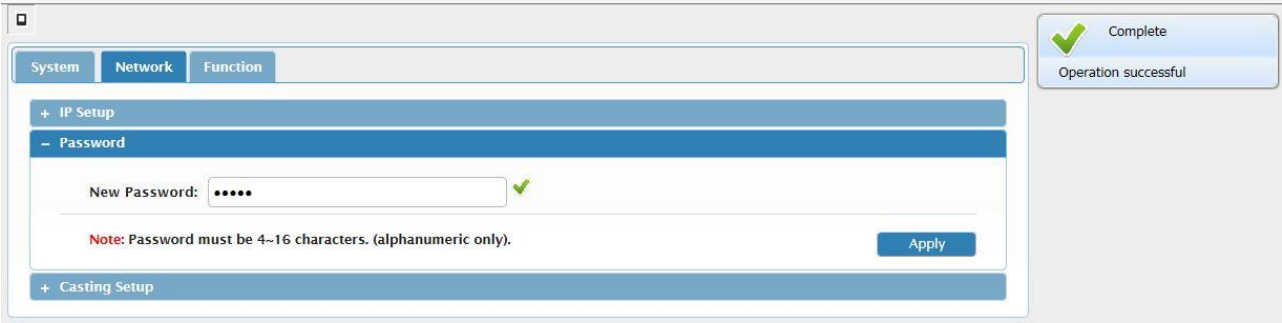


Figure 6: Embedded Web Pages with Operation Successful Message

## Configuring Streaming/Encoding Settings

KDS-EN5 web pages enable you to configure streaming/encoding settings.



This section applies only to the encoder web pages.

### To configure streaming/encoding settings:

1. On the **KDS-EN5** web pages, click **Function > Stream Settings**.  
The Streaming Settings tab appears.

System	Network	Function
+ Video Settings		
+ Audio Settings		
- Stream Settings		
Stream Video Over IP		Enable
Transport Type		tsoverrrtp
Rate Limit Enable		Disable
		Apply
+ Serial over IP		

Figure 7: Function > Stream Settings Tab

2. Under Stream Video Over IP, select Enable.
3. Under Transport Type, select one of the following:
  - tsoverudp – use Transport Stream over UDP protocol
  - tsovertcp – use Transport Stream over TCP protocol
4. If required, under Rate Limit Enable, select Enable, to limit the bitrate.



You can set the limit value in the Video Settings tab.

5. Click **Video Settings**.

The Video Settings tab appears.

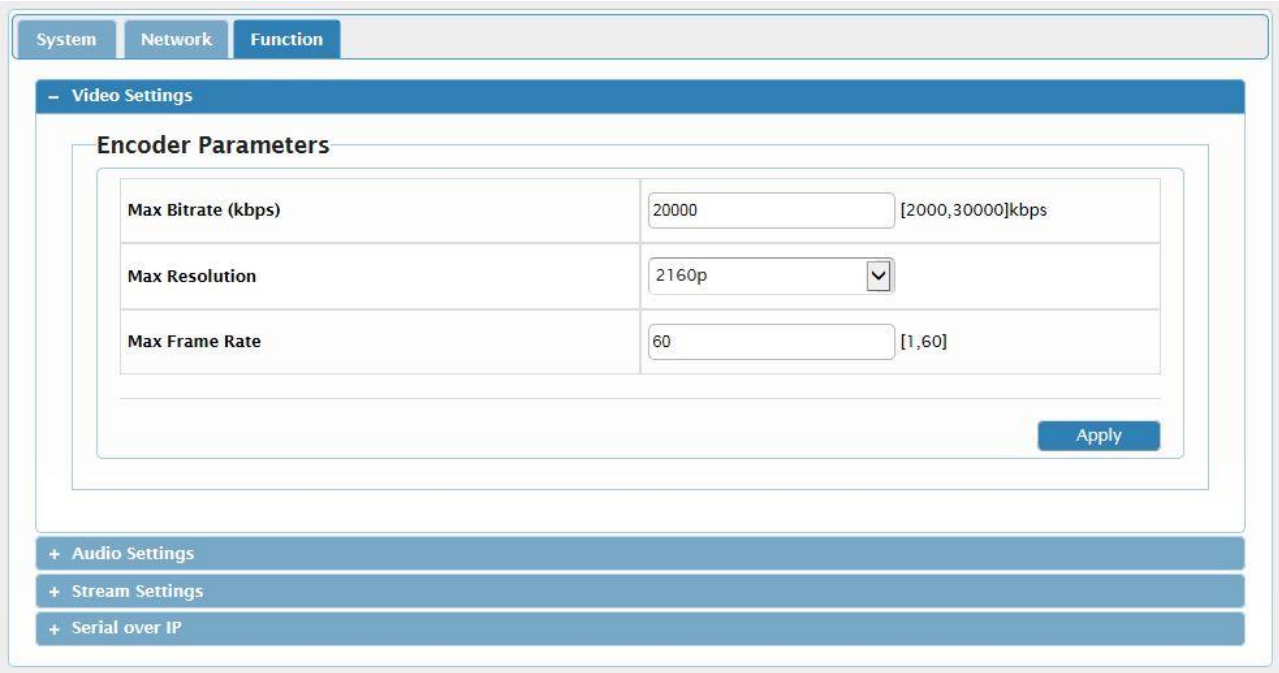


Figure 8: Function > Video Settings Tab

- 6. Under Encoder Parameters, define the following:
  - Max Bitrate – Maximum bitrate (2000–30000kbps)
  - Max Resolution – Maximum output resolution (480p–2160p)
  - Max Frame Rate – Maximum frames per second (1–60)
- 7. Click **Audio Settings**.

The Audio Settings tab appears.

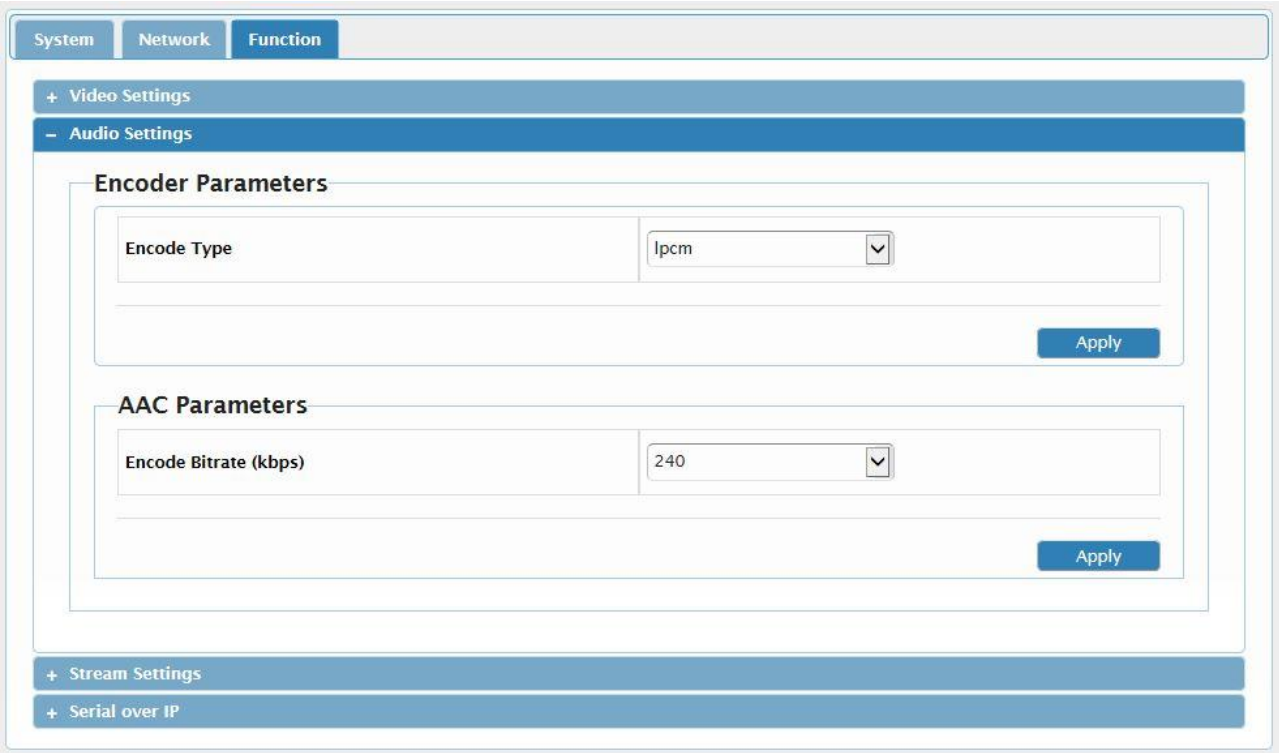


Figure 9: Function > Audio Settings Tab

8. Under Encoder Parameters, select the Encode Type:
  - lpcm
  - aac
9. Under AAC Parameters, select the Encode Bitrate (kbps).

**To validate E2E encoding using VLC® decoding**


1. Launch VLC media player.
2. Select **Media > Open network stream**.
3. Select **Network** tab.
4. Enter Encoder streaming information in the VLC open media network protocol settings (e.g.: `rtsp://192.168.0.200/sdp.live`).



Refer to VLC documentation for more information.

## Configuring Decoding Settings

KDS-DEC5 web pages enable you to configure decoding settings.

 This section applies only to the decoder web pages.

To configure decoding settings:

1. On the decoder web pages, click **Function > Stream**.

The Stream tab appears.

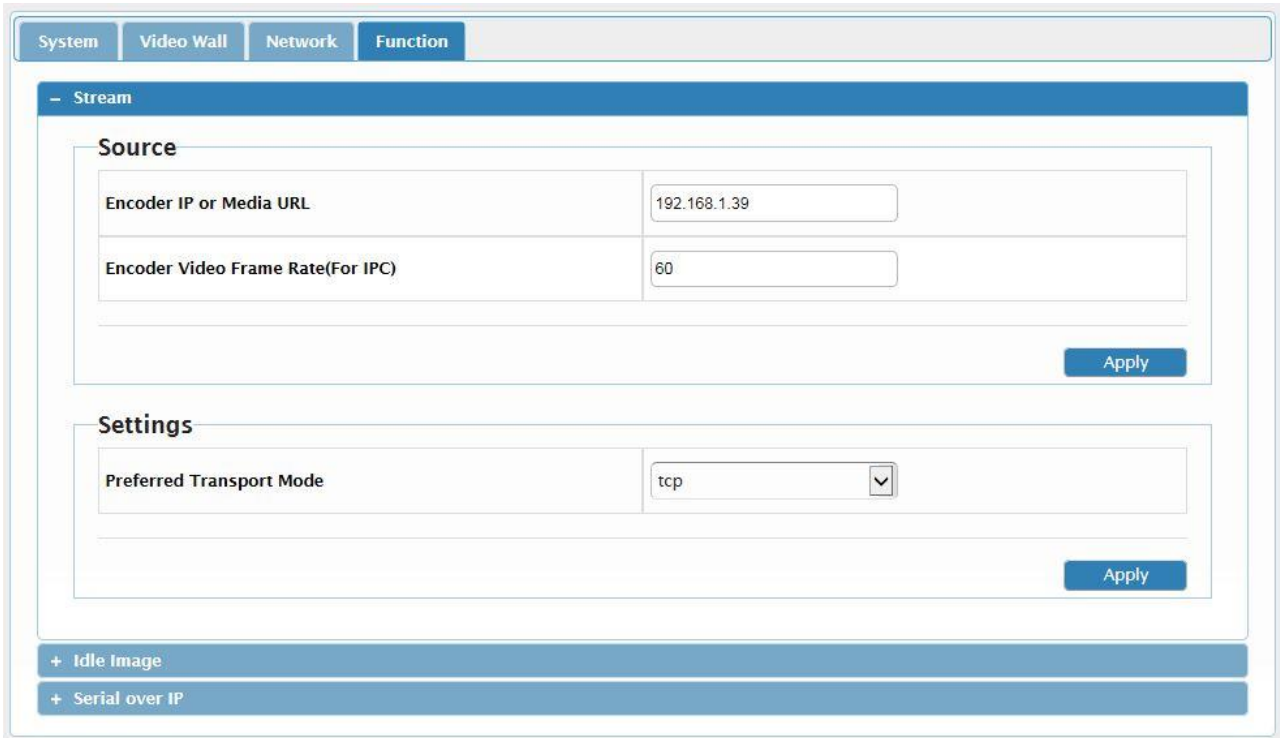




Figure 10: KDS-DEC5 Function > Stream Tab

2. In the Source section, under Encoder IP or Media URL, enter the encoder IP address (default = 192.168.1.39).
3. When using an IP camera, under Encoder Video Frame Rate (For IPC), enter the frame rate.

 The frame rate must be the same one defined on the encoder web pages (see [Configuring Streaming/Encoding Settings](#) on page 10).

4. In the Settings section, select the Preferred Transport Mode: tcp or udp.

 The transport mode must be the same one defined on the encoder web pages (see [Configuring Streaming/Encoding Settings](#) on page 10).

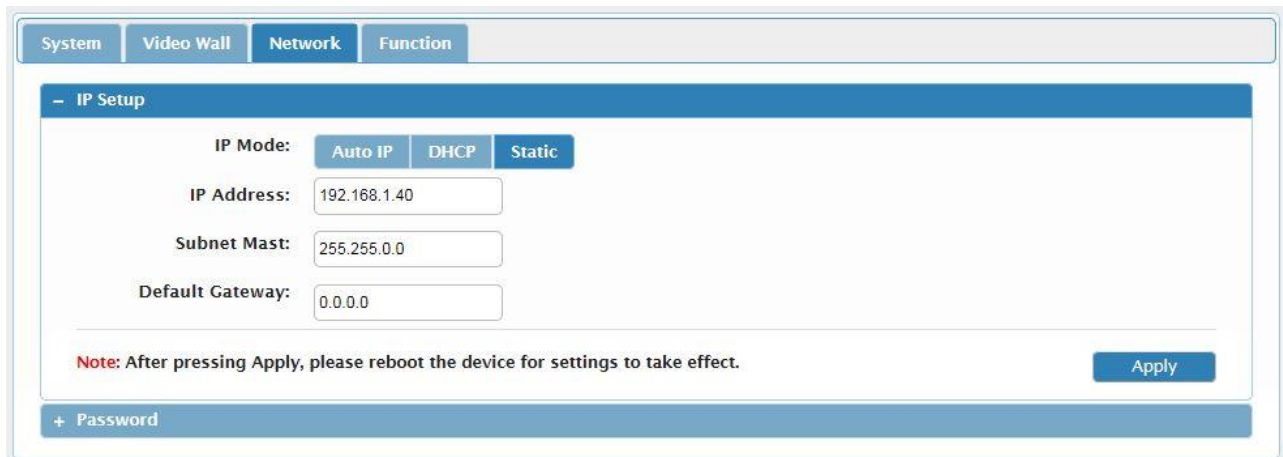


## Configuring Network Settings

KDS-EN5, KDS-DEC5 embedded web pages enable you to configure network settings.

To configure network settings:

1. Click **Network > IP Setup**.  
The IP Setup tab appears.



The screenshot shows a web interface with a navigation bar at the top containing 'System', 'Video Wall', 'Network', and 'Function'. The 'Network' tab is selected. Below the navigation bar is a blue header for the 'IP Setup' page. The main content area contains the following fields and options:

- IP Mode:** Three buttons: 'Auto IP' (selected), 'DHCP', and 'Static'.
- IP Address:** A text input field containing '192.168.1.40'.
- Subnet Mast:** A text input field containing '255.255.0.0'.
- Default Gateway:** A text input field containing '0.0.0.0'.

Below the input fields is a red note: "Note: After pressing Apply, please reboot the device for settings to take effect." To the right of the note is a blue 'Apply' button. At the bottom of the page is a blue bar with a '+' icon and the text 'Password'.

Figure 11: Network > IP Setup Tab

2. Change the network settings as required and click **Apply**.  
–OR–  
If you want the device to obtain a DHCP IP, do the following:
  - a. Click **DHCP**.
  - b. Click **Apply**.
  - c. Reboot the device.  
The changes take effect.

## Locating Device

KDS-EN5, KDS-DEC5 embedded web pages enable you to activate the status LED of the encoder or decoder to which you are connected so that you can visually locate the device in a rack.

### To locate a device:

1. On the web pages of the relevant device, click **System > Utilities**.  
The Utilities tab appears.

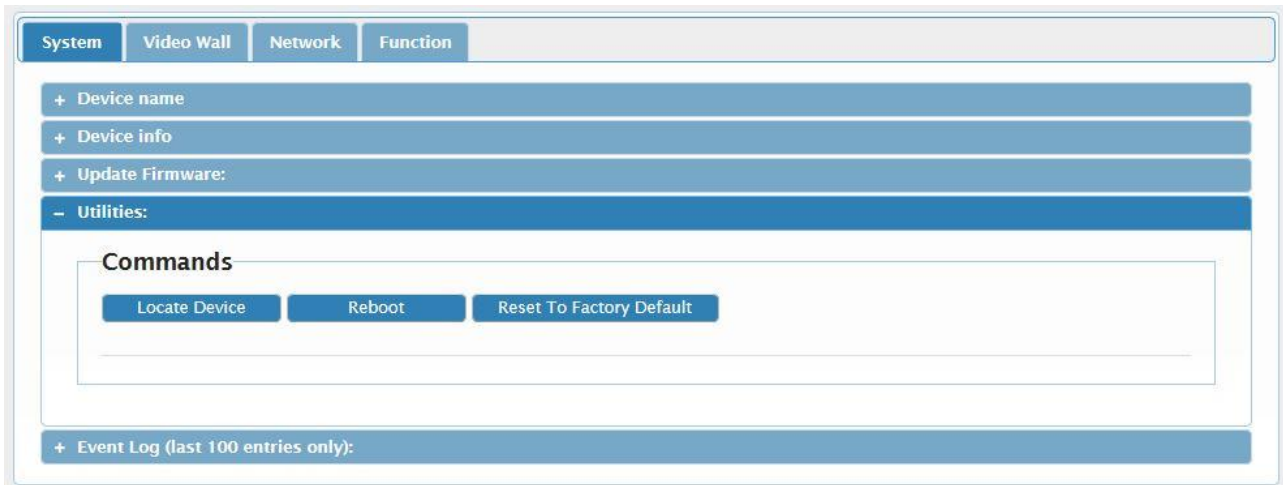


Figure 12: System > Utilities Tab

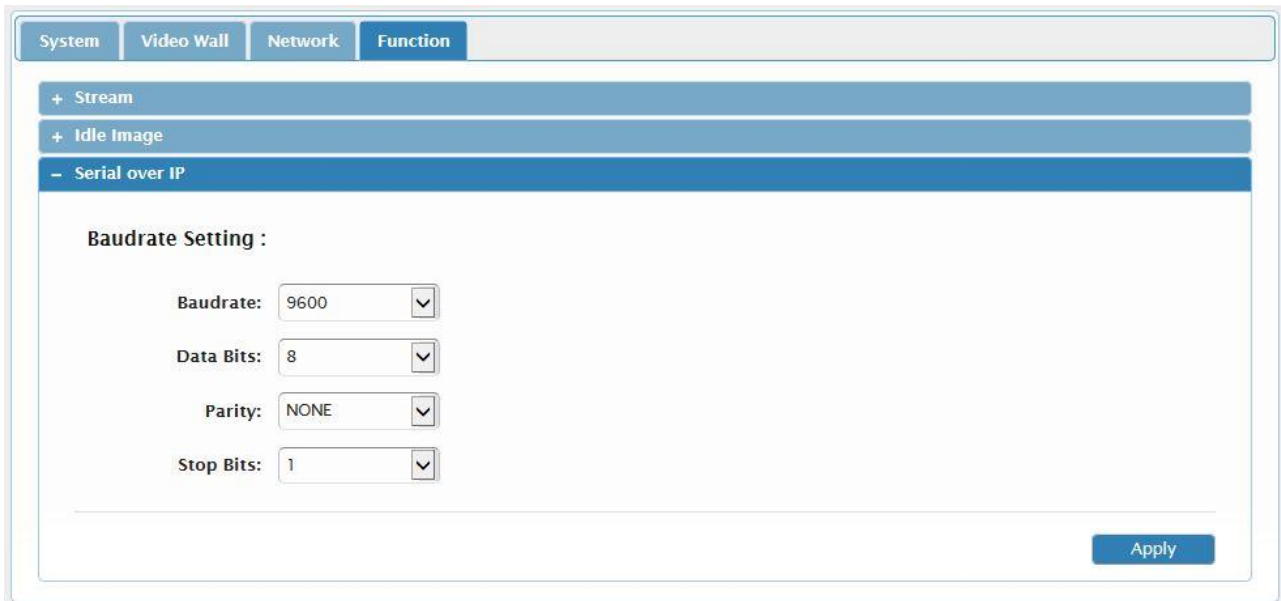
2. Click **Locate Device**.  
The status LED on the device lights for several seconds.

## Configuring RS-232 over IP Settings

KDS-EN5, KDS-DEC5 embedded web pages enable you to configure RS-232 settings for controlling an external device (e.g. a camera or display screen) via the IP controller SW / API.S.

To configure the RS-232 over IP Settings:

1. Click **Function > Serial over IP**.  
The Serial over IP tab appears.



The screenshot shows a web interface with a navigation menu at the top containing 'System', 'Video Wall', 'Network', and 'Function' tabs. The 'Function' tab is selected. Below the navigation menu, there are three expandable sections: '+ Stream', '+ Idle Image', and '- Serial over IP'. The '- Serial over IP' section is expanded, showing a 'Baudrate Setting' section with four dropdown menus: 'Baudrate' (9600), 'Data Bits' (8), 'Parity' (NONE), and 'Stop Bits' (1). An 'Apply' button is located at the bottom right of the settings area.

Figure 13: Function > Serial over IP Tab

2. Change the Baudrate Settings as needed.

## Changing the Device DNS Name

KDS-EN5, KDS-DEC5 embedded web pages enable you to change the device DNS name.

To change the device DNS name:

1. Click **System > Device Name**.  
The Device Name tab appears.



The screenshot shows a web interface with a navigation bar at the top containing tabs for 'System', 'Video Wall', 'Network', and 'Function'. The 'System' tab is selected. Below the navigation bar, there is a section titled '- Device name' with a blue header. Inside this section, there is a text input field labeled 'Device Name' containing the text '4KDecoder-001D5605105F'. Below the input field, there is a red note: 'Note: Device name must be 1~30 characters. (alphanumeric, '-' or '\_' characters only)'. To the right of the note is an 'Apply' button. Below the note, there are four expandable sections: '+ Device info', '+ Update Firmware:', '+ Utilities:', and '+ Event Log (last 100 entries only):'. Each section has a blue header and a plus sign on the left.

Figure 14: System > Device Name Tab

2. Enter the new name of the device in the Device Name text box.  
The device name cannot include any spaces, can be up to 63 characters and can include only letters, numbers, hyphens and underscores.

## Upgrading the Firmware

KDS-EN5, KDS-DEC5 embedded web pages enable you to upgrade the device firmware.



KDS-EN5, KDS-DEC5 firmware can also be upgraded via Kramer Network, go to [www.kramerav.com/product/Kramer Network](http://www.kramerav.com/product/Kramer_Network) for more information.

To upgrade KDS-EN5, KDS-DEC5 firmware:

1. Download the latest firmware from the Kramer website to your computer.
2. Click **System > Update Firmware**.  
The Update Firmware tab appears.

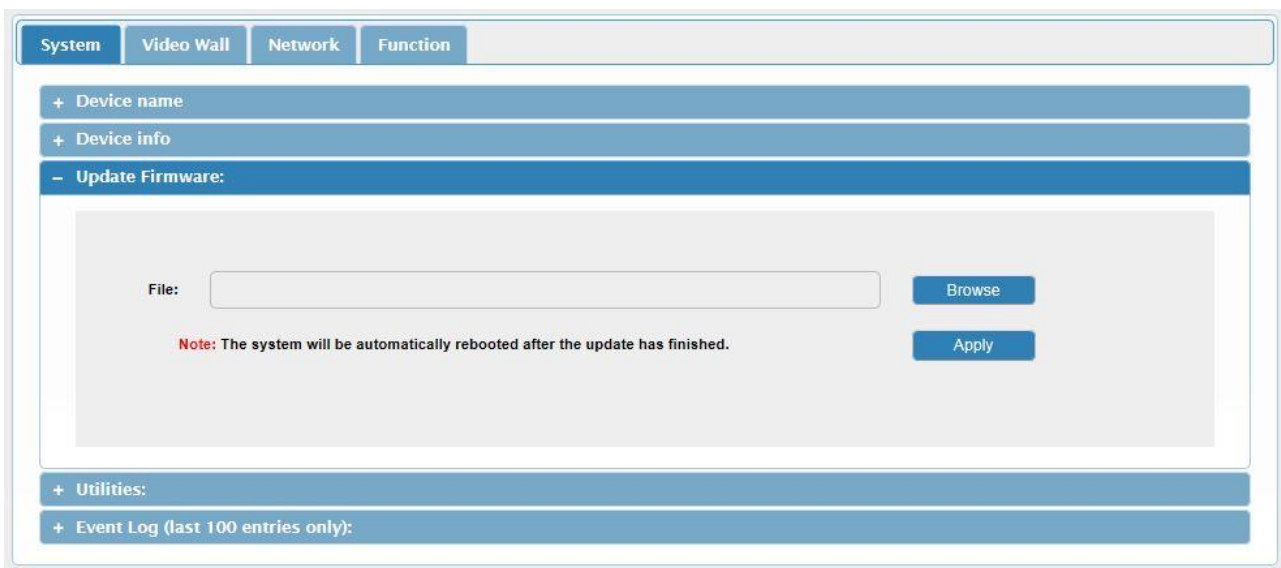


Figure 15: System > Update Firmware Tab

3. Click **Browse**.  
A file browser appears.
4. Select the new firmware file and click **Apply**.  
The updating process runs. When the update is finished, the device automatically reboots.



**Caution:** We recommend not operating the device during firmware upgrade.

## Changing Password

KDS-EN5, KDS-DEC5, web pages enable you to change the password for accessing the web pages.

To change the web pages password:

1. Click **Network > Password**.  
The Password tab appears.

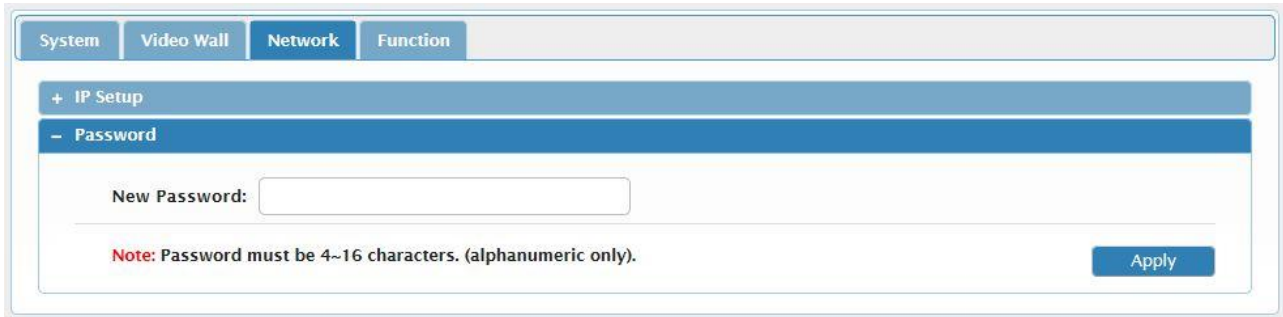
The screenshot shows a web interface with a navigation menu at the top containing 'System', 'Video Wall', 'Network', and 'Function'. Below the menu, there are two expandable sections: '+ IP Setup' and '- Password'. The 'Password' section is expanded, showing a 'New Password:' label followed by a text input field. Below the input field, a red note states: 'Note: Password must be 4~16 characters. (alphanumeric only)'. An 'Apply' button is located at the bottom right of the form area.

Figure 16: Network > Password Tab

2. Type a new password.



The password must be 4–16 alphanumeric characters.

## Configuring Video Wall

KDS-DEC5 web pages enable you to configure video wall size and positioning of each display.



This section applies only to the decoder web pages.

### To configure a video wall:

1. Connect a **KDS-DEC5** unit to each of the displays in the video wall.
2. On the **KDS-DEC5** web pages for the display in the upper left corner of the video wall, click **Video Wall > Basic Setup**.

The Basic Setup tab appears.

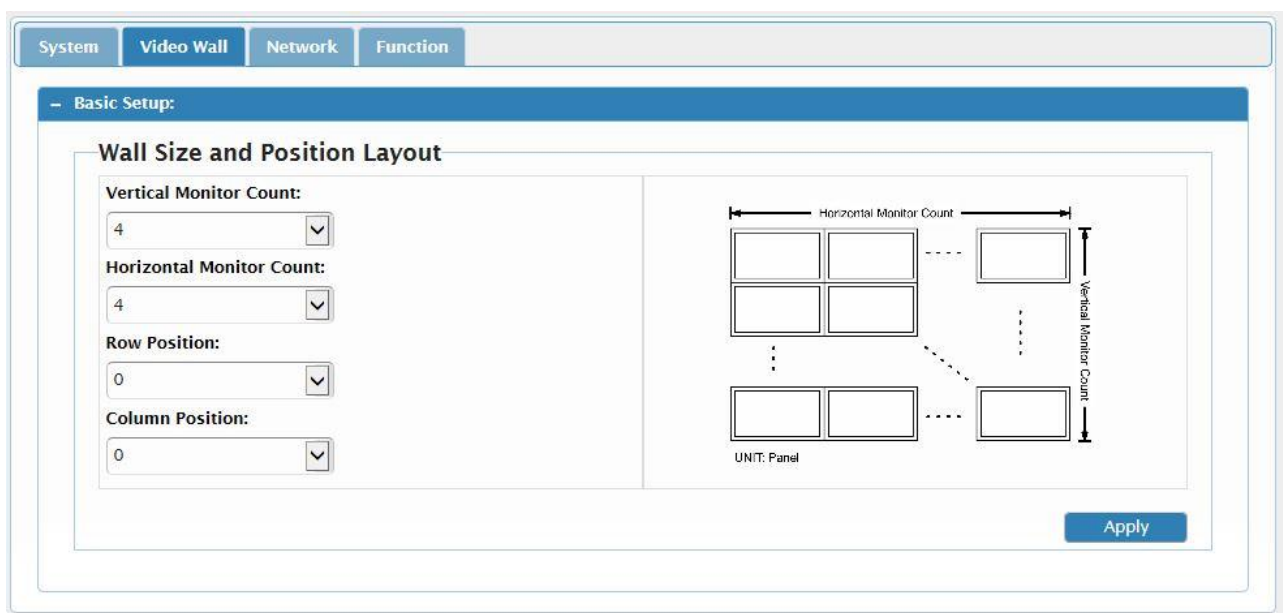



Figure 17: Video Wall > Basic Setup Tab

3. Select a number for each of the following:
  - Vertical Monitor Count – number of displays in the height of the video wall
  - Horizontal Monitor Count – number of displays in the width of the video wall
  - Row Position – number of the row in the video wall where this display is located (e.g. the display in the upper left corner of the video wall is in Row Position “1”)
  - Column Position – number of the column in the video wall where this display is located (e.g. the display in the upper left corner of the video wall is in Column Position “1”)
4. Repeat steps 1–3 on the web pages on each of the **KDS-DEC5** units in the video wall.

## Defining an Idle Image

KDS-DEC5 embedded web pages enable you to select an image that will appear on the display when the unit is on, but there is no streaming signal.

 This section applies only to the decoder web pages.

To define an idle image:

1. On the **KDS-DEC5** web pages, click **Function > Idle Image**.

The Idle Image tab appears.

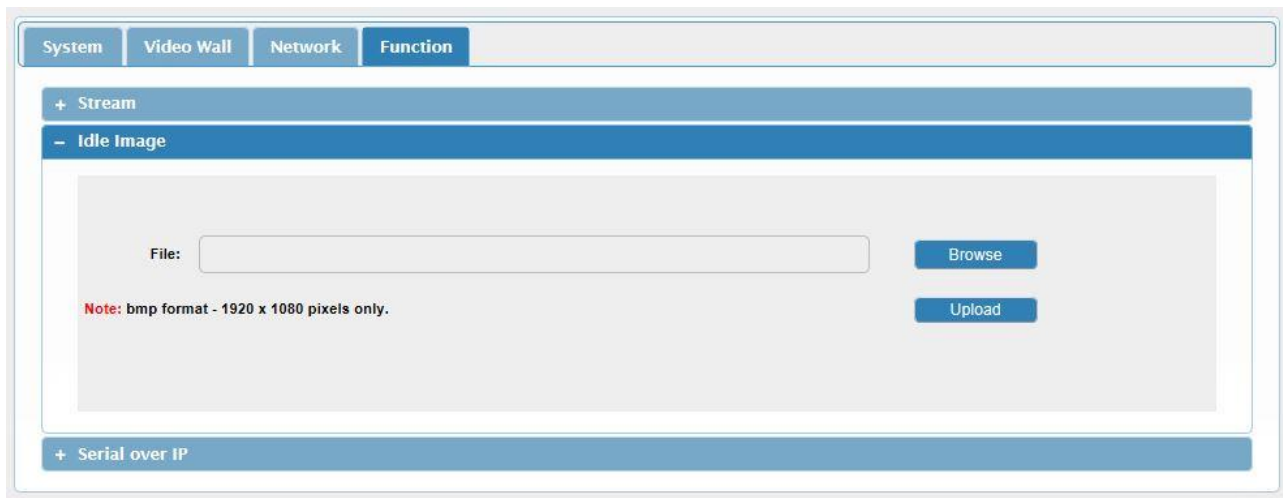



Figure 18: Function > Idle Image Tab

2. Click **Browse**.  
A file browser window appears.
3. Open the desired image file.

 The image must be a bmp file that is 1920 x 1080 pixels.

4. Click **Upload**.  
The image is uploaded to the decoder.



# Verifying Device Information

To verify information about KDS-EN5, KDS-DEC5:

- Click **System > Device Info**.  
The Device Info tab appears.

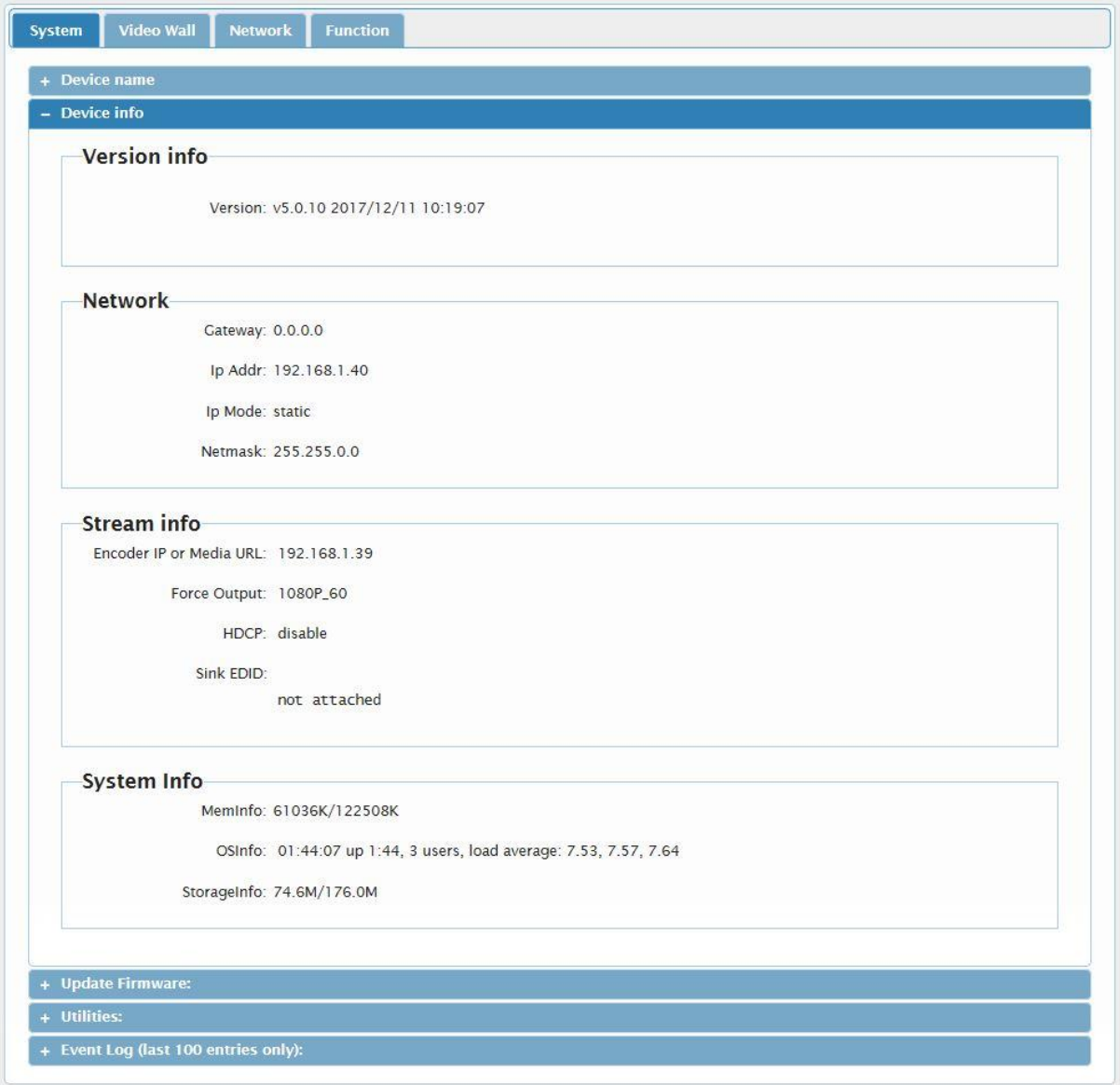


Figure 19: System > Device Info tab

# Technical Specifications

Inputs (KDS-EN5)	1 HDMI (1.4)	On a female HDMI connector
	1 Unbalanced Stereo Analog Audio	On a 3-pin terminal block connector
Outputs (KDS-DEC5)	1 HDMI (1.4)	On a female HDMI connector
	1 Unbalanced Stereo Analog Audio	On a 3-pin terminal block connector
Ports	1 Ethernet	On an RJ-45 connector
	2 RS-232	On a 3-pin terminal block connector
Video	Compression Standard	H.264/MPEG-4 AVC
	Profiles	Base line, Main, High profile
	Levels	Up to 5.0
	Rate Control	CBR, VBR, adjustable GOP size
	Bit Rates	2Mbps–30Mbps
	Encapsulation Format	MPEG-2 transport stream
	Transmission format	TS over UDP, TS over RTP
	Input Resolutions	640x480, 800x600, 1024x768, 1280x800, 1280x1024, 1360x768, 1366x768, 1440x900, 1400x1050, 1600x1200, 1680x1050, 1920x1200, 720x480 (480p), 720x576 (576p), 1280x720 (720p30), 1280x720 (720p50), 1280x720 (720p60), 1920x1080 (1080p24), 1920x1080 (1080p25), 1920x1080 (1080p30), 1920x1080 (1080p50), 1920x1080 (1080p60), 1920x1200, 3840x2160 (4Kp24), 3840x2160 (4Kp30)
Output Resolutions	640x480, 720x480 (480p), 720x576 (576p), 800x600, 1024x768, 1280x720 (720p50), 1280x720 (720p60), 1280x800, 1280x1024, 1366x768, 1440x900, 1600x1200, 1680x1050, 1920x1080 (1080p24), 1920x1080 (1080p25), 1920x1080 (1080p30), 1920x1080 (1080p50), 1920x1080 (1080p60), 1920x1200, 3840x2160 (4Kp24), 3840x2160 (4Kp30)	
Audio	Compression Standard	MPEG4 AACLC
	Channels	2 channel (stereo), HDMI with stereo LPCM/AAC audio
	Sample Frequency	48kHz
	Bitrate	1.6Mbps (LPCM), ≤240Kbps (AAC)
Supported Web Browsers	Windows 10	Microsoft Edge
Power	Source	PoE or 12V DC power supply (not included)
	Consumption	5.6W
Environmental Conditions	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
Enclosure	Type	Aluminum
	Cooling	Convection Ventilation

General	Product Dimensions (W, D, H)	21.90cm x 13.50cm x 2.50cm (8.62" x 5.31" x 0.98" ) W, D, H
	Product Weight	0.8kg (1.7lbs) approx.
	Shipping Dimensions (W, D, H)	35.10cm x 21.20cm x 7.20cm (13.82" x 8.35" x 2.83" ) W, D, H
	Shipping Weight	1.1kg (2.4lbs) approx.
Accessories	Included	Bracket set
	Optional	For optimum range and performance use recommended Kramer cables.
Specifications are subject to change without notice at <a href="http://www.kramerav.com">www.kramerav.com</a>		

## Default Communication Parameters

RS-232 Control / Protocol 3000 Parameters	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Example (start device operation):	#HELP<CR>
Ethernet Default Parameters	
Encoder IP Address:	192.168.1.39
Decoder IP Address:	192.168.1.40
Subnet mask:	255.255.0.0
Default gateway:	192.165.0.1
TCP Port #:	5000
UDP Port #:	50000

---

## Resetting the Unit

Two types of reset can be performed:

- Reboot – Reboots your unit and keeps all your unit settings, including the IP address and password.
- Factory reset – Reboots your unit and restores all factory settings, including the IP address and password.


Resetting the decoder or encoder can be accomplished by using:

- The Front Panel Reset button.
- Protocol 3000 commands (see [System Commands](#) on page [30](#)).
- Web pages.
- Kramer Network.



The device must be powered on when performing a reset.

### To reset a unit using the front panel:

- Press and hold the RESET Button  with the tip of a paper clip:
  - For reboot, hold for 2 seconds.
  - For factory reset, hold for more than 15 seconds.

### To reset a unit using the web pages:

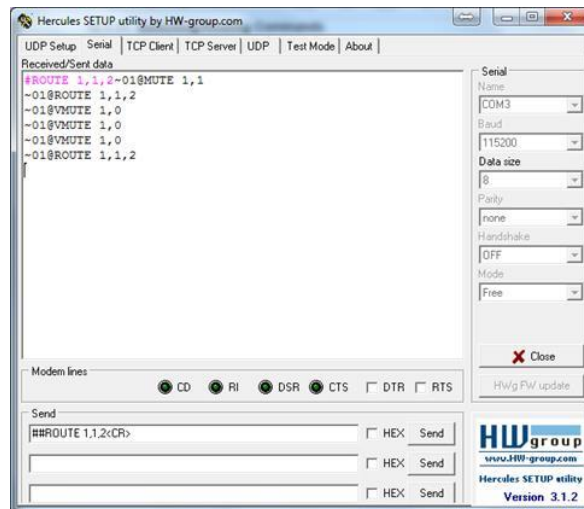
1. Click **System > Utilities**.  
The Utilities tab appears ([Figure 12](#)).
2. Click **Reboot** or **Reset to Factory Default**.


# Protocol 3000


The **KDS-EN5, KDS-DEC5 H.264 Encoder and Decoder** can be operated using the Kramer Protocol 3000 serial commands.

The command framing varies according to how you interface with a device. For example, a basic video input switching command that routes a layer 1 video signal to HDMI out 1 from HDMI input 2 (`ROUTE 1, 1, 2`), is entered as follows:

- Terminal communication software, such as Hercules:



 The above image is for illustration purposes only.

 The framing of the command varies according to the terminal communication software.

You can enter commands directly using terminal communication software (e.g., Hercules) by connecting a PC to the serial or Ethernet port on **KDS-EN5, KDS-DEC5**. To enter `CR` press the Enter key (`LF` is also sent but is ignored by the command parser).

Commands sent from various non-Kramer controllers (e.g., Crestron) may require special coding for some characters (such as, `/X##`). For more information, refer to your controller's documentation.

For more information about:

- Using Protocol 3000 commands, see [Understanding Protocol 3000](#) on page [28](#).
- General syntax used for Protocol 3000 commands, see [Kramer Protocol 3000 Syntax](#) on page [28](#).
- Protocol 3000 commands available for **KDS-EN5, KDS-DEC5**, see [Protocol 3000 Commands](#) on page [30](#).

## Understanding Protocol 3000

Protocol 3000 commands are structured according to the following:

- **Command** – A sequence of ASCII letters (A–Z, a–z and -). A command and its parameters must be separated by at least one space.
- **Parameters** – A sequence of alphanumeric ASCII characters (0–9, A–Z, a–z and some special characters for specific commands). Parameters are separated by commas.
- **Message string** – Every command entered as part of a message string begins with a message starting character and ends with a message closing character.



A string can contain more than one command. Commands are separated by a pipe (|) character.

- **Message starting character:**
  - # – For host command/query
  - ~ – For device response
- **Device address** – K-NET Device ID followed by @ (optional, K-NET only)
- **Query sign** – ? follows some commands to define a query request
- **Message closing character:**
  - CR – Carriage return for host messages (ASCII 13)
  - CR LF – Carriage return for device messages (ASCII 13) and line-feed (ASCII 10)
- **Command chain separator character** – Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|). When chaining commands, enter the message starting character and the message closing character only at the beginning and end of the string.



Spaces between parameters or command terms are ignored. Commands in the string do not execute until the closing character is entered. A separate response is sent for every command in the chain.

## Kramer Protocol 3000 Syntax

The Kramer Protocol 3000 syntax uses the following delimiters:

- CR = Carriage return (ASCII 13 = 0x0D)
- LF = Line feed (ASCII 10 = 0x0A)
- SP = Space (ASCII 32 = 0x20)

Some commands have short name syntax in addition to long name syntax to enable faster typing. The response is always in long syntax.

The Protocol 3000 syntax is in the following format:

- Host Message Format:

Start	Address (optional)	Body	Delimiter
#	<i>Device_id@</i>	<b>Message</b>	CR

- **Simple Command** – Command string with only one command without addressing:

Start	Body	Delimiter
#	<b>Command</b> <small>SP</small> <i>Parameter_1,Parameter_2,...</i>	CR

- **Command String** – Formal syntax with command concatenation and addressing:

Start	Address	Body	Delimiter
#	<i>Device_id@</i>	<b>Command_1</b> <i>Parameter1_1,Parameter1_2,...</i> <b>Command_2</b> <i>Parameter2_1,Parameter2_2,...</i> <b>Command_3</b> <i>Parameter3_1,Parameter3_2,...</i> ...	CR

- **Device Message Format:**

Start	Address (optional)	Body	Delimiter
~	<i>Device_id@</i>	<b>Message</b>	CR LF

- **Device Long Response** – Echoing command:

Start	Address (optional)	Body	Delimiter
~	<i>Device_id@</i>	<b>Command</b> <small>SP</small> [ <i>Param1,Param2 ...</i> ] <b>result</b>	CR LF

## Protocol 3000 Commands

This section includes the following commands:

- [System Commands](#) on page 30.
- [Communication Commands](#) on page 36.

### System Commands

Command	Description
#	Protocol handshaking
BUILD-DATE	Get device build date
FACTORY	Reset to factory default configuration
HELP	Get command list
MODEL	Get device model
NAME	Set/get machine (DNS) name
PROT-VER	Get device protocol version
RESET	Reset device
SN	Get device serial number
VERSION	Get device firmware version

#

Functions		Permission	Transparency
Set:	#	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Protocol handshaking	# <input type="text"/>	
Get:	-	-	
Response			
~ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			
Notes			
Validates the Protocol 3000 connection and gets the machine number. Used to identify the availability of the device.			
Example			
#<CR>			



**BUILD-DATE**

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>BUILD-DATE?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device build date	# <b>BUILD-DATE?</b> <input type="checkbox"/> CR	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>BUILD-DATE</b> <input type="checkbox"/> SPdate <input type="checkbox"/> SPtime <input type="checkbox"/> CR LF			
Parameters			
date – Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day			
time – Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
Response Triggers			
Notes			
Example			
#BUILD-DATE?<CR>			

**FACTORY**

Functions		Permission	Transparency
Set:	<b>FACTORY</b>	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device to factory default configuration	# <b>FACTORY</b> <input type="checkbox"/> CR	
Get:	-	-	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>FACTORY</b> <input type="checkbox"/> SPOK <input type="checkbox"/> CR LF			
Parameters			
Response Triggers			
Notes			
This command deletes all user data from the device. The deletion can take some time. You must power cycle the device for the changes to take effect.			
Example			
#FACTORY<CR>			

# HELP

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>HELP</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get command list or help for specific command	1. #HELP<CR> 2. #HELP<SP>COMMAND_NAME<CR>	
Response			
1. Multi-line: ~nn@Device available protocol 3000 commands:<CR LF> <i>command,&lt;SP&gt;command...&lt;CR LF&gt;</i>			
2. Multi-line: ~nn@HELP<SP>command:<CR LF>description<CR LF>USAGE:usage<CR LF>			
Parameters			
COMMAND_NAME – name of a specific command			
Response Triggers			
Notes			
Example			
1. Get a list of all KDS-EN5, KDS-DEC5 commands: #HELP<CR>			
2. Get help for the ETH-PORT command: #HELP ETH-PORT<CR>			

**MODEL**

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>MODEL?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device model	# <b>MODEL?</b> <input type="checkbox"/> CR	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>MODEL</b> <input type="checkbox"/> SPmodel_name <input type="checkbox"/> CR LF			
Parameters			
model_name – String of up to 19 printable ASCII chars			
Response Triggers			
Notes			
This command identifies equipment connected to <b>KDS-EN5</b> , <b>KDS-DEC5</b> and notifies of identity changes to the connected equipment.			
Example			
#MODEL?<CR>			

**NAME**

Functions		Permission	Transparency
Set:	<b>NAME</b>	Administrator	Public
Get:	<b>NAME?</b>	End User	Public
Description		Syntax	
Set:	Set machine (DNS) name	# <b>NAME</b> <input type="checkbox"/> SPmachine_name <input type="checkbox"/> CR	
Get:	Get machine (DNS) name	# <b>NAME?</b> <input type="checkbox"/> CR	
Response			
Set: ~ <input type="checkbox"/> <input type="checkbox"/> @ <b>NAME</b> <input type="checkbox"/> SPmachine_name <input type="checkbox"/> CR LF			
Get: ~ <input type="checkbox"/> <input type="checkbox"/> @ <b>NAME?</b> <input type="checkbox"/> SPmachine_name <input type="checkbox"/> CR LF			
Parameters			
machine_name – string of up to 63 alpha-numeric chars (can include hyphen, not at the beginning or end)			
Response Triggers			
Notes			
The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on).			
Example			
Set the machine name to Alpha: #NAME Alpha<CR>			

## PROT-VER

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>PROT-VER?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device protocol version	# <b>PROT-VER?</b> <input type="checkbox"/> <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>PROT-VER</b> <input type="checkbox"/> 3000:version <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
version – XX.XX where X is a decimal digit			
Response Triggers			
Notes			
Example			
#PROT-VER?<CR>			

## RESET

Functions		Permission	Transparency
Set:	<b>RESET</b>	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device	# <b>RESET</b> <input type="checkbox"/> <input type="checkbox"/>	
Get:	-	-	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>RESET</b> <input type="checkbox"/> OK <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
Response Triggers			
Notes			
Example			
#RESET<CR>			

**SN**

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>SN?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device serial number	# <b>SN?</b> <input type="checkbox"/> <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>SN</b> <input type="checkbox"/> <i>serial_number</i> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
<i>serial_number</i> – 11 decimal digits, factory assigned			
Response Triggers			
Notes			
This device has a 14-digit serial number, only the last 11 digits are displayed			
Example			
#SN?<CR>			

**VERSION**

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>VERSION?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get firmware version number	# <b>VERSION?</b> <input type="checkbox"/> <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>VERSION</b> <input type="checkbox"/> <i>firmware_version</i> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
<i>firmware_version</i> – XX.XX.XXXX where the digit groups are: major.minor.build version			
Response Triggers			
Notes			
Example			
#VERSION?<CR>			

## Communication Commands

Command	Description
<b>ETH-PORT</b>	Set/get Ethernet port protocol
<b>NET-GATE</b>	Set/get gateway IP
<b>NET-IP</b>	Set/get IP address
<b>NET-MAC</b>	Get MAC address
<b>NET-MASK</b>	Set/get subnet mask

### ETH-PORT

Functions		Permission	Transparency
Set:	<b>ETH-PORT</b>	Administrator	Public
Get:	<b>ETH-PORT?</b>	End User	Public
Description		Syntax	
Set:	Set Ethernet port protocol	# <b>ETH-PORT</b> [SP] <i>portType</i> , <i>ETHPort</i> [CR]	
Get:	Get Ethernet port protocol	# <b>ETH-PORT?</b> [SP] <i>portType</i> [CR]	
Response			
~nn@ <b>ETH-PORT</b> [SP] <i>portType</i> , <i>ETHPort</i> [CR LF]			
Parameters			
<i>portType</i> – string of 3 letters indicating the port type: TCP, UDP			
<i>ETHPort</i> – TCP / UDP port number: 0-65565			
Response Triggers			
Notes			
If the port number you enter is already in use, an error is returned. The port number must be within the following range: 0-(2 <sup>16</sup> -1).			
Example			
Set the Ethernet port protocol for TCP to port 12457: #ETH-PORT TCP,12457<CR>			

**NET-GATE**

Functions		Permission	Transparency
Set:	<b>NET-GATE</b>	Administrator	Public
Get:	<b>NET-GATE?</b>	End User	Public
Description		Syntax	
Set:	Set gateway IP	# <b>NET-GATE</b> <input type="text" value="ip_address"/> <input type="text" value="CR"/>	
Get:	Get gateway IP	# <b>NET-GATE?</b> <input type="text" value="CR"/>	
Response			
~ <input type="text" value="nn"/> @ <b>NET-GATE</b> <input type="text" value="ip_address"/> <input type="text" value="CR LF"/>			
Parameters			
<i>ip_address</i> – gateway IP address, in the following format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
A network gateway connects the device via another network, possibly over the Internet. Be careful of security problems. Consult your network administrator for correct settings.			
Example			
Set the gateway IP address to 192.168.0.1: #NET-GATE 192.168.000.001<CR>			

**NET-IP**

Functions		Permission	Transparency
Set:	<b>NET-IP</b>	Administrator	Public
Get:	<b>NET-IP?</b>	End User	Public
Description		Syntax	
Set:	Set IP address	# <b>NET-IP</b> <input type="text" value="ip_address"/> <input type="text" value="CR"/>	
Get:	Get IP address	# <b>NET-IP?</b> <input type="text" value="CR"/>	
Response			
~ <input type="text" value="nn"/> @ <b>NET-IP</b> <input type="text" value="ip_address"/> <input type="text" value="CR LF"/>			
Parameters			
<i>ip_address</i> – IP address, in the following format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
Consult your network administrator for correct settings			
Example			
Set the IP address to 192.168.1.39: #NET-IP 192.168.001.039<CR>			

**NET-MAC**

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>NET-MAC?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get MAC address	# <b>NET-MAC?</b> <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>NET-MAC</b> <input type="checkbox"/> <i>mac_address</i> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
<i>mac_address</i> – unique MAC address. Format: <i>XX-XX-XX-XX-XX-XX</i> where <i>X</i> is hex digit			
Response Triggers			
Notes			
Example			
#NET-MAC?<CR>			

**NET-MASK**

Functions		Permission	Transparency
Set:	<b>NET-MASK</b>	Administrator	Public
Get:	<b>NET-MASK?</b>	End User	Public
Description		Syntax	
Set:	Set subnet mask	# <b>NET-MASK</b> <input type="checkbox"/> <i>net_mask</i> <input type="checkbox"/>	
Get:	Get subnet mask	# <b>NET-MASK</b> <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>NET-MASK</b> <input type="checkbox"/> <i>net_mask</i> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
<i>net_mask</i> - format: <i>xxx.xxx.xxx.xxx</i>			
Response Triggers			
The subnet mask limits the Ethernet connection within the local network Consult your network administrator for correct settings.			
Notes			
Example			
Set the subnet mask to 255.255.0.0: `#NET-MASK 255.255.000.000", 0x0D`			



The warranty obligations of Kramer Electronics Inc. ("Kramer Electronics") for this product are limited to the terms set forth below:

#### **What is Covered**

This limited warranty covers defects in materials and workmanship in this product.

#### **What is Not Covered**

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

#### **How Long this Coverage Lasts**

The standard limited warranty for Kramer products is seven (7) years from the date of original purchase, with the following exceptions:

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates.
2. All Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, all Kramer speakers and Kramer touch panels are covered by a standard one (1) year warranty.
3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.
5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).
6. K-Touch software is covered by a standard one (1) year warranty for software updates.
7. All Kramer passive cables are covered by a ten (10) year warranty.

#### **Who is Covered**

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

#### **What Kramer Electronics Will Do**

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

#### **What Kramer Electronics Will Not Do Under This Limited Warranty**

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

#### **How to Obtain a Remedy Under This Limited Warranty**

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, visit our web site at [www.kramerav.com](http://www.kramerav.com) or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required (RMA number). You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

#### **Limitation of Liability**

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

#### **Exclusive Remedy**

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPLICABLE LAW. IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPLICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

#### **Other Conditions**

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, visit our web site at [www.kramerav.com](http://www.kramerav.com) or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.



P/N: 2900-300906



Rev: 1



## SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

We welcome your questions, comments, and feedback.