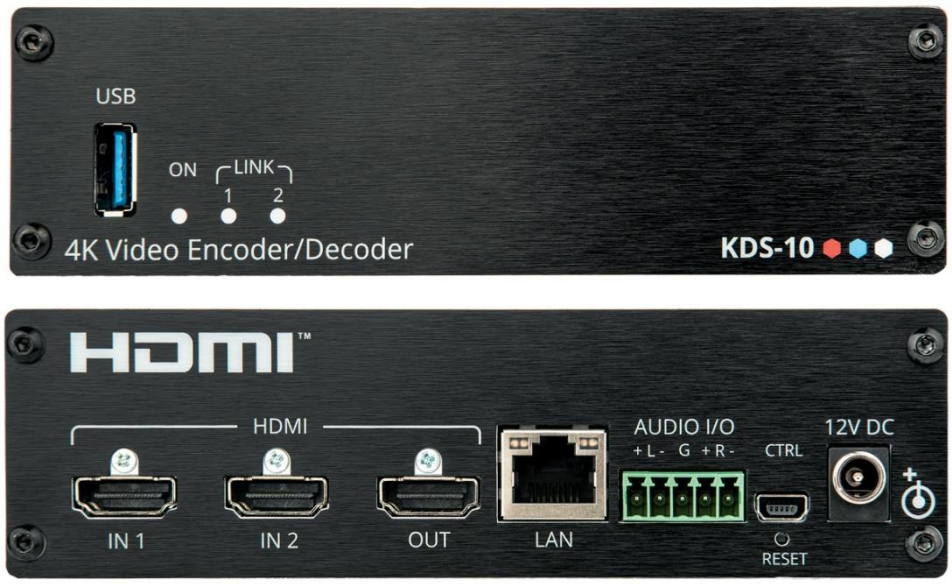
KRAMER

USER MANUAL

MODEL:

KDS-10
4K Video Encoder/Decoder



Contents

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!

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-10 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving 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-10** away from moisture, excessive sunlight and dust.

Safety Instructions

Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPI/O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.

Warning:

- Use only the power cord that is supplied with the unit.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which is located on the bottom of the unit.

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/.

Overview

Congratulations on purchasing your Kramer **KDS-10 4K Video** Encoder/Decoder. **KDS-10** is an advanced, multi-standard, dual-stream transceiver for streaming 4K@60Hz (4:4:4) video signals via Ethernet over copper cable. **KDS-10** can be set as either an encoder or decoder. As an encoder, it encodes and streams one or two HDMI™ inputs over an IP network. As a decoder, it receives the encoded signal, decodes it and outputs it to an HDMI output.

KDS-10 features:

- Advanced Video Streaming Transceiver – Streams up to 4K@60Hz (4:4:4) resolution signals over a 1G network interface, when streaming one source and 4K@30Hz (4:2:0) when streaming two sources.
- Multi-Standard Video Coding – Configure the transceivers according to your needs to stream using either H.264 or H.265.
- Flexible Input and Output Options – Includes two HDMI inputs that can be streamed alternately or together.
- Streaming Support – Unicast and multicast over RTP (Real-Time Protocol).
- Flexible Analog Audio Embedding and De-embedding – When in encoding mode, you can select the balanced analog audio input to embed into the streaming HDMI output signal. When in decoding mode, you can extract the HDMI audio signal and output it as balanced analog audio.
- Convenient and Comprehensive Control – Control the unit using intuitive embedded web pages or Protocol 3000 API commands via Ethernet.
- Simple System Management – Remote system management support to enable quick and efficient remote system and device life-cycle management.

Typical Applications

KDS-10 is ideal for the following typical applications:

- Real-time essential installations such as Command and Control centers and interactive solutions with or without KVM capabilities.
- 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.

Defining KDS-10 4K Video Encoder/Decoder

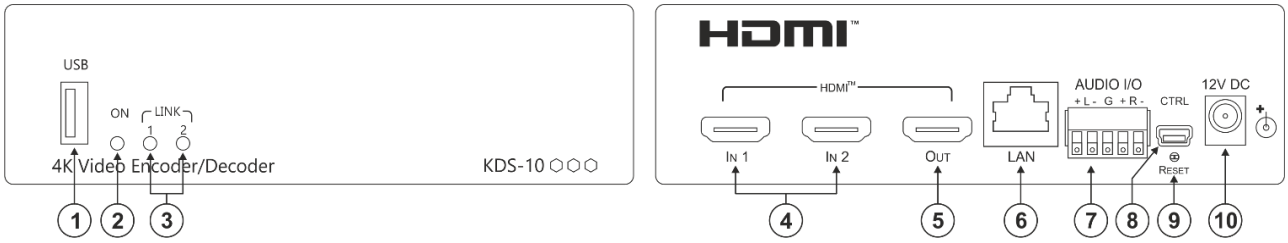


Figure 1: KDS-10 4K Video Encoder/Decoder front and back panel

#	Feature	Function	
1	USB Type A Port	For future use.	
2	POWER LED	Lights when the device is powered ON.	
3	LINK LEDs (1 & 2)	**Encoder Mode**	**Decoder Mode**
		Each LED represents an HDMI input status: • **White Flashing** – Device booting up. • **Red** – Error. HDMI In is not connected. Ethernet is not connected. • **Blue** – The stream is administratively stopped via web page interface. • **Green** – HDMI input signal detected.	LED 1 represents HDMI output. LED 2 is non-functional: • **White Flashing** – Device booting up. • **Red** – Error. HDMI Out not connected. Ethernet not connected. • **Blue** – The stream is administratively stopped via web page interface. • **Green** – HDMI output signal detected.
4	IN HDMI Connectors (1 to 2)	Connect to up to 2 HDMI sources.	
5	OUT HDMI Connector	Connect to an HDMI sink.	
6	LAN RJ-45 Connector	Connect to the network using recommended Kramer cables.	
7	AUDIO IN/OUT Balanced Stereo Audio 5-pin Terminal Block Connector	Connect to an analog audio acceptor or receiver.	
8	CTRL Mini USB Connector	Connect to PC to send P3K commands to control device.	
9	RESET button	Press and hold while powering on the device to reset to factory default parameters.	
10	12V DC Connector	Connect to the power adapter.	

Mounting KDS-10

This section provides instructions for mounting **KDS-10**. Before installing, verify that the environment is within the recommended range:

- Operation temperature – 0° to 40°C (32 to 104°F).
- Storage temperature – -20° to +70°C (-4 to +158°F).
- Humidity – 10% to 90%, RHL non-condensing.

Caution:

- Mount **KDS-10** before connecting any cables or power.

Warning:

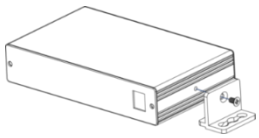
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.
- Maximum mounting height for the device is 2 meters.

Mount KDS-10 in a rack:

- Use the recommended rack adapter (see www.kramerav.com/product/KDS-10).

Mount KDS-10 on a surface using one of the following methods:

- Attach the rubber feet and place the unit on a flat surface.



Connecting KDS-10

Always switch off the power to each device before connecting it to your **KDS-10**. After connecting your **KDS-10**, connect its power and then switch on the power to each device.

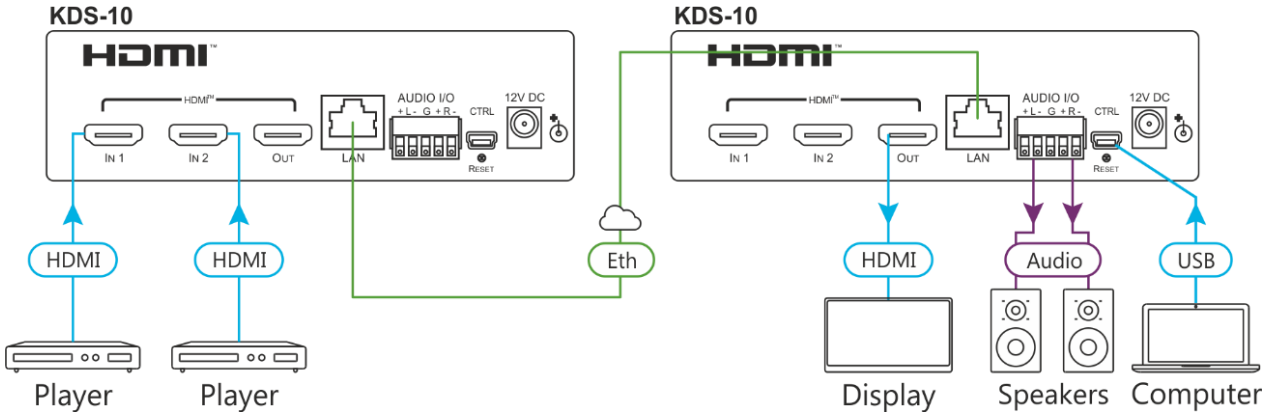


Figure 2: Connecting to the KDS-10 Rear Panel

To connect KDS-10 as illustrated in the above example:

1. Configure the encoder mode:
   a. Connect a laptop or PC to the **KDS-10** Encoder via Ethernet LAN RJ-45 Connector either directly or via IP network (6).
   b. Following the web page directions, set the **KDS-10** configuration to Encoder (see Setting KDS-10 Configuration to Encoder/Decoder on page 19).
   c. Connect the video source(s) to one or more IN HDMI connectors (1 to 2) if device configured as Encoder (4).

      One video source can stream up to 4K60 and two video sources can stream up to 4K30.

      All inputs should be non-HDCP.
2. Configure the decoder mode:
   a. Connect a laptop or PC to the **KDS-10** Decoder via Ethernet LAN RJ-45 Connector (6).
   b. Following the web page directions, set the **KDS-10** configuration to Decoder (see Setting KDS-10 Configuration to Encoder/Decoder on page 19).
   c. Connect an HDMI acceptor to the OUT HDMI Connector (5).
3. Connect Ethernet LAN RJ-45 Connector (6) from the **KDS-10** Encoder to the **KDS-10** Decoder.
4. If analog audio is required, connect speakers to AUDIO IN/OUT Balanced Stereo Audio 5-pin Terminal Block Connector (7) (see Connecting the Output to a Balanced/Unbalanced Stereo Audio Acceptor on page 7.

5. Connect the 12V DC Connector (10) power adapter to the device and the mains electricity in the following manner:
   - To the **KDS-10** decoder first (for configuration purposes, see Setting the KDS-10 System on page 8).
   - To the **KDS-10** encoder (once the decoder configuration is complete).

Connecting the Output to a Balanced/Unbalanced Stereo Audio Acceptor

The following are the pinouts for connecting the output to a balanced or unbalanced stereo audio acceptor:

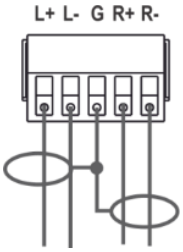


Figure 3: Connecting to a Balanced Stereo Audio Acceptor

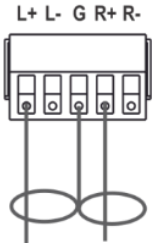


Figure 4: Connecting to an Unbalanced Stereo Audio Acceptor

Connecting a Balanced/Unbalanced Stereo Audio Source to the Balanced Input

The following are the pinouts for connecting a balanced or unbalanced stereo audio source to the balanced input:

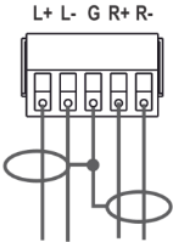


Figure 5: Connecting a Balanced Stereo Audio Source to the Balanced Input

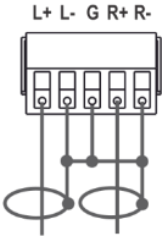


Figure 6: Connecting an Unbalanced Stereo Audio Source to the Balanced Input

Setting and Operating KDS-10

This section describes the **KDS-10** setup encoder-decoder system. To set up the system, perform the following actions:

Configuring Network Switch to Multicast Mode

Before setting up the **KDS-10** encoder and decoder, you need to configure a network switch to stream in multicast mode.

It is important that you use a 1G Managed switch with IGMP snooping layer 2.

To configure the switch:

1. Connect the switch to your PC.
2. Set the following:
   - Jumbo Frames – Off.
   - IGMP Snooping – On.
   - IGMP Querier – On.
   - IGMP Immediate/Fast Leave – Off.

Switch is configured.

Setting the KDS-10 System

This section describes the following **KDS-10** setups:

Setting a KDS-10 Encoder and Decoder System

By default, **KDS-10** is configured as an encoder. When setting a **KDS-10** encoder-decoder system, you need to set the decoder first.

To configure the encoder and decoder:

1. Connect the encoder-decoder system (see Connecting KDS-10 on page 6).
2. Connect a laptop to the network switch.
3. Make sure that power to the encoder is Off.
4. Turn the power on the decoder to On.

5. Define the device as a decoder (see Setting KDS-10 Configuration to Encoder/Decoder on page 19).
6. Change the decoder IP address (see Setting Device IP Address and Other IP Settings on page 23).
7. Define the source (encoder) IP address and streaming port (see Defining Decoder Streaming Settings on page 17).

   We recommend that for the encoder you use the default IP address.

8. Power the encoder.
9. Make sure that the streaming channel appears on the display.

KDS-10 encoder-decoder system is configured.

Setting an Encoder with a Custom Decoder

You can use a **KDS-10** encoder to stream to a custom decoder (for example, using MediaPlayer).

To configure an encoder and custom decoder:

1. Connect the encoder to the same network as the decoder.
2. Turn the encoder power On.
3. Use the following URL template to connect to a generated stream for both unicast and multicast streaming: “rtsp://ip_of_encoder:port_number/stream”.
   For example, to generate a stream from the **KDS-10** HDMI 1 input, enter the following: rtsp://192.168.1.20:554/stream.

Using Embedded Web Pages

The web pages enable you to control **KDS-10** via the Ethernet. The web pages include all the OSD items and are accessed using a Web browser and an Ethernet connection.

If a web page does not update correctly, clear your Web browser's cache.

To access KDS-10 web pages:

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

   If security is enabled, the Login window appears.

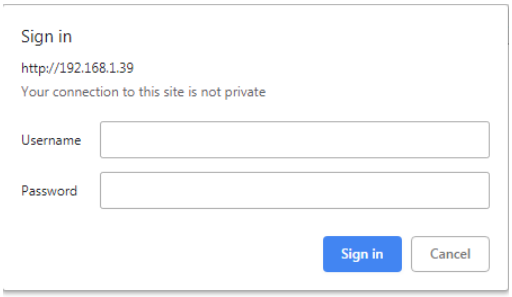


Figure 7: Embedded Web Pages Login Window

2. Enter the Username (default = Admin) and Password (default = Admin) and click **Sign in**. The default web page appears, and General settings are presented (by-default, **KDS-10** is set as an encoder.

KDS-10 Web page enables performing the following actions:

Viewing Encoder General Settings

To view encoder general settings:

1. In the Navigation Pane, click **Streaming Settings**. The Streaming Settings page appears.

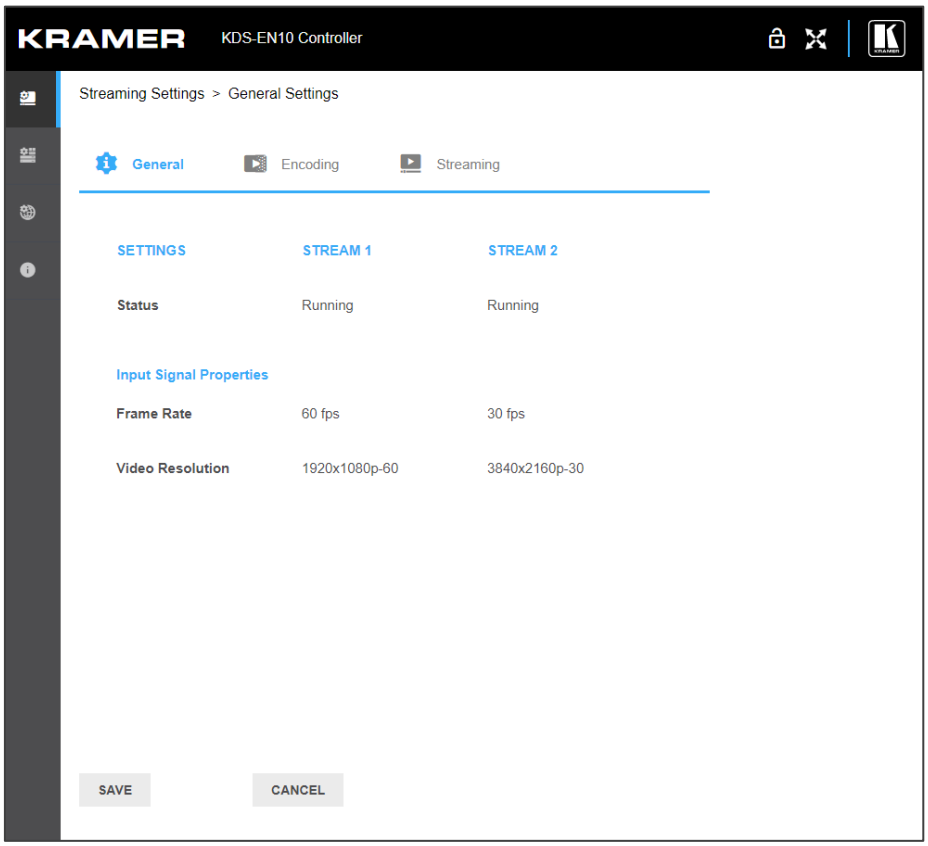


Figure 8: KDS-EN10 Default Web Page

2. View the encoder general Settings.

Encoder general settings are viewed.

Setting KDS-10 as the Decoder

To set **KDS-10** as a decoder, go to Setting KDS-10 Configuration to Encoder/Decoder on page 19.

Once **KDS-10** is defined as the Decoder, you can perform the following decoder actions:

- Viewing Decoder General Settings on page 15.
- Defining Decoding Preferences on page 16.
- Defining Decoder Streaming Settings on page 17.

Defining Encoding Preferences

You can define the encoder device preferences.

To define encoding preferences:

1. In the Navigation Pane, click **Streaming Settings**. The Streaming Settings page appears.
2. Click Encoding to open the Encoding tab.

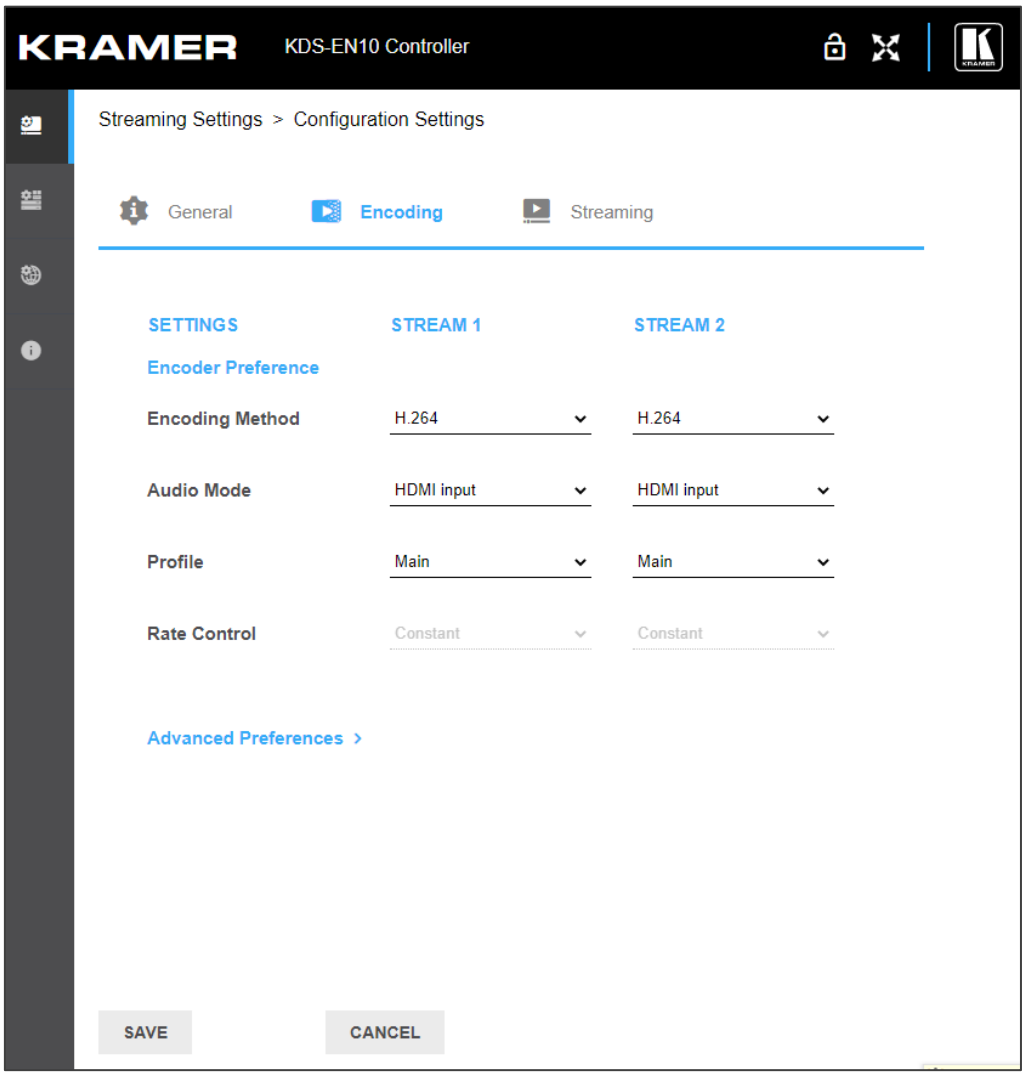


Figure 9: General Settings – Encoding Preferences

3. Open drop-down boxes to define encoder preferences for each input:
   - Set Encoding method.
   - Define Audio mode (HDMI input, Analog input, or None).
   - Set the streaming Profile to Baseline (the most simplest profile, supported by any decoder).Main or High (for highest quality streaming).

By-default Rate Control is set to Constant (CBR) mode which generates a constant bitrate that you can predefine and is recommended for limited bandwidth use cases.

4. Click **Advanced Preferences** and set the following for each input:
   - **Bitrate (kbit)** – to define the number of bits used per unit of playback time to represent a continuous medium such as audio or video after source coding (data compression.
   - **GOP** – to define the number of successive Group of Pictures within a coded video stream from which the visible frames are generated.
   - **B Frames** – to define the number of bi-directional frames (a video compression method used by the MPEG standard).
   - **Slices per Frame** – to define the number of slices produced for each frame. Each slice contains one or more complete macroblock/CTU row(s). Slices are distributed over the frame as regularly as possible.
5. Click **SAVE** to save the changes.

Encoding preferences are defined.

Defining Encoder Streaming Settings

To define encoder streaming settings:

1. In the Navigation Pane, click **Streaming Settings**. The Streaming Settings page appears.
2. Click Streaming to open the Encoder streaming tab.

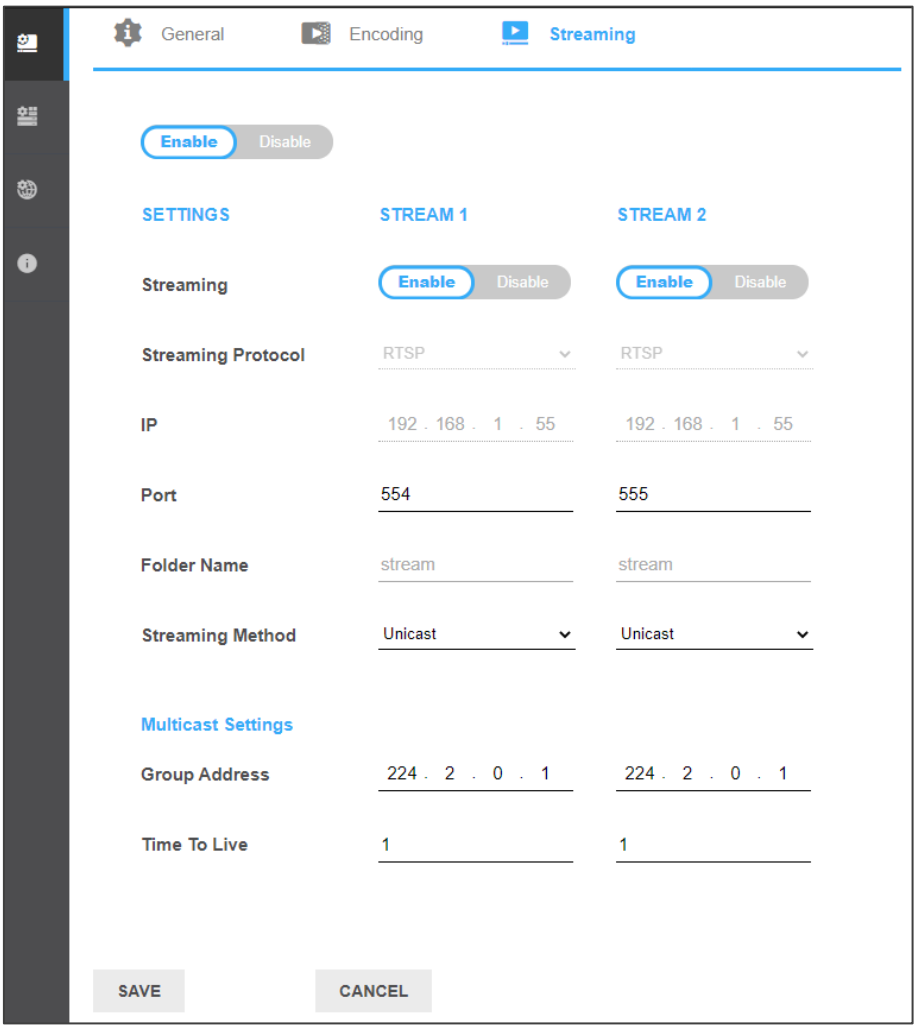


Figure 10: Streaming Settings – Encoder Streaming Tab

3. Click **Disable** to disable all streaming (at the top of the page).
4. Perform the following for each Stream 1 and Stream 2:
   - Enable or disable Streaming per input.
   - Set the streaming protocol (RTSP/UDP).
   - View the Streaming IP address (for unique identification and access) to report to the corresponding decoders.
   - Define the RTSP Port number (default ports are 554 and 555).
   - View the folder name to report to the decoder (for IP stream access).
   - Select the Streaming Method to Unicast or Multicast.

5. If streaming method is set to Multicast:
   - Enter group Address.
   - Enter time to live (TTL).

   When setting TTL, note that:
   - 1 is restricted to the same subnet.
   - 32 is restricted to the same site.
   - 64 is restricted to the same region.
   - 128 is restricted to the same continent.
   - 255 is unrestricted.

6. Click **SAVE** to save changes.

Encoder streaming settings are defined.

Viewing Decoder General Settings

To view decoder general streaming settings:

1. In the Navigation Pane, click **Streaming Settings**. The Streaming Settings page appears.

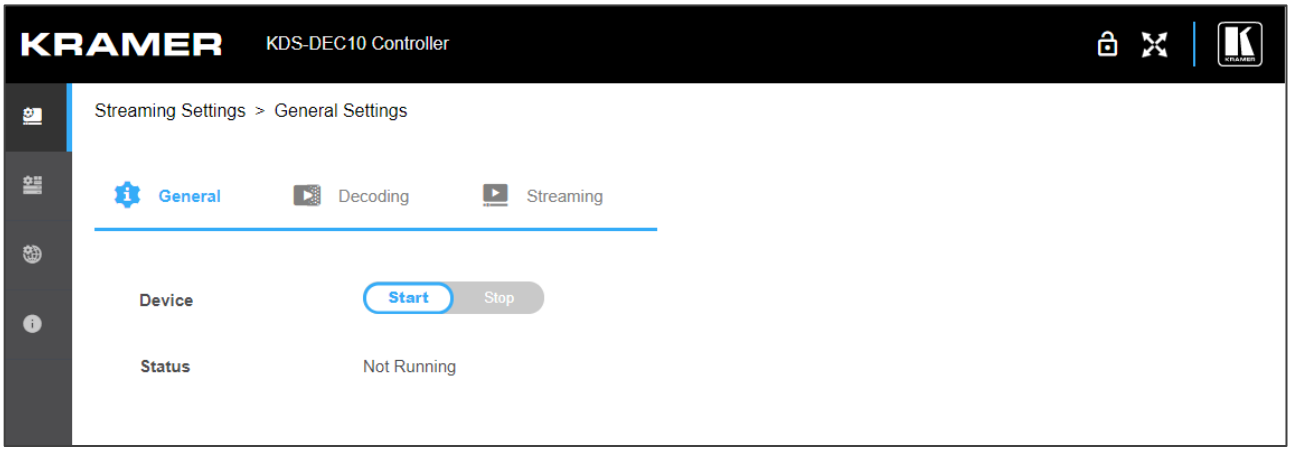


Figure 11: Decoder General Settings Tab

2. View the decoder status.

General settings are viewed.

Defining Decoding Preferences

You can view the decoding method and set the audio mode and other decoder preferences.

To set decoding preferences:

1. In the Navigation Pane, click **Streaming Settings**. The Streaming Settings page appears.
2. Click **Decoding** to open the Decoding tab.

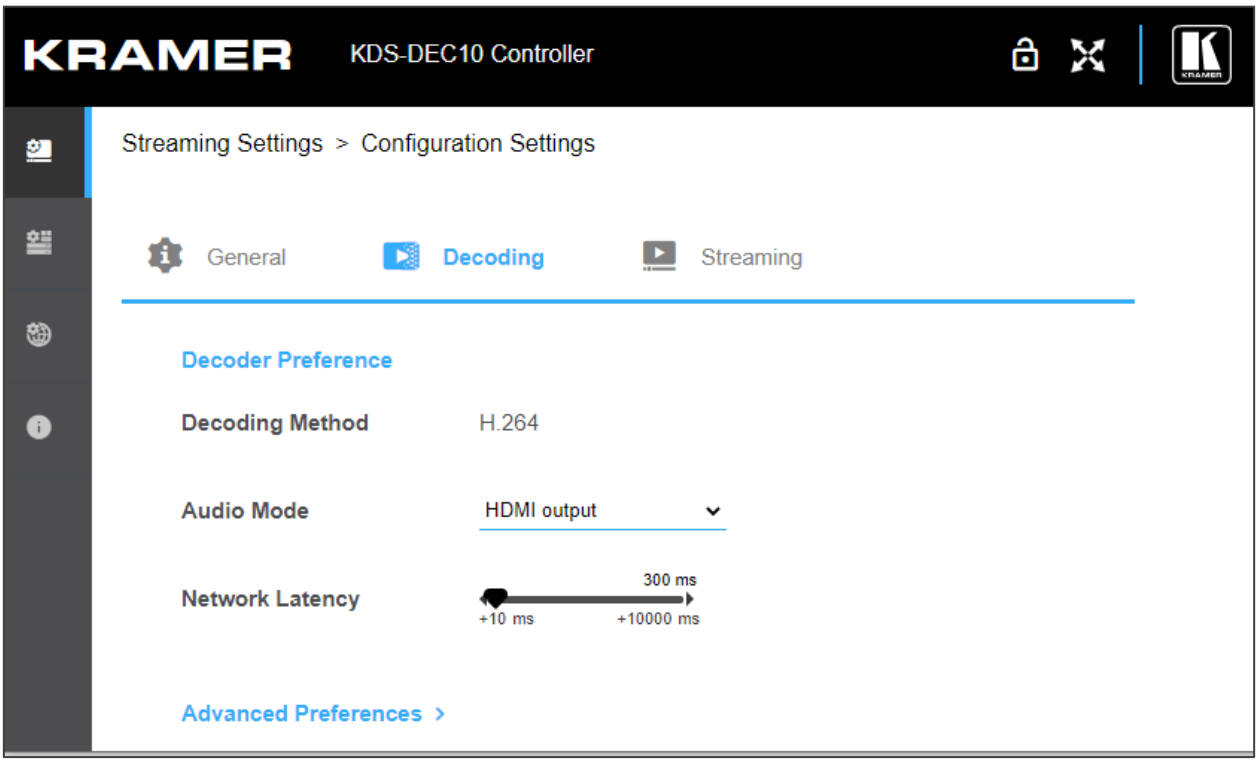


Figure 12: General Settings – Decoding Preferences

3. View the Decoding Method.
4. Set the Audio mode via the drop-down box (HDMI output, Analog output, Both or None).
5. Use the slider to define Network Latency.
6. Click **Advanced Preferences** to set the following:
   - Define the streaming quality.
   - View the Scale Mode.
   - Sync the clock (Sync or Not Sync).
7. Click **SAVE** to save the changes.

Decoding preferences are set.

Defining Decoder Streaming Settings

To define decoder streaming settings:

1. In the Navigation Pane, click **Streaming Settings**. The Streaming Settings page appears.
2. Click **Streaming** to open the Decoder streaming tab.

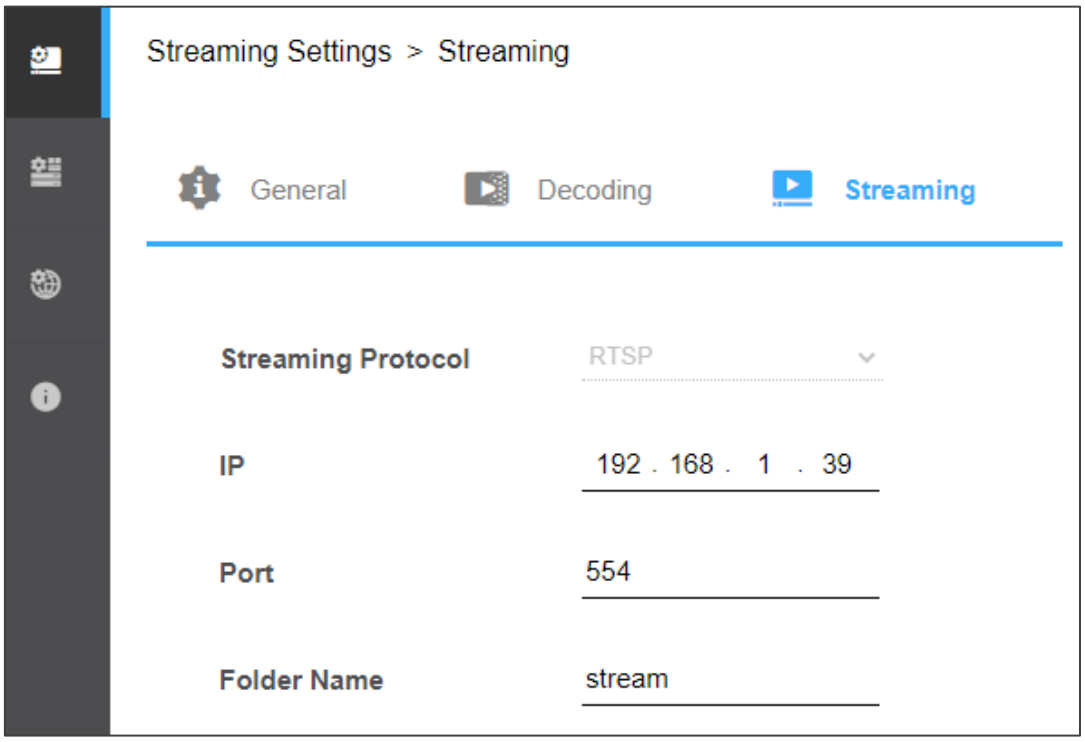


Figure 13: Streaming Settings – Decoder Streaming Tab

3. Perform the following for each Stream 1 and Stream 2:
   - View the streaming protocol (RTSP/UDP).
   - Enter the **encoder** streaming IP address.

     You need to enter the **encoder** IP address for the decoder to recognize the encoder to which it needs to connect.

   - Define the Port number (default ports are 554 for HDMI 1 and 555 for HDMI 2 on the encoder).

     Default ports are 554 to view/display Input 1 at the Encoder, and 555 to view Input 2 at the Encoder.

   - Enter folder name (do not change for **KDS-10** stream).
4. Click **SAVE** to save changes.

Decoder streaming settings are defined.

Defining Device General Settings

The Device General Settings page enables you to perform the following functions:

- Changing Device Name on page 18.
- Viewing device model and serial Number.
- Updating Firmware on page 19.
- Setting KDS-10 Configuration to Encoder/Decoder on page 19.
- Resetting Device on page 19.

Changing Device Name

To change device name:

1. In the navigation bar, click the **Device Settings** tab.

   The Device General Settings page appears (see Figure 14).

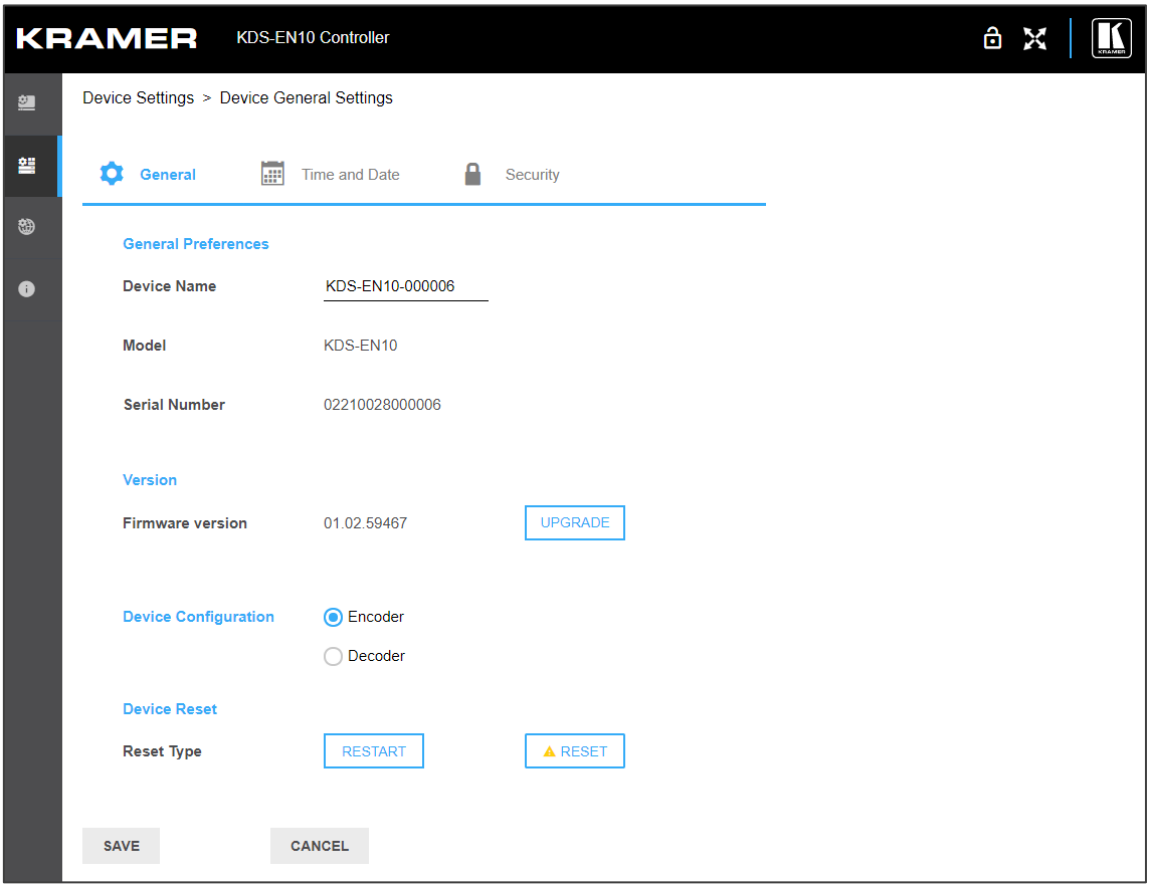


Figure 14: Device General Settings Page

2. Type a new device name and click **SAVE**.

The device name is changed.

Updating Firmware

To update firmware:

1. In the navigation bar, click the **Device Settings** tab.

   The Device General Settings page appears (see Figure 14).

2. Click **UPGRADE**.

   A file browser appears.

3. Open the relevant firmware file.

The firmware uploads to the device.

Setting KDS-10 Configuration to Encoder/Decoder

To set encoder/decoder configuration:

1. In the navigation bar, click the **Device Settings** tab.

   The Device General Settings page appears (see Figure 14).

2. Select **Encoder** or **Decoder** and click **SAVE**.
   Wait for the re-initialization of the device.

   Do not disconnect from power during this operation until the device completes the reset process.
   Note that the device loses all previous configuration parameters except for the IP address of the device.

The device is set as an encoder or decoder mode.

Resetting Device

To restart or reset the device:

1. In the navigation bar, click the **Device Settings** tab.

   The Device General Settings page appears (see Figure 14).

2. do the following:

   - To restart the **KDS-10** and refresh the web page, click **RESTART**, and follow the directions.
   - To reset the **KDS-10** to factory defaults, click **RESET** and follow the directions.

Device is restarted/reset.

Setting Device Date and Time

The Device Time and Date Settings page enables you to perform the following actions:

- Changing Device Date and Time Manually on page 20.
- Setting Device Date and Time According to External Server on page 21.

Changing Device Date and Time Manually

To change device date and time:

1. In the navigation bar, click the **Device Settings** tab.

   The Device General Settings page appears (see Figure 14).

2. Click **Time and Date.**

   The Device Date and Time Settings page appears (see Figure 15).

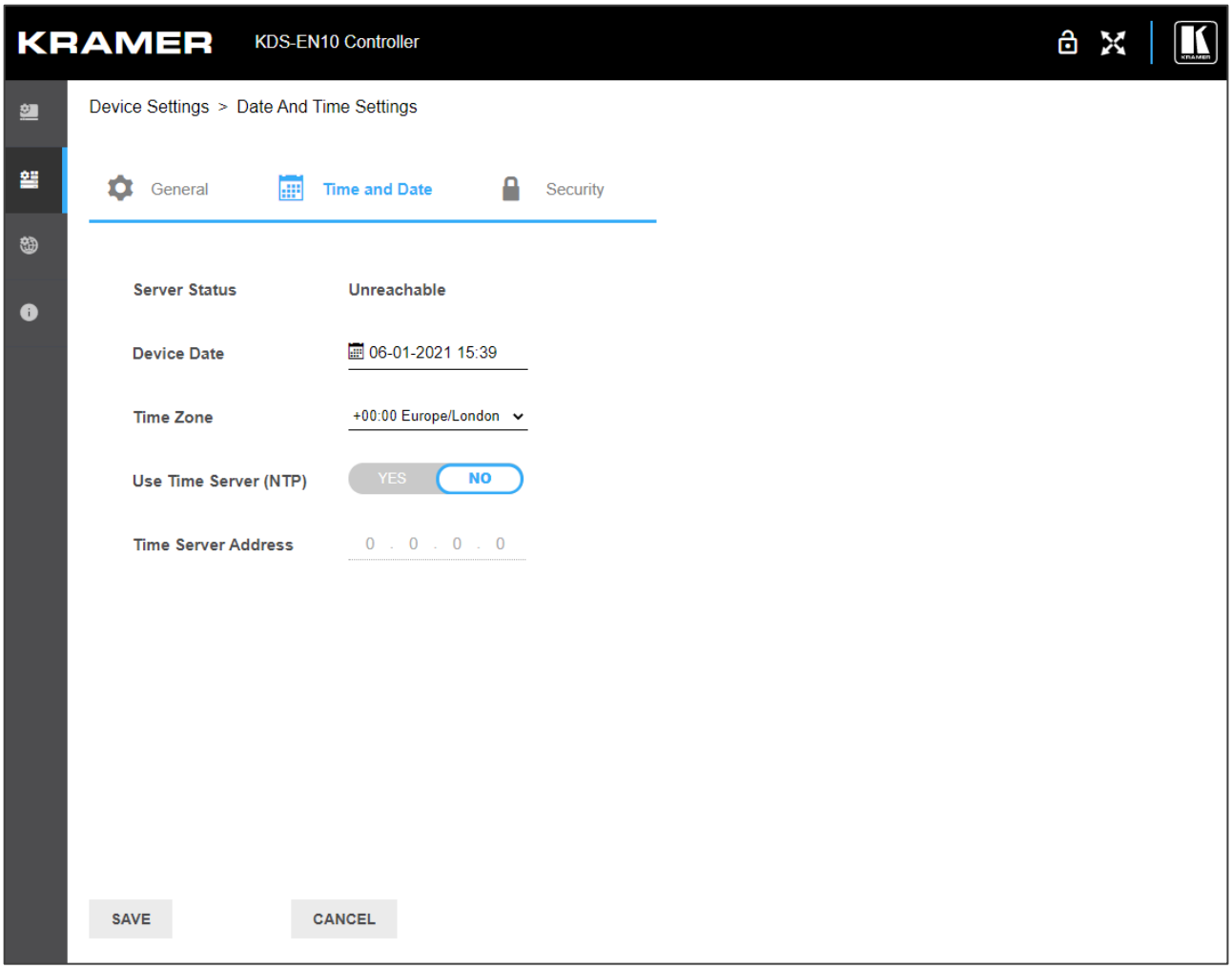


Figure 15: Device Date and Time Settings Page

3. Click the current Device Date.

   A dialog pops up allowing you to change date and time.

4. Modify the date and time.
5. Select a time zone from the dropdown list.
6. Click **SAVE**.

The date and time on the device are changed.

Setting Device Date and Time According to External Server

To set device date and time according to external server:

1. In the navigation bar, click the **Device Settings** tab.

   The Device General Settings page appears (see Figure 14).

2. Click Time and Date.

   The Device Date and Time Settings page appears (see Figure 15).

3. Set **Use Time Server (NTP)** to yes.

4. Enter a valid IP address for Time Server Address and click **SAVE.**

The date and time on the device are changed according to an external server.

Setting Device Security

The security Settings page enables you to require a password to lock and unlock the web page.

To set device security:

1. In the navigation bar, click the **Device Settings** tab.

   The Device General Settings page appears (see Figure 14).

2. Click **Security.**

   The Device Security Settings page appears (see Figure 16).

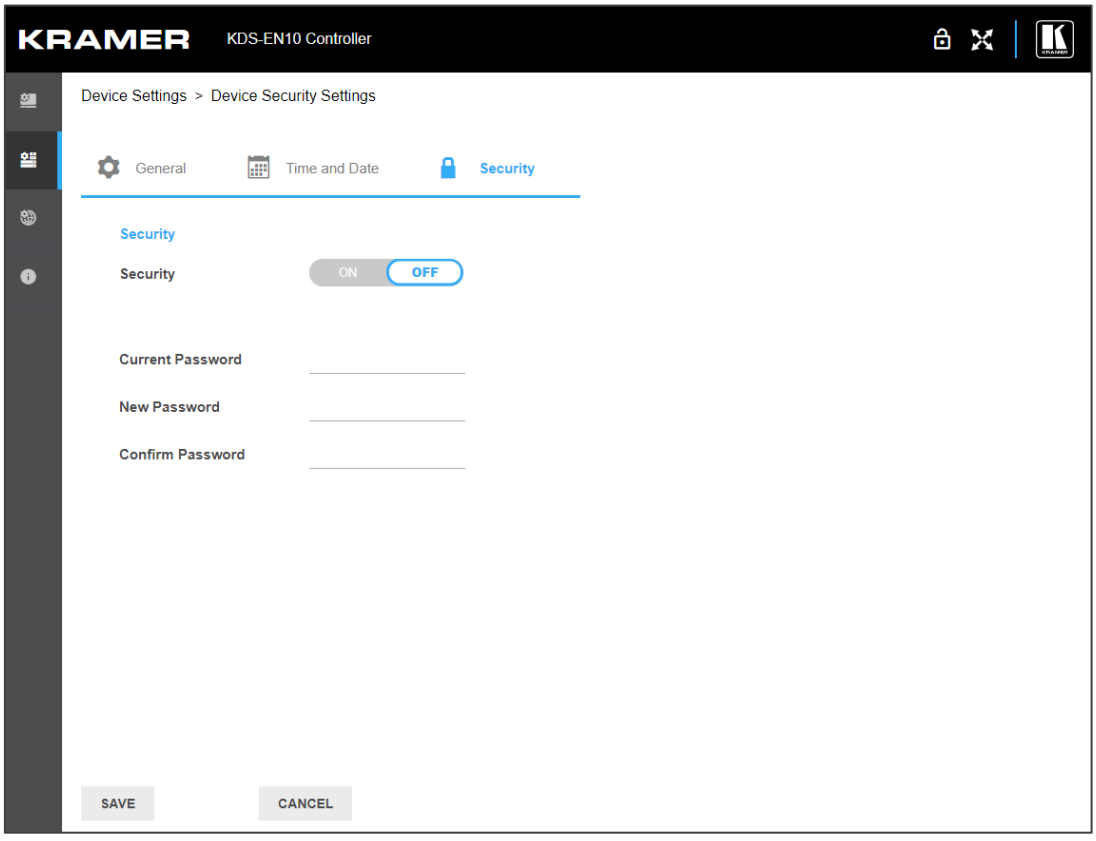


Figure 16: Device Security Settings Page

3. Set Security to **ON**.

   The open lock icon located in the upper right changes to a locked icon.
4. Enter Old Password (if it exists).
5. Enter New Password, and then Confirm Password.
6. Click **SAVE.**

Default password is **Admin**

Device security is set.

Defining Network Settings

The Network Settings page enables you to:

- Setting DHCP to On/Off on page 22.
- Setting Device IP Address and Other IP Settings on page 23.

Setting DHCP to On/Off

To set DHCP to On/Off:

1. In the navigation bar, click the **Network Settings** tab.

   The Network Settings page appears (see Figure 17).

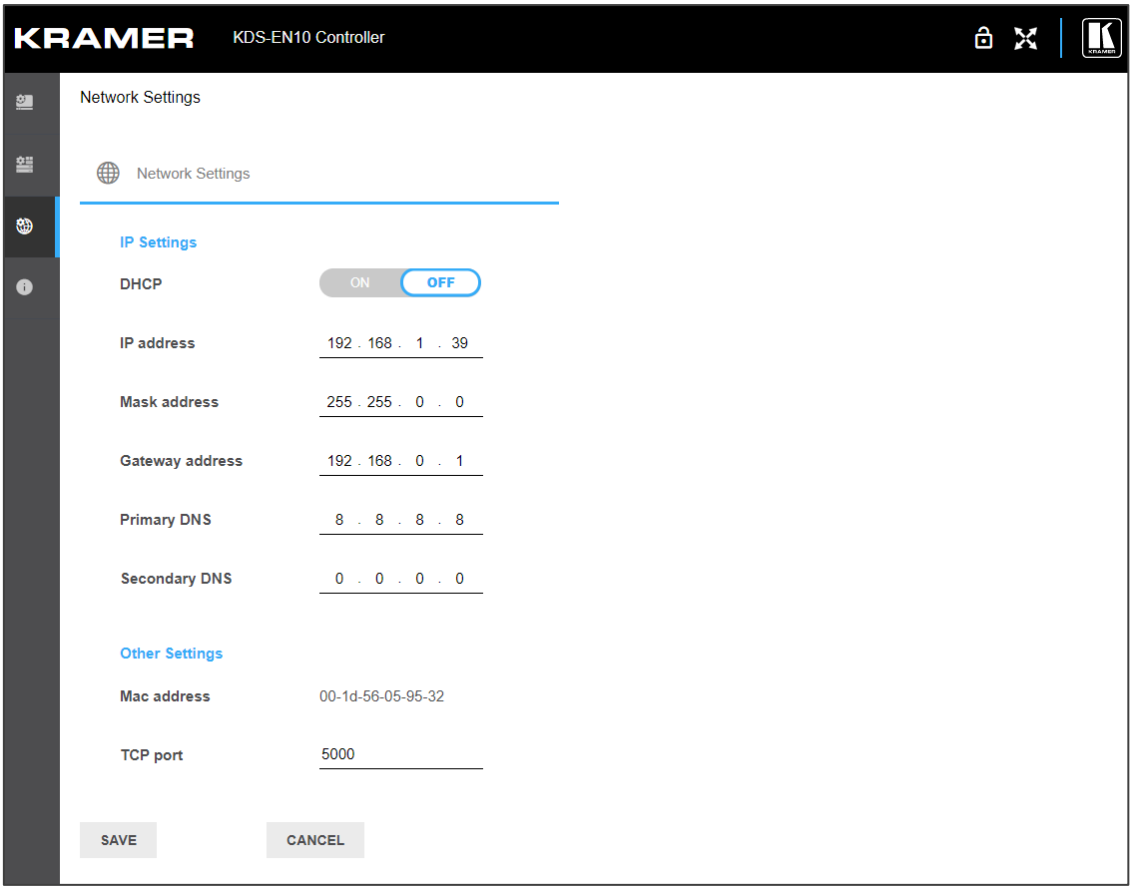


Figure 17: Network Settings Page

2. Select DHCP **ON** or **OFF** and follow the directions.

   It might take several seconds to take on the changes.

DHCP is set.

Setting Device IP Address and Other IP Settings

To set device IP address and other IP settings:

1. In the navigation bar, click the **Network Settings** tab.

   The Network Settings page appears (see Figure 17).

2. Modify an IP setting and click **SAVE**.

IP settings are modified.

Viewing About Page

The **KDS-10** About page lets you view the web page version and Kramer Electronics Ltd details.

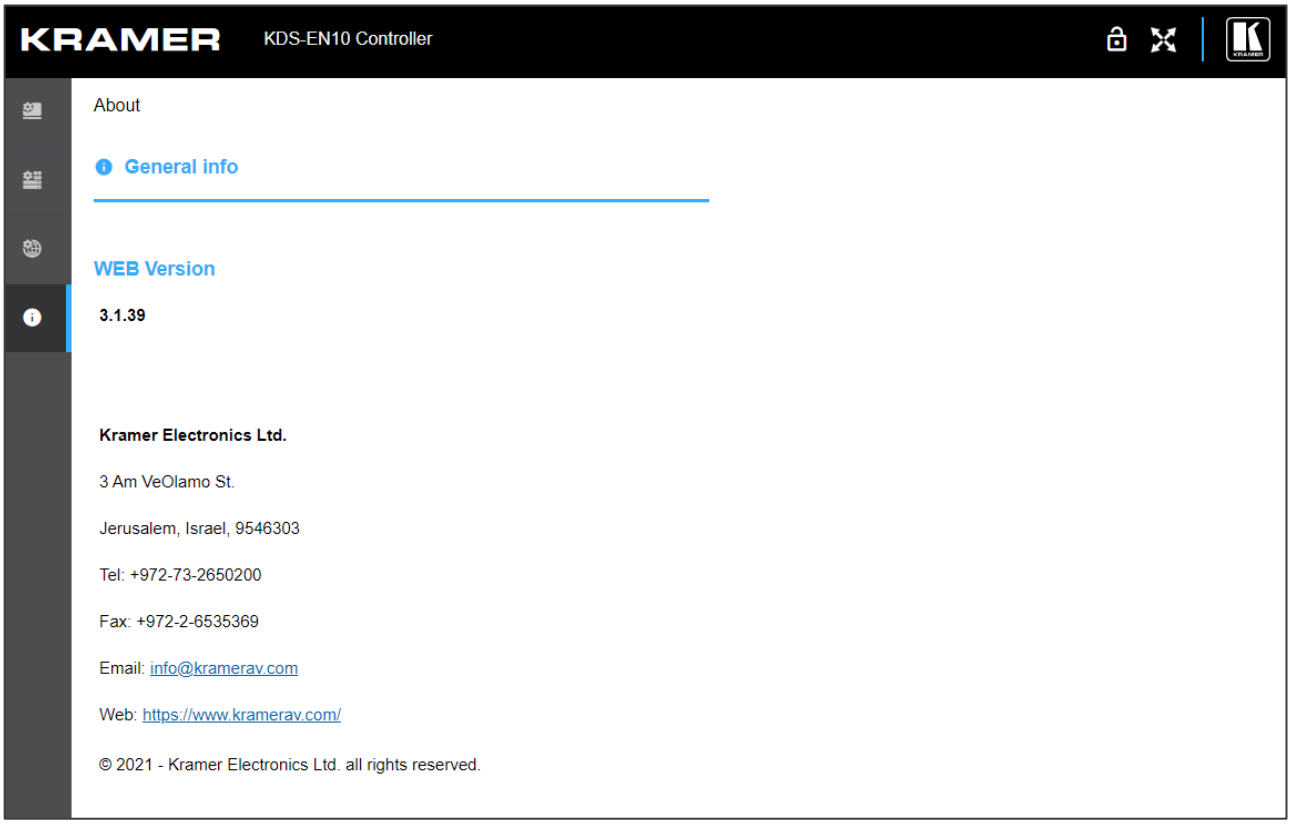


Figure 18: The About Page

Technical Specifications

Inputs	2 HDMI	On female HDMI connectors
Outputs	HDMI	On a female HDMI connector
Ports	Ethernet	On an RJ-45 connector
	Balanced Stereo Audio	On a 5-pin terminal block connector
	USB	On a mini-USB connector
Video	Max Resolution	4K@60Hz (4:4:4)
	Streaming Resolution	4K@60Hz (4:2:0) – One stream 4K@30Hz (4:2:0) – Two simultaneous streams
Indication LEDs	Front Panel	Link and power LEDs
Controls	Front Panel	Restart and factory reset
	Other	API, embedded web pages, and RTSP via Ethernet, API commands via serial USB.
Power	Max Consumption	1.7A
	Source	12V DC, 2A
Environmental Conditions	Operating Temperature	0° to +40°C (32° to 104°F)
	Storage Temperature	-20° to +70°C (-4° to 158°F)
	Humidity	10% to 90%, RHL non-condensing
Regulatory Compliance	Safety	CE, UL
	Environmental	RoHs, WEEE
Enclosure	Size	1/3 19” 1U
	Type	Aluminum
	Cooling	Convection ventilation
General	Net Dimensions (W, D, H)	14.3cm x 12.2cm x 4.36cm (5.63" x 4.80" x 1.72") W, D, H
	Shipping Dimensions (W, D, H)	31.9cm x 16.5cm x 6.7cm (12.6" x 6.5" x 2.6")
	Net Weight	0.5 kg (1.1lbs)
	Shipping Weight	1.0kg (2.3lbs) approx.
Accessories	Included	Power adapter and cord
Specifications are subject to change without notice at www.kramerav.com		

Default Communication Parameters

RS-232	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Ethernet	
To reset the IP settings to the factory reset values go to: Menu->Setup -> Factory Reset-> press Enter to confirm	
IP Address:	192.168.1.39
Subnet mask:	255.255.0.0
Default gateway:	192.168.0.1
TCP Port #:	5000 for P3K; 80 for Web UI
Default username:	Admin
Default password:	Admin

Default EDID

0x00, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0x00, 0x2D, 0xB2, 0x73, 0x06, 0xD6, 0x12, 0x00, 0x00,
0xFF, 0x1D, 0x01, 0x03, 0x80, 0x59, 0x32, 0x78, 0x0A, 0xEE, 0x91, 0xA3, 0x54, 0x4C, 0x99, 0x26,
0x0F, 0x50, 0x54, 0x20, 0x08, 0x00, 0x71, 0x4F, 0x81, 0xC0, 0x81, 0x00, 0x81, 0x80, 0x95, 0x00,
0xA9, 0xC0, 0xB3, 0x00, 0x01, 0x01, 0x08, 0xE8, 0x00, 0x30, 0xF2, 0x70, 0x5A, 0x80, 0xB0, 0x58,
0x8A, 0x00, 0x20, 0xC2, 0x31, 0x00, 0x00, 0x1E, 0x00, 0x00, 0x00, 0xFC, 0x00, 0x4B, 0x52, 0x41,
0x4D, 0x45, 0x52, 0x20, 0x4B, 0x44, 0x53, 0x31, 0x30, 0x0A, 0x00, 0x00, 0x00, 0xFD, 0x00, 0x18,
0x4B, 0x0F, 0x8C, 0x3C, 0x00, 0x0A, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x00, 0x00, 0x00, 0x10,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x01, 0x2B,
0x02, 0x03, 0x38, 0x70, 0x57, 0xE1, 0x10, 0x1F, 0x21, 0x20, 0x5D, 0x5E, 0x5F, 0x60, 0x48, 0x67,
0x68, 0x69, 0x6B, 0x6A, 0x22, 0x3E, 0x04, 0x3E, 0x3D, 0x41, 0x43, 0x45, 0x23, 0x09, 0x04, 0x04,
0x6D, 0x03, 0x0C, 0x00, 0x10, 0x00, 0x78, 0x3C, 0x20, 0x00, 0x60, 0x01, 0x02, 0x03, 0x67, 0xD8,
0x5D, 0xC4, 0x01, 0x78, 0x80, 0x07, 0xE1, 0x0F, 0x11, 0x3A, 0x80, 0x18, 0x71, 0x38, 0x2D, 0x40,
0x58, 0x2C, 0x45, 0x00, 0x20, 0xC2, 0x31, 0x00, 0x00, 0x1E, 0x11, 0xE8, 0x00, 0x30, 0xF2, 0x70,
0x5A, 0x80, 0xB0, 0x58, 0x8A, 0x00, 0x20, 0xC2, 0x31, 0x00, 0x00, 0x1E, 0x11, 0x74, 0x00, 0x30,
0xF2, 0x70, 0x5A, 0x80, 0xB0, 0x58, 0x8A, 0x00, 0x20, 0x52, 0x31, 0x00, 0x00, 0x1E, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x8B

Protocol 3000

Kramer devices can be operated using Kramer Protocol 3000 commands sent via serial or Ethernet ports.

Understanding Protocol 3000

Protocol 3000 commands are a sequence of ASCII letters, structured according to the following.

- **Command format**:

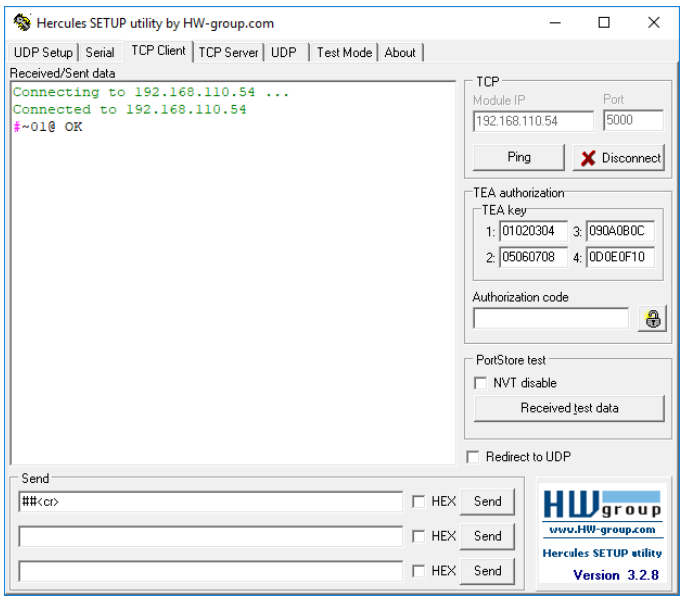
Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	␣	Parameter	<CR>

- **Feedback format**:

Prefix	Device ID	Constant	Command Name	Parameter(s)	Suffix
~	nn	@	Command	Parameter	<CR><LF>

- **Command parameters** – Multiple parameters must be separated by a comma (,). In addition, multiple parameters can be grouped as a single parameter using brackets ([and]).
- **Command chain separator character** – Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|).
- **Parameters attributes** – Parameters may contain multiple attributes. Attributes are indicated with pointy brackets (<…>) and must be separated by a period (.).

The command framing varies according to how you interface with **KDS-10**. The following figure displays how the # command is framed using terminal communication software (such as Hercules):



Protocol 3000 Commands

Command	Description	Syntax	Device
BUILD-DATE?	Prints build date		ENC, DEC
DISPLAY?	Display output plug state (0=unplugged, 1=plugged, 2=plugged and EDID is ready)	syntax: <output port num (1..n)>	DEC
ETH-PORT	Sets protocol port	syntax: <UDP/TCP>,<port>	ENC, DEC
ETH-PORT?	Gets protocol port	syntax: <UDP/TCP>	ENC, DEC
FACTORY	Reset device to factory defaults		ENC, DEC
GEDID	ReadEDID	syntax: <stage 0-INP,1-OUT,DEF-2> <stage_id> <size>	ENC, DEC
HELP	This help	syntax: [<Command Name>]	ENC, DEC
KDS-ACTION	Set action to perform by encoder (0=Stop,1=Play,2=Save config) (input:'*' for all inputs)	syntax: <input>,<action>	ENC, DEC
KDS-ACTION?	Get last action (0=Stop,1=Play)	syntax: <input>	ENC, DEC
KDS-AUD	Set audio input source	syntax: <input>,<sourceid>	ENC, DEC
KDS-AUD?	Set audio input source	syntax: <input>,<sourceid>	ENC, DEC
KDS-B-FRAMES	Set current streaming b-frames (Number of B-frames between two consecutive P-frames 0..4)	syntax: <input>,<frames>	ENC, DEC
KDS-BR	Set encoder bitrate in kbps (1kbps..60Mbps)	syntax: <input>,<bitrate>	ENC,
KDS-CODEC-ENC-PROFILE	Set current streaming profile H264-(0=Main,1=Baseline,2=High) for H265-(0=Main)	syntax: <input>,<profile>	ENC,
KDS-CONN	Set streaming connection parameters	syntax: <input>,<P1>,<P2>,<P3>	ENC, DEC
KDS-CONN?	Get current streaming connection parameters	syntax: <input>,<P1>,<P2>,<P3>	ENC, DEC
KDS-EN	Set encoding method to encoder	syntax: <input>,<method>	ENC, DEC
KDS-EN?	Get current encoding method	syntax: <input>,<method>	ENC, DEC
KDS-FEATURE	Set encoder feature and its status	syntax: <feature_id>,<isEnable>	ENC, DEC
KDS-FEATURE?	Get encoder feature and its status	syntax: <feature_id>	ENC, DEC
KDS-FR?	Get encoder frame rate	syntax: <input>,<framerate>	ENC
KDS-GOP	Set encoder GOP size	syntax: <input>,<gop_value>	ENC
KDS-GOP?	Get encoder GOP size	syntax: <input>,<gop_value>	ENC
KDS-LATENCY	Set network latency estimated	syntax: <channel>,<number>	DEC
KDS-LATENCY?	Get network latency estimated	syntax: <channel>,<number>	DEC
KDS-METHOD	Set encoding method to encoder (1-Unicast,2-Multicast)	syntax: <input>,<method>	ENC
KDS-METHOD?	Get current encoding method	syntax: <channel>,<method> (0=Unicast,1=Multicast) error when RTSP	ENC
KDS-METHOD?	Get current encoding method	syntax: <input>,<method>	ENC

Command	Description	Syntax	Device
KDS-MOD?	Get encoder working mode (3=HighQuality)	syntax: <input>,<mode>	ENC, DEC
KDS-MULTICAST	Set multicast group address value	syntax: <input>,<value>	ENC
KDS-MULTICAST?	Get multicast group address value	syntax: <input>,<value>	ENC
KDS-NUM-SLICES	Set current streaming number of slices produced for each frame	syntax: <input>,<slices>	ENC
KDS-NUM-SLICES?	Get current streaming number of slices produced for each frame	syntax: <input>,<slices>	ENC
KDS-OP-STAT?	Get operational status perform by encoder	syntax: <input>,<statuscode>	ENC, DEC
KDS-PROT?	Get current streaming protocol (RTSP=1)	syntax: <input>,<protocol>	ENC, DEC
KDS-RTP-PARAM	Set RTP video and audio port	syntax: <input>,<video_port>,<audio_port>	ENC
KDS-RTP-PARAM?	Get RTP video and audio port	syntax: <input>,<video_port>,<audio_port>	ENC
KDS-SCALE	Set video scaler mode	syntax: <channel>,<number>,<resol>	DEC
KDS-SCALE?	Get video scaler mode	syntax: <channel>,<number>,<resol>	DEC
KDS-SYNC-CLOCK	Set streaming sink SyncClock parameter (0:disable,1:enable kds4mode)	syntax: <channel>,<enable>	DEC
KDS-SYNC-CLOCK?	Get streaming sink SyncClock parameter (0:disable,1:enable kds4mode)	syntax: <channel>,<enable>	DEC
LDEDID	Load EDID	syntax: <dst_type 0-INP,1-OUT,DEF-2> <dest_bitmask> <size> <safe_mode 0-as is,1-edit>	ENC
LOGIN	Logs into privilege mode	syntax: <USER/ADMIN>,<passwd>	ENC, DEC
LOGIN?	Is this a privilege session		ENC, DEC
LOGOUT	Logs out current session		ENC, DEC
MODEL?	Get device model name		ENC, DEC
NAME	Set device name	syntax: <device name>	ENC, DEC
NAME?	Get device name		ENC, DEC
NAME-RST	Reset device name to default		ENC, DEC
NET-CONFIG	Set the network config	syntax: <id>,<ip>,<netmask>,<gw>[,<dns1>[,<dns2>]]	ENC, DEC
NET-CONFIG?	Get the network config per interface	syntax: [<id>]	ENC, DEC
NET-DHCP	Sets DHCP on and off	syntax: [<id>],<1>	ENC, DEC
NET-DHCP?	Gets DHCP state	syntax: [<id>]	ENC, DEC
NET-DNS	Set DNS address	syntax: [<id>],<dns-id>,<ip>	ENC, DEC
NET-DNS?	Get DNS address	syntax: [<id>],<dns-id>	ENC, DEC
NET-GATE	Sets gateway address	syntax: <gw ip>	ENC, DEC
NET-GATE?	Get gateway address	syntax: [<id>]	ENC, DEC

Command	Description	Syntax	Device
NET-IP	Set the device's IP	syntax: <ip>	ENC, DEC
NET-IP?	Get the device's IP	syntax: [<id>]	ENC, DEC
NET-MAC?	Gets the MAC address		ENC, DEC
NET-MASK	Sets the netmask	syntax: <netmask>	ENC, DEC
NET-MASK?	Gets the netmask	syntax: [<id>]	ENC, DEC
PASS	Sets protocol password	syntax: <USER/ADMIN>,<passwd>	ENC, DEC
PASS?	Gets protocol password	syntax: <USER/ADMIN>	ENC, DEC
PORTS-LIST?	Get all portIDs list		ENC
PROT-VER?	Get protocol version		ENC, DEC
RESET	Resets the device/Full reboot		ENC, DEC
SECUR	Sets protocol security	syntax: <ON/OFF>	ENC, DEC
SECUR?	Is the protocol security on		ENC, DEC
SIGNAL?	Get signal detection at input (0:no signal, 1:signal detected)	syntax: <input>,<status>	ENC
SN?	Get device serial number		ENC, DEC
TIME	Set the current time	syntax: YYYY-MM-DD HH:MM:SS	ENC, DEC
TIME?	Get the current time		ENC, DEC
TIME-SRV	Set the ntp time server	syntax: <is active>,<server>	ENC, DEC
TIME-SRV?	Get the ntp time server		ENC, DEC
TIME-ZONE	Set time zone	syntax: <timezone-in-string>	ENC, DEC
TIME-ZONE?	Get time zone		ENC, DEC
TIME-ZONE-LIST?	Get the time zones list		ENC, DEC
VERSION?	Get firmware version		ENC, DEC

Result and Error Codes

Syntax

In case of an error, the device responds with an error message. The error message syntax:

- **~NN@ERR XXX<CR><LF>** – when general error, no specific command
- **~NN@CMD ERR XXX<CR><LF>** – for specific command
- **NN** – machine number of device, default = 01
- **XXX** – error code

Error Codes

Error Name	Error Code	Description
P3K_NO_ERROR	0	No error
ERR_PROTOCOL_SYNTAX	1	Protocol syntax
ERR_COMMAND_NOT_AVAILABLE	2	Command not available
ERR_PARAMETER_OUT_OF_RANGE	3	Parameter out of range
ERR_UNAUTHORIZED_ACCESS	4	Unauthorized access
ERR_INTERNAL_FW_ERROR	5	Internal FW error
ERR_BUSY	6	Protocol busy
ERR_WRONG_CRC	7	Wrong CRC
ERR_TIMEDOUT	8	Timeout
ERR_RESERVED	9	(Reserved)
ERR_FW_NOT_ENOUGH_SPACE	10	Not enough space for data (firmware, FPGA…)
ERR_FS_NOT_ENOUGH_SPACE	11	Not enough space – file system
ERR_FS_FILE_NOT_EXISTS	12	File does not exist
ERR_FS_FILE_CANT_CREATED	13	File can’t be created
ERR_FS_FILE_CANT_OPEN	14	File can’t open
ERR_FEATURE_NOT_SUPPORTED	15	Feature is not supported
ERR_RESERVED_2	16	(Reserved)
ERR_RESERVED_3	17	(Reserved)
ERR_RESERVED_4	18	(Reserved)
ERR_RESERVED_5	19	(Reserved)
ERR_RESERVED_6	20	(Reserved)
ERR_PACKET_CRC	21	Packet CRC error
ERR_PACKET_MISSED	22	Packet number isn't expected (missing packet)
ERR_PACKET_SIZE	23	Packet size is wrong
ERR_RESERVED_7	24	(Reserved)
ERR_RESERVED_8	25	(Reserved)
ERR_RESERVED_9	26	(Reserved)
ERR_RESERVED_10	27	(Reserved)
ERR_RESERVED_11	28	(Reserved)
ERR_RESERVED_12	29	(Reserved)
ERR_EDID_CORRUPTED	30	EDID corrupted
ERR_NON_LISTED	31	Device specific errors
ERR_SAME_CRC	32	File has the same CRC – not changed
ERR_WRONG_MODE	33	Wrong operation mode
ERR_NOT_CONFIGURED	34	Device/chip was not initialized

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; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.
2. Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, ring mounted adapters, portable power chargers, Kramer speakers, and Kramer touch panels are covered by a standard one (1) year warranty. Kramer 7-inch touch panels purchased on or after April 1st, 2020 are covered by a standard two (2) year warranty.
3. 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 lifetime 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. If a direct or similar replacement product is supplied, the original product’s end warranty date remains unchanged and is transferred to the replacement 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 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

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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 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.

KRAMER

P/N: 2900-301458 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 website where updates to this user manual may be found.

We welcome your questions, comments, and feedback.

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