KRAMER

USER MANUAL

MODEL:

ASPEN-32UFX, ASPEN-1616UX, VS-8UFX 12G SDI Matrix Switcher

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/ASPEN-32UFX 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 **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX** 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 power cord that is supplied with the unit.

Warning: Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only.

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.

Overview

Congratulations on purchasing your Kramer **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX 12G SDI Matrix Switcher**.

ASPEN-32UFX, ASPEN-1616UX, VS-8UFX are matrix switchers for SDI signals of up to 12G. They equalize the input signal and reclock the output signal to gain extended-reach signal extension. **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX** are easy to operate and control through the network using the intuitive web pages and through RS-232 using a serial controller.

ASPEN-32UFX and **VS 8UFX** have interchangeable inputs and outputs. Each SDI port can be defined as either an input or output, enabling flexible configurations such as a 1x7 distribution amplifier, 7x1 switcher, 4x4 matrix switcher or any other possible input-output combination.

- High–Performance Matrix Switcher – Switches 12G SDI inputs to 12G SDI outputs with a maximum resolution of 4K@60Hz (4:2:2). Features Kramer Equalization & reKlocking™ Technology that rebuilds the digital signal to travel longer distances.

- HDTV Compatible.

- SDI Multi Rate Signals – Auto–adapts from 270Mbps to 12Gbps data rates, accepts SDI, HD-SDI, 3G HD-SDI, 6G and 12G SDI compliant input signals with video resolution of up to 4K@60Hz (4:2:2) 30bpp. Complying with SMPTE 259M (SD-SDI), 292M (HD-SDI), 344M (ED-SDI), 424M (3G HD-SDI), ST-2081 (6G-SDI) and ST-2082 (12G-SDI) standards, it supports pass-through of standard embedded audio channels with ancillary ID and metadata information.

- Extended-Reach Input Extension – Input signal equalization and output signal reclocking to gain extended-reach signal extension. Using high-quality coaxial SDI cables, supports extension of up to 300m (984ft) for SD signals; 200m (656ft) for 1.5G HD signals; 100m (328ft) for 3G and 6G HD signals; 80m (260ft) for 12G 4K signals. Note: Reach depends on signal resolution, and quality of copper cable used. Reach extension performance may vary while using coaxial cables that are not high-quality.

- Clean Switching — With a difference of no more than two lines of video, when using genlock.

- Versatile Genlocking — Using an analog signal.

- Convenient and Comprehensive Control – Control the unit using intuitive embedded web pages via the Ethernet or Protocol 3000 API commands via RS–232 serial communication transmitted by a PC, touch screen system or other serial controller. Stores 8 switching configurations as presets to be recalled and executed when needed. Upgrade firmware via the embedded webpages.

- Compact and Easy to Install – 19" wide for rack mounting a unit in a 1U rack space with

included rack ears. **ASPEN-32UFX** and **ASPEN-1616UX** are 4" deep.

Defining ASPEN-32UFX, ASPEN-1616UX, VS-8UFX 12G SDI Matrix Switcher

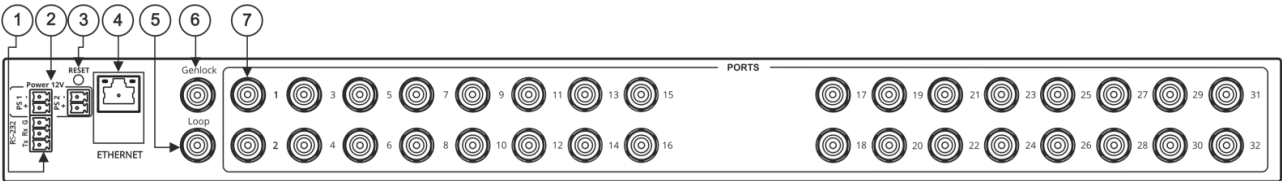This section defines **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX**.

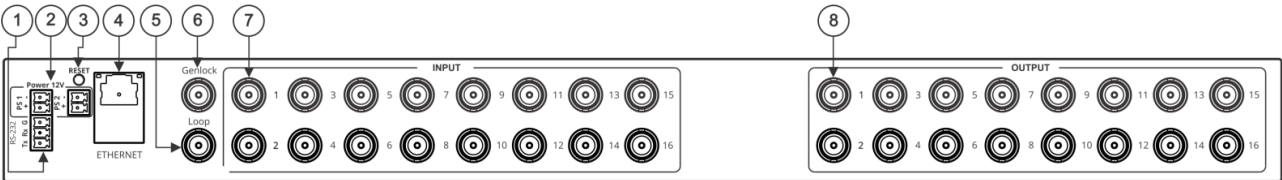Figure 1: **ASPEN-32UFX 12G SDI Matrix Switcher** Back Panel

Figure 2: **ASPEN-1616UX 12G SDI Matrix Switcher** Back Panel

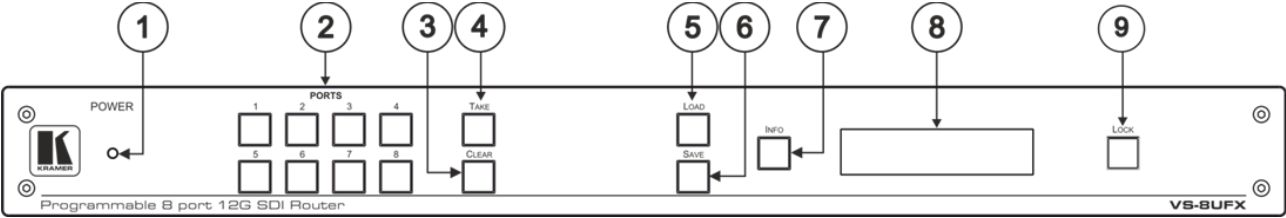| #	Feature	Function
1	RS-232 (G,Rx,Tx) Terminal Block Connector	Connect to a PC or remote controller.
2	POWER 12V DC Terminal Block Connector	Dual power supply for redundancy: • PS 1 – primary power connector • PS 2 – redundant power connector (optional). Connect each power adapter into a separate branch circuit employing a separate service ground.
3	RESET Button	Press briefly to restart the system. Press for 5 seconds to reset all settings, including IP settings to factory default values.
4	ETHERNET RJ-45 Connector	Connect to a PC via LAN for unit control and firmware upgrade via the web pages.
5	LOOP BNC Connector	Connect to the genlock connector of the next unit in the daisy chain or terminate with 75Ω.
6	GENLOCK BNC Connector	Connect to a genlock source.
7	**ASPEN-32UFX** PORTS BNC Connectors (1 to 32)	Connect to SDI sources and acceptors.
	ASPEN-1616UX: INPUT BNC Connectors (1 to 16)	Connect to SDI sources.
8	**ASPEN-1616UX**: OUTPUT BNC Connectors (1 to 16)	Connect to SDI acceptors.

Figure 3: **VS-8UFX 12G SDI Matrix Switcher** Front Panel

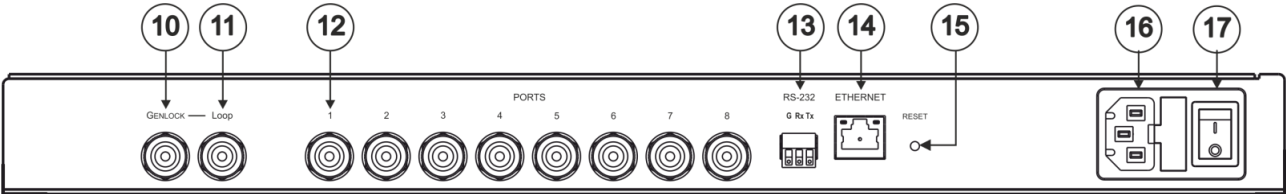| #	Feature	Function
1	POWER LED	Lights when the device is powered.
2	PORT Buttons (1 to 8)	Press an output port (lit green) and then an input port (lit blue) to route an input to an output.
3	CLEAR Button	Press to clear a selection.
4	TAKE Button	Press to enter Take mode. In Take mode, press several sets of output-input ports and then press TAKE to activate all the selected routings at the same time. When Take mode is off, each output-input pair is switched immediately.
5	LOAD Button	To load a preset configuration: Press LOAD, press the appropriate PORT preset button to select a preset configuration, and then press TAKE to load that preset.
6	SAVE Button	To save the current port configuration to a PORT preset button: Press SAVE, press the port button to which you want to save the configuration, and then press TAKE to save the setup to that port.
7	INFO Button	Press to display general information, such as the firmware version and IP address. Press INFO and then a specific PORT button to display the information of that selected port.
8	LCD Display Panel	Displays the current routing status, device information and so on.
9	LOCK Button	Press for 3 seconds (approx.) to lock the front panel buttons. When locked (button is lit), press again for 3 seconds (approx.) to unlock the front panel buttons.

Figure 4: **VS-8UFX 12G SDI Matrix Switcher** Back Panel

#	Feature	Function
10	GENLOCK BNC Connector	Connect a the genlock source.
11	LOOP BNC Connector	Connect to the genlock connector of the next unit in the daisy chain or terminate with 75Ω.
12	PORTS BNC Connectors (1 to 8)	Connect to SDI sources and acceptors.
13	RS-232 (G,Rx,Tx) Terminal Block Connector	Connect to a PC or remote controller.
14	ETHERNET RJ-45 Connector	Connect to a PC via LAN for unit control and firmware upgrade via the web pages.

#	Feature	Function
(15)	RESET Button	Press briefly to restart the system. Press for 10 seconds to reset IP settings to factory default values. The device powers up and loads the factory default values: IP address: 192.168.1.39; Mask: 255.255.0.0; Gateway 192.168.0.1.
(16)	Power Socket	Connect to AC power source.
(17)	Power Switch	Switch for turning the unit ON and OFF.

Installing in a Rack

This section provides instructions for rack mounting **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX**. Before installing in a rack, 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 on a 19" rack, 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 rack mounted, there is enough air flow around **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX**.

- **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX** is placed upright in the correct horizontal position.

- You do not overload the circuit(s). When connecting **VS-8UFX** to the supply circuit, overloading the circuits may have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

- **VS-8UFX** is earthed (grounded) and connected only to an electricity socket with grounding. Pay particular attention when electricity is supplied indirectly (for example, when the power cord is not plugged directly into the wall socket but to an extension cable or power strip). Use only the supplied power cord.

To rack-mount ASPEN-32UFX, ASPEN-1616UX, VS-8UFX:

- Remove the three screws from each side of the unit, reinsert those screws through the rack ears and mount on a 19" rack.

- Detachable rack ears can be removed for desktop use.

- Always mount **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX** in the rack before connecting any cables or power.

Connecting ASPEN-32UFX, ASPEN-1616UX, VS-8UFX

ⓘ Always switch off the power to each device before connecting it to your **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX**. After connecting your **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX**, connect its power and then switch on the power to each device.

Connecting ASPEN 32UFX, ASPEN 1616UX

ⓘ For illustrative purposes, the figure below shows **ASPEN 32UFX**, but the same connections apply to **ASPEN 1616UX**. The only exception is that for **ASPEN 32UFX** the sources and acceptors can be connected to any of the 32 interchangeable ports and for **ASPEN 1616UX** the sources must be connected to the inputs and the acceptors to the outputs.
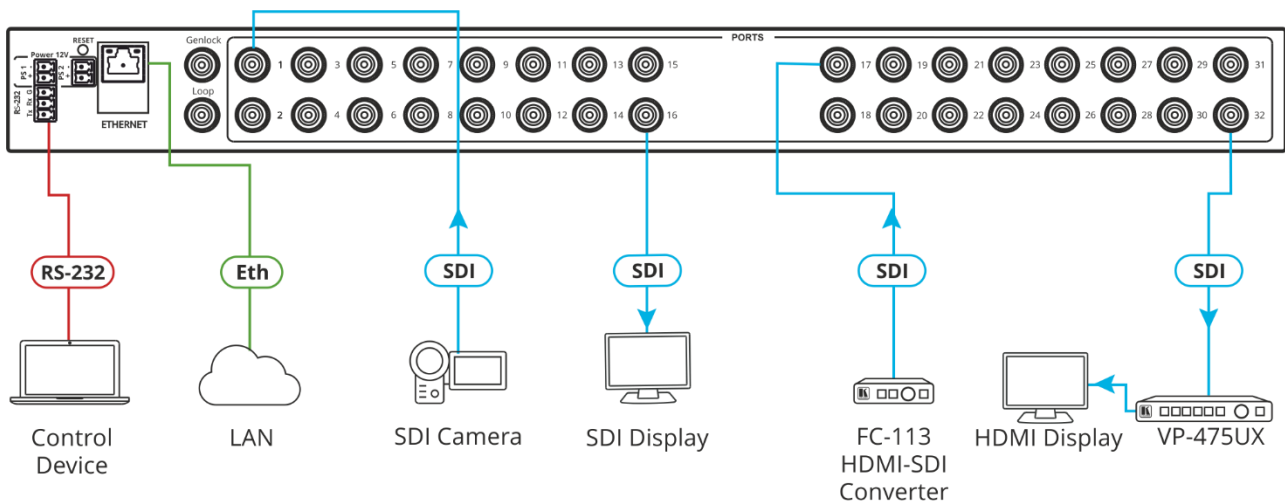

Figure 5: Connecting to the **ASPEN-32UFX** Rear Panel

To connect ASPEN 32UFX or ASPEN 1616UX as illustrated in Figure 5:

1. Connect the video sources (for example, SDI camera, FC-113 HDMI™-SDI Converter) and acceptors (for example, SDI display, VP-475UX SDI to HDMI converter):

   ▪ For **ASPEN-32UFX** connect up to 32 video sources and acceptors to the interchangeable PORT BNC Connectors ⑦.

   ▪ For **ASPEN 1616UX** connect up to 16 video sources to the INPUT BNC Connectors ⑦ and up to 16 video acceptors to the OUTPUT BNC Connectors ⑧.

2. Connect the LAN to the ETHERNET RJ-45 Connector ④.

3. Connect a control device (for example, computer or serial controller) to the RS-232 Terminal Block Connector ①.

4. If required, connect a genlock source to the GENLOCK BNC Connector ⑥.

5. Connect the next SDI switcher in a daisy chain to the LOOP BNC Connector ⑤ -OR-
   terminate the connector with 75Ω.

6. Connect the 12V power adapter to the POWER 12V DC PS1 Terminal Block Connector ②.

7. Optionally, connect a second 12V power adapter to the POWER 12V DC PS2 Terminal Block Connector ② as a redundant power source.
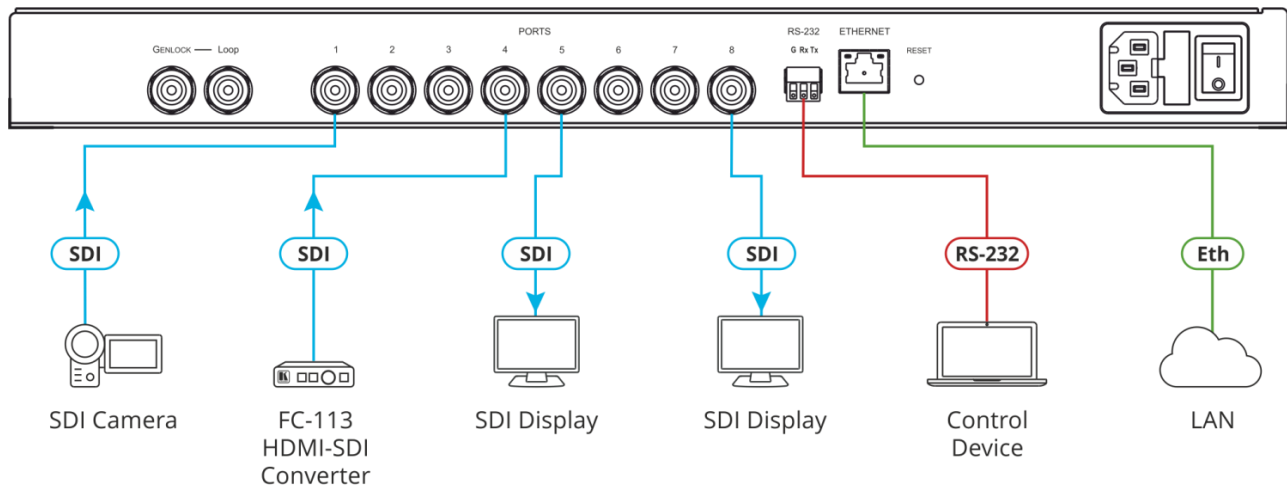
Connecting VS-8UFX

Figure 6: Connecting to the **VS-8UFX** Rear Panel

To connect VS-8UFX as illustrated in Figure 6:

1. Connect up to 8 video sources (for example, SDI camera, FC-113 HDMI™-SDI Converter) and acceptors (for example, SDI display, VP-475UX SDI to HDMI converter) to the interchangeable PORTS BNC Connectors ⑫.

2. Connect the LAN to the ETHERNET RJ-45 Connector ⑭.

3. Connect a control device (for example, computer or serial controller) to the RS-232 Terminal Block Connector ⑬.

4. If required, connect a genlock source to the GENLOCK BNC Connector ⑩.

5. If required, connect the next SDI switcher in a daisy chain to the LOOP BNC Connector ⑪ -OR-
   terminate the connector with 75Ω.

6. Connect the power cord to the Power Socket ⑯.

Configuring ASPEN-32UFX, ASPEN-1616UX, VS-8UFX

ASPEN-32UFX, ASPEN-1616UX, VS-8UFX enable you to configure settings in the following ways:

- Via Ethernet using built-in, user-friendly web pages (see Configuring – Web Pages on page 10).

- Protocol 3000 commands (see Protocol 3000 Commands on page 34).

In addition, **VS 8UFX** can be operated from its front panel buttons (see Configuring – Front Panel on page 20).

Configuring – Web Pages

The embedded web pages enable you to configure **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX** via Ethernet.

For illustrative purposes, the screenshots below show the web pages of only one of the 3 devices – the web pages of your device may differ in the number and type of ports it shows and in some of the features. Unless otherwise noted, the instructions apply to all devices.

ASPEN-32UFX, ASPEN-1616UX, VS-8UFX web pages enable performing the following:

- Defining Interchangeable Ports on page 12.
- Saving Configuration – Web Page on page 14.
- Configuring Genlock Settings on page 16.
- Configuring Network Settings on page 16.
- Changing the TCP Port on page 17.
- Changing the Unit Name on page 17.
- Enabling/Disabling Web Page Password Security on page 18.
- Changing Web Pages Password on page 18.
- Upgrading the Firmware on page 19.

To browse ASPEN-32UFX, ASPEN-1616UX, VS-8UFX web pages:

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

The Login page window appears.

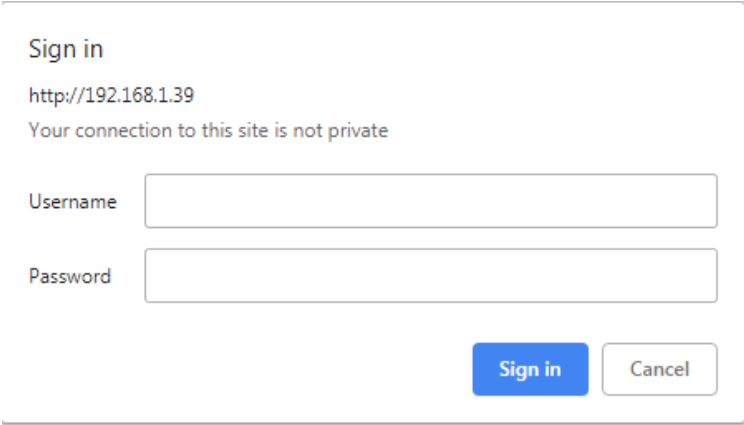Figure 7: Embedded Web Pages Login Window

2. Enter the Username (default = Admin) and Password (default = Admin) and click **Sign in**.
   The embedded web pages appear with the Video Switching page open.
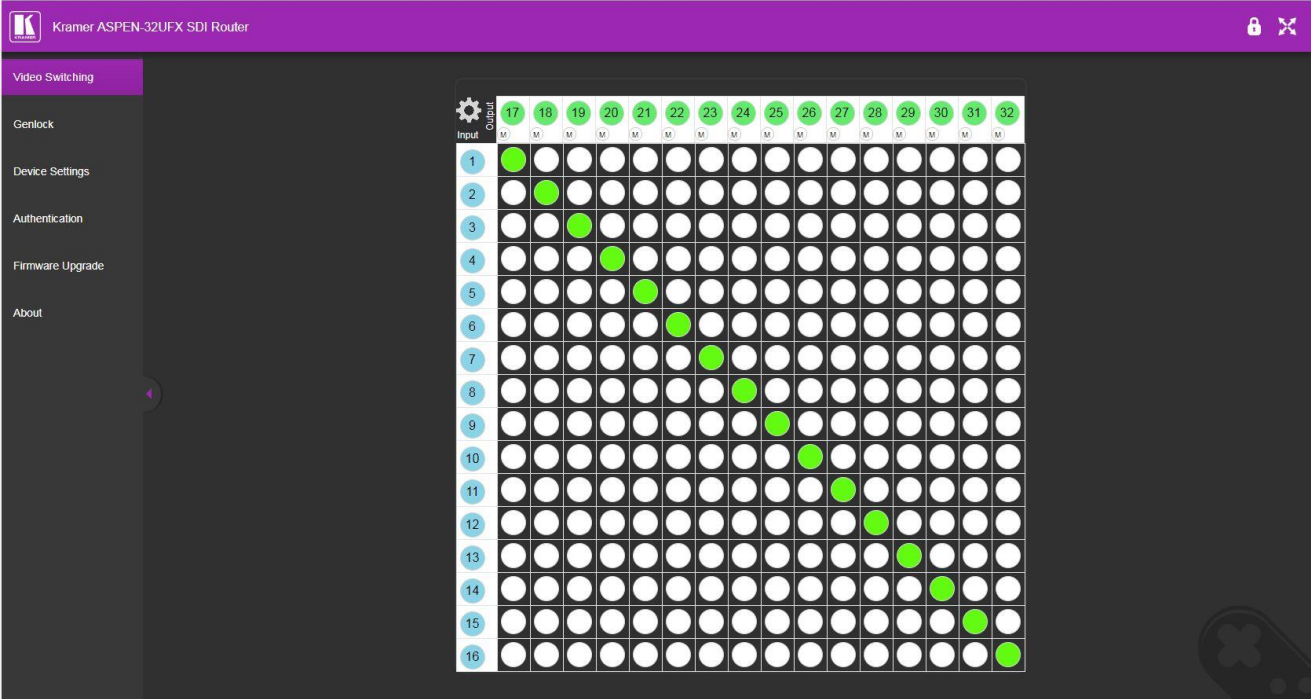
Figure 8: Embedded Web Pages with Video Switching Page Open

3. Use the navigation pane on the left to open the desired web page.

Defining Interchangeable Ports

ⓘ This section applies only to **ASPEN-32UFX** and **VS-8UFX**.

The embedded web pages enable you to define each interchangeable port on **ASPEN-32UFX** and **VS-8UFX** as an input or an output. The procedure for defining the ports is slightly different for each of the models, as follows:

Defining ASPEN-32UFX Ports

To define ASPEN-32UFX interchangeable ports:

1. Click **Video Switching**.
   The Video Switching page appears.

Figure 9: ASPEN-32UFX Embedded Web Pages – Video Switching Page

2. Click the Settings icon in the upper left corner.

The Ports setup page appears.

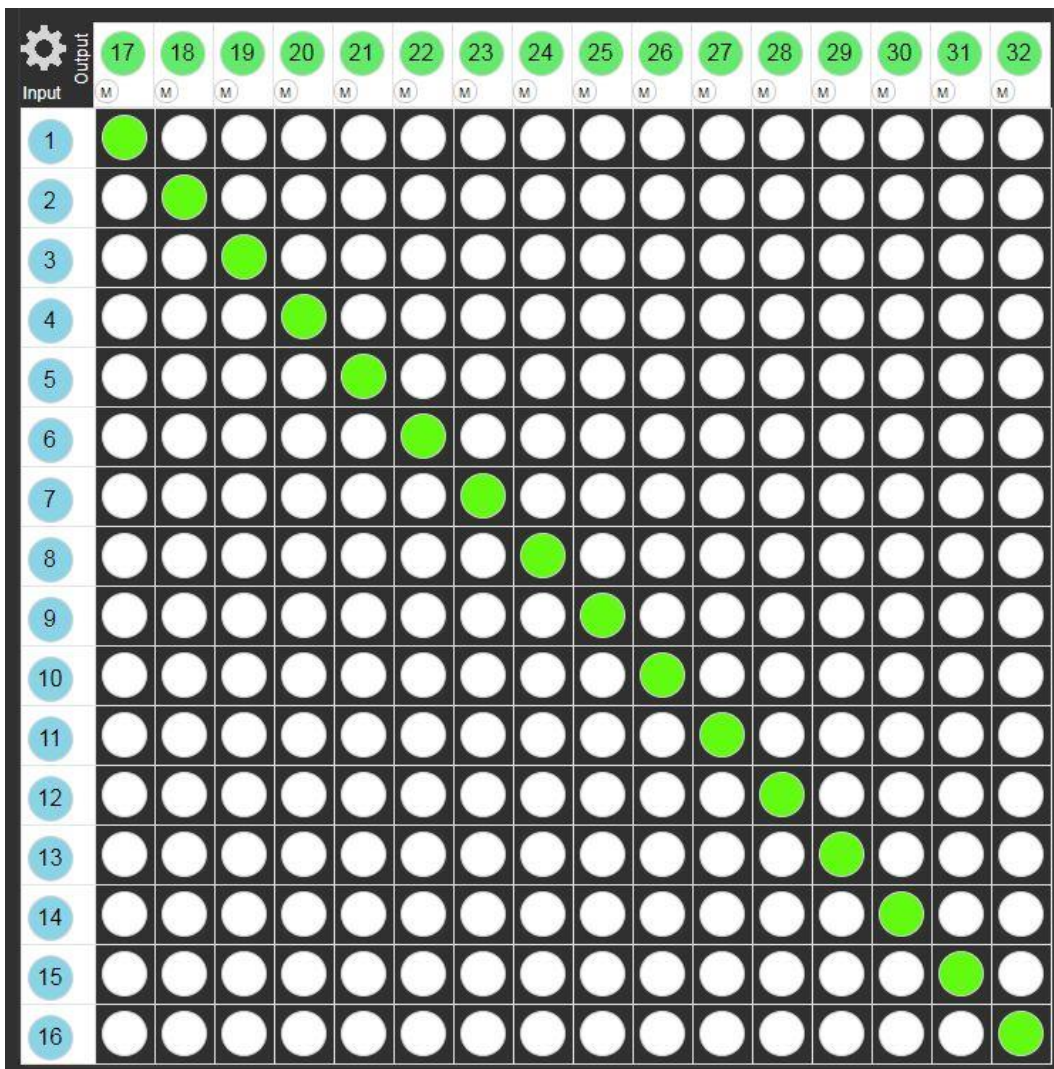Figure 10: ASPEN-32UFX Embedded Web Pages – Video Switching > Ports Setup Page

3. For each port, click **Input** or **Output**.
   The port changes to the selected mode.

4. When you are finished defining ports, click **Close**.
   The Video Switching page appears.

Defining VS-8UFX Ports

To define VS-8UFX interchangeable ports:

1. Click **Video Switching**.
   The Video Switching page appears.
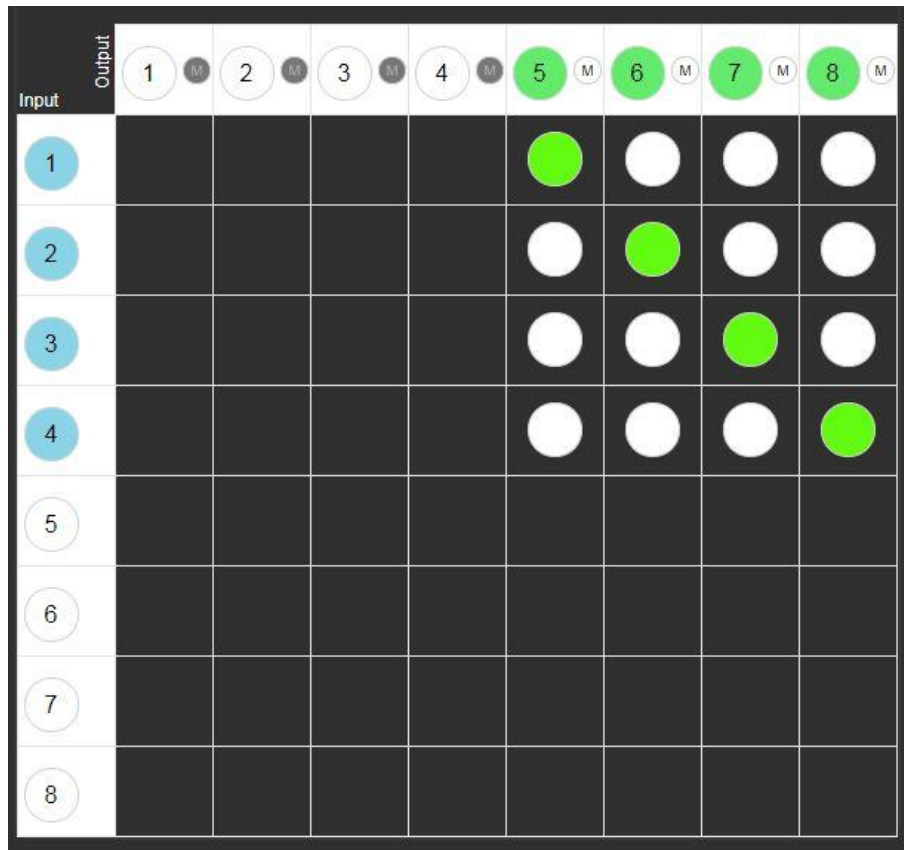
Figure 11: VS-8UFX Embedded Web Pages – Video Switching Page

2. Click a white number in the left column to define that port as an input.
   The selected port turns blue and the port changes to an input.

3. Click a white number in the upper row to define that port as an output.
   The selected port turns green and the port changes to an output.

Saving Configuration – Web Page

The embedded web pages enable you to save the input/output definitions (for **ASPEN-32UFX** and **VS-8UFX)** and switching configuration as a preset for recall at a later time.

To save a configuration as a preset:

1. Define each port as an input or output (for **ASPEN-32UFX** and **VS-8UFX** –see Defining Interchangeable Ports on page 12).

2. Switch inputs to outputs (see Switching – Web Pages on page 21).

3. Click **Device Settings**.

The Device Settings page appears.

Figure 12: Embedded Web Pages – Device Settings Page

4. From the Preset 1 drop-down, select the preset number to which you would like to save this configuration.

5. Click **Save**.
   The current input/output definitions (for **ASPEN-32UFX** and **VS-8UFX)** and switching configuration are saved under the selected preset number.

Clicking the Save button overwrites the configuration that was previously saved under the selected preset number.

Disable the Save button for the selected Preset to prevent losing the currently saved configuration by selecting the Locked checkbox.

To load a saved configuration, see .

Configuring Genlock Settings

The embedded web pages enable you to configure genlock settings for when you connect a Genlock source to your device.

To configure genlock settings:

1. Click **Genlock**.

   The Genlock page appears.
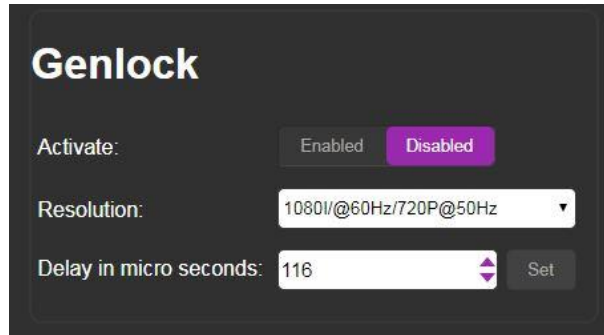
Figure 13: Embedded Web Pages – Genlock Page

2. Click Enabled.
   Genlock is enabled.

3. In the Resolution drop-down, select the display resolution.
   The preset delay for that resolution appears under Delay in micro seconds.

   > It is recommended to use one of the preset delay times, according to the resolution. If required you can set a custom delay in the Delay in micro seconds field, and click **Set**.

Configuring Network Settings

The embedded web pages enable you to configure network settings for your device.

> For proper settings and before changing to DHCP, consult your network administrator.

To configure network settings:

1. Click **Device Settings**.

   The Device Settings page appears (Figure 12).

2. In the Ethernet Settings section, change the network settings as required and click **Set**.
   –OR–
   If you want the device to obtain a DHCP IP, under DHCP, click **ON**.

3. Click **Set**.

A warning appears.
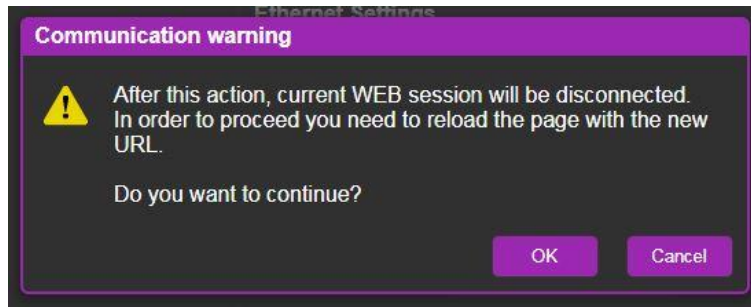
Figure 14: Network Settings Warning

4. Click **OK**.

   The network settings change and a confirmation appears.
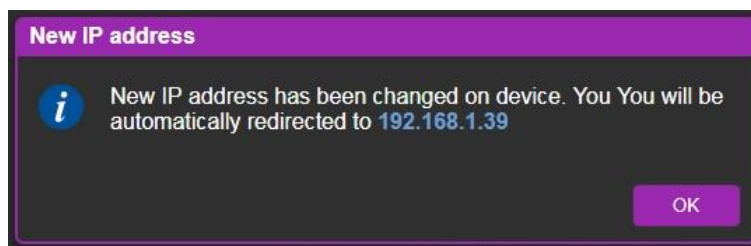
Figure 15: Network Settings Confirmation

5. Click **OK**.
   The web page logs out and the browser reloads with the new network information.

Changing the TCP Port

To change the device TCP port.

1. Click **Device Settings**.

   The Device Settings page appears (Figure 12).

2. In the Ethernet Settings section, under TCP port, change the number as required and click **Set**.
   The new TCP port number is saved.

Changing the Unit Name

To change the unit name:

1. Click **Device Settings**.
   The Device Settings page appears (Figure 12).

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

3. Click **Set**.
   The unit name is changed.

The first 15 characters of the unit name are used by the NetBIOS protocol.

Enabling/Disabling Web Page Password Security

The embedded web pages enable you to require a password for logging into the web pages or to disable this feature and allow login without a password.

To enable/disable web page security:

1. Click **Authentication**.
   The Authentication page appears.
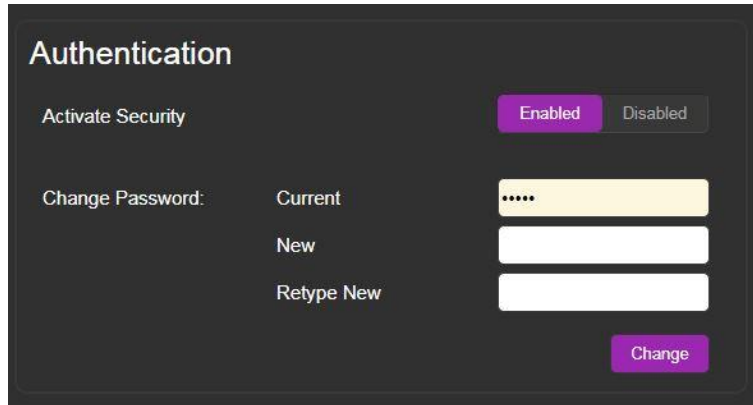
Figure 16: Embedded Web Pages – Authentication Page

2. Click Enabled/Disabled.
   Web page security is enabled/disabled.

Changing Web Pages Password

To change the web pages password when security is enabled:

1. Click **Authentication**.
   The Authentication page appears ([Figure 16](#)).

   Enter the current password, new password and retype the new password.

   A password must contain 5 to 15 alphanumeric characters and no spaces.

2. Click **Change**.
   A warning appears.
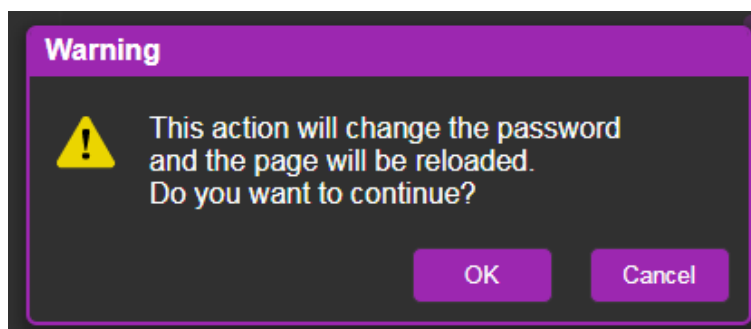
Figure 17: Password Change Warning

3. Click **OK**.
   The password is changed, and the login window appears ([Figure 7](#)).

4. Log in with the new password.

A message appears.
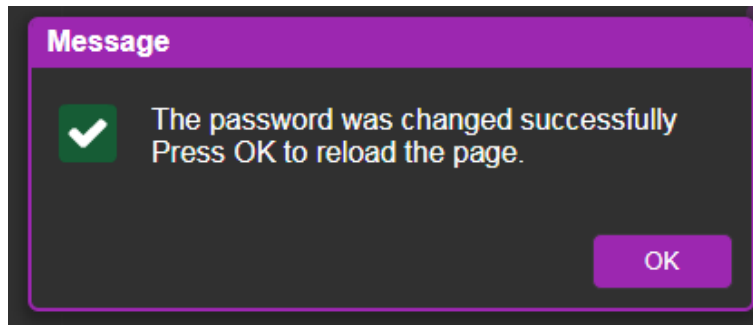
Figure 18: Password Change Success Message

5. Click **OK**.
The web pages reload.

Upgrading the Firmware

To upgrade the device firmware:

1. Click **Firmware Upgrade**.
The Firmware Upgrade page appears.
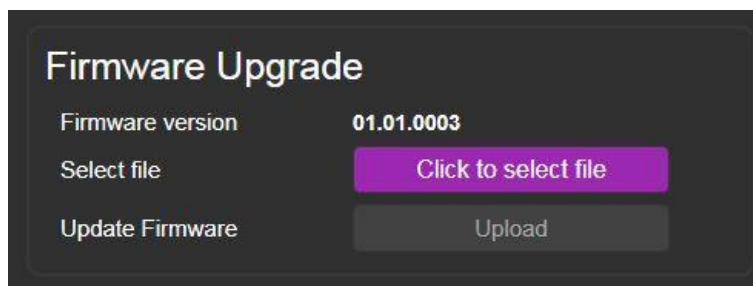
Figure 19: Firmware Upgrade Page

2. Click **Click to select file**.
A file browser appears.

3. Open the relevant firmware file.

4. Click **Upload**.
The firmware uploads to the device.

> **Caution:** Do not power cycle or operate the device during firmware upgrade.

Configuring – Front Panel

This section applies only to **VS 8UFX**.

VS 8UFX enables you to configure the device using the front panel buttons and LCD display.

Saving Configuration – Front Panel

VS 8UFX front panel buttons enable you to save the input/output definitions and switching configuration as a preset for later recall.

To save a configuration as a preset:

1. Define each port as an input or output (see <u>Defining Interchangeable Ports</u> on page <u>12</u>).

The ports can be defined as an input or output only from the web pages.

2. Switch inputs to outputs (see <u>Switching – Front Panel</u> on page <u>23</u>).
3. Press the SAVE Button ⑥.
   The SAVE Button lights and the PORT Button ② lights go off.
4. Press the PORT Button ② to which you would like to save the configuration.
   The PORT Button flashes red.
5. Press the TAKE button ④.
   The PORT and TAKE Buttons return to their previous state and the current configuration is saved under the selected PORT Button.

Saving a configuration overwrites the configuration that was previously saved under the selected PORT Button.

To disable the Save button to prevent losing a previous configuration see <u>Saving Configuration – Web Page</u> on page <u>14</u>.

Verifying Device Information

The **VS 8UFX** front panel enables you to view the device firmware version and IP address.

To view device information:

- Press the INFO Button ⑦.
  The device firmware version and IP address appear on the LCD Display Panel ⑧.

Operating ASPEN-32UFX, ASPEN-1616UX, VS-8UFX

Operate your **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX** using any of the following methods:

- Via Ethernet using built-in, user-friendly web pages (see Operating – Web Pages on page 21).

- Protocol 3000 commands (see Protocol 3000 Commands on page 34).

In addition, **VS 8UFX** can be operated from its front panel buttons (see Operating – Front Panel Buttons on page 23).

Operating – Web Pages

ASPEN-32UFX, ASPEN-1616UX, VS-8UFX web pages enable performing the following:

- Switching – Web Pages on page 21**.**

- Muting Outputs on page 22**.**

- Loading Saved Configurations – Web Pages on page 22**.**

Switching – Web Pages

The embedded web pages enable you to switch inputs to outputs. One input can be switched to multiple outputs, but each output can only have one input switched to it.

ⓘ For instructions to define whether a port is an input or output, see (see Defining Interchangeable Ports on page 12).

ⓘ The screenshots are for demonstration purposes and may differ for your device.

To switch input 1 to output 21:

1. Click **Video Switching**.
   The Video Switching page appears (Figure 9).

2. Click the circle in the switching table that corresponds to the input row and output column that you want to switch. For example, in the switching table below, click the first circle in the column for output 22.

The circle turns green, and Input 1 is switched to output 22.
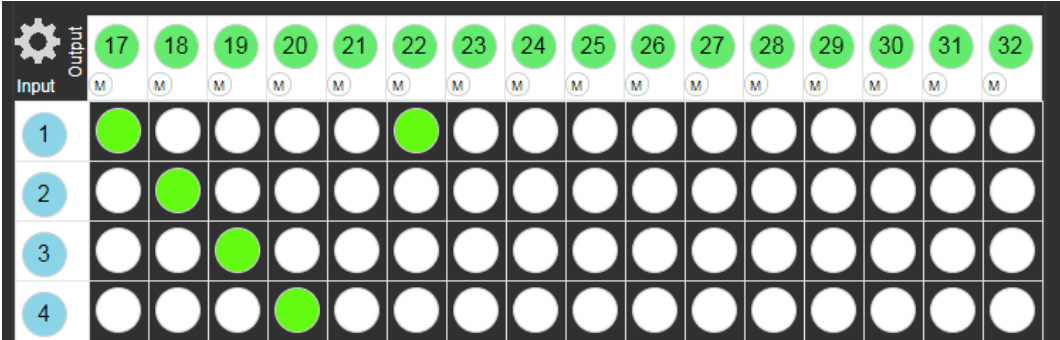
Figure 20: Input 1 Switched to Output 22

Muting Outputs

The embedded web pages enable you to disable (mute) the video and audio of each output individually.

To mute an output:

1. Click **Video Switching**.
   The Video Switching page appears (Figure 9).

2. Click the **M** at the top of the column of the output to be muted.
   The column is grayed out and the output is muted.

ⓘ A muted output shows no signal on the display.

ⓘ You can switch an input to a muted output.
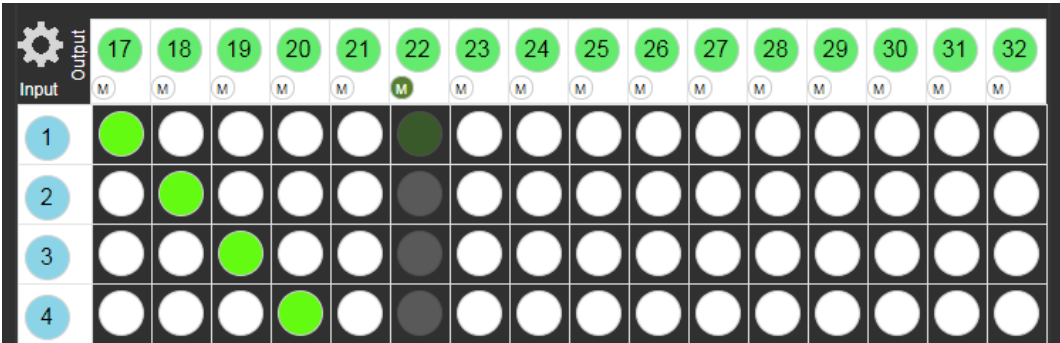
Figure 21: Output 22 Muted

Loading Saved Configurations – Web Pages

The embedded web pages enable you to load preset input/output definitions (for **ASPEN-32UFX** and **VS-8UFX)** and switching configurations.

ⓘ To save a configuration, see Saving Configuration – Web Page on page 14.

To load a saved configuration:

1. Click **Device Settings**.
   The Device Settings page appears (Figure 12).

2. Select the relevant Preset number from the Preset 1 drop-down.

3. Click **Load**.
   The input/output definitions (for **ASPEN-32UFX** and **VS-8UFX)** and switching
   configuration changes according to the preset, and a message appears.
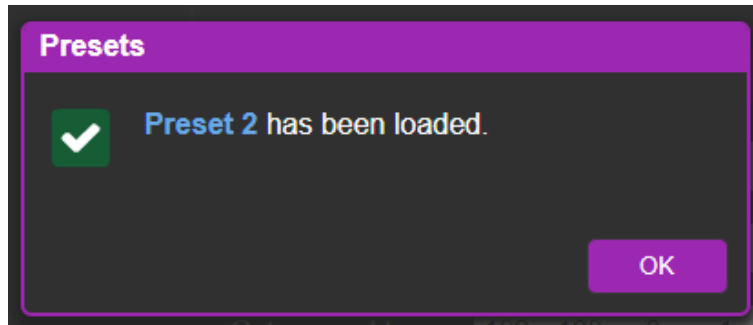
Figure 22: Preset Loaded Message

4. Click **OK** to return the web pages.

Operating – Front Panel Buttons

ℹ️ This section applies only to **VS 8UFX**.

Switching – Front Panel

VS 8UFX front panel buttons enable you to switch an input to an output in the following ways:

- Direct Switching – Activate a switching event immediately after pressing the buttons (see page 23).

- Take Mode Switching – Program multiple switching events and execute them simultaneously (see page 24).

ℹ️ For instructions to define whether a port is an input or output, see (see Defining Interchangeable Ports on page 12).

Direct Switching

To switch an input to an output directly:

1. Press the required green output PORT Button ②.
   The selected button flashes.

ℹ️ If an input button is not pressed within about 10 sec, the switching operation is cancelled, and the button goes back to its original state.

2. Press the required blue input PORT Buttons ②.
   The selected input is switched to the selected output and the change is reflected in the LCD display.

Take Mode Switching

To execute multiple switching events, simultaneously:

1. Press the TAKE Button ④.
   The TAKE Button flashes and the panel enters Take Mode.

2. Press a green output PORT Button ② and a blue input PORT Buttons ②.
   The switching event appears on the LCD display.

3. Press additional input/output pairs.
   The switching events appear on the LCD display.

4. Press the TAKE Button ④.
   All of the selected switching events are executed.

Loading Saved Configurations – Front Panel

VS 8UFX front panel buttons enable you to load preset input/output definitions and switching configurations.

ⓘ   To save a configuration, see

To load a saved configuration:

1. Click the LOAD Button ⑤.
   The LOAD Button flashes and PORTS Buttons ② lights go off.

2. Click the PORTS Button ② that corresponds to the preset number under which the configuration is saved.
   The selected PORTS Button flashes red and the preset configuration appears on the LCD display.

3. Click the TAKE Button ④.
   The configuration is loaded and the PORTS Buttons ② light normally.

Technical Specifications

ASPEN-32UFX	Inputs	1 Genlock	On a BNC connector
	Outputs	1 Genlock (Loop)	On a BNC connector
	Ports	32 Interchangeable12G SDI/HD-SDI/SDI Video (75Ω)	On BNC connectors (by default, 1 to 16 are set as inputs and 17 to 32 are set as outputs)
		1 RS-232	On a 3-pin terminal block
		1 Ethernet	On an RJ-45 connector
		1 12V DC Primary Power	On a 2-pin connector
		1 12V DC Redundant Power	On a 2-pin connector
ASPEN-1616UX	Inputs	16 12G SDI/HD-SDI/SDI Video (75Ω)	On BNC connectors
		1 Genlock	On a BNC connector
	Outputs	16 12G SDI/HD-SDI/SDI Video (75Ω)	On BNC connectors
		1 Genlock (Loop)	On a BNC connector
	Ports	1 RS-232	On a 3-pin terminal block
		1 Ethernet	On an RJ-45 connector
		1 12V DC Primary Power	On a 2-pin connector
		1 12V DC Redundant Power	On a 2-pin connector
VS-8UFX	Inputs	1 Genlock	On a BNC connector
	Outputs	1 Genlock (Loop)	On a BNC connector
	Ports	8 Interchangeable12G SDI/HD-SDI/SDI Video (75Ω)	On BNC connectors (by default, 1 to 4 are set as inputs and 5 to 8 are set as outputs)
		1 RS-232	On a 3-pin terminal block
		1 Ethernet	On an RJ-45 connector
		1 AC Power	On an AC power connector
Video	Standards:		12G-SDI – SMPTE ST-2082-1 3G-SDI – SMPTE 424M 6G — SMPTE ST–2081 - HD-SDI – SMPTE 292M - SDI – SMPTE 259M/344M
	Max Resolution	4K@60Hz (4:2:2)	
	Max Bandwidth	12Gbps	
Extension Line	SD Signals	Up to 300m	
	1.5G HD Signals	Up to 200m	
	3G Signals	Up to 100m	
	6G Signals	Up to 100m	
	12G Signals	Up to 80m	
	Coupling	DC	
User Interface (**ASPEN-32UFX, ASPEN-1616UX**)	Controls	Web pages and Protocol 3000 API via Ethernet and remote RS-232	
User Interface (**VS-8UFX**)	Indicators	Port buttons LEDs, LCD display	
	Controls	Switching buttons, web pages and Protocol 3000 API via Ethernet and remote RS-232	

Supported Web Browsers	Windows 7	Internet Explorer, Firefox, Chrome, Safari
	Windows 10	Internet Explorer, Edge, Firefox, Chrome
	MAC 10.11	Safari
	iOS 10.3.2	Safari
	Android	N/A
Power (ASPEN-32UFX)	Consumption	12V DC, 2A
	Source	5A
Power (ASPEN-1616UX)	Consumption	12V DC, 1.35A
	Source	5A
Power (VS-8UX)	Consumption	100–240V AC
	Source	33VA max
Enclosure	Size	19" 1U
	Type	Aluminum
	Cooling	Fan Ventilation
Regulatory Compliance	Safety	CE
	Environmental	RoHs, WEEE
ASPEN-32UFX, ASPEN-1616UX — Dimensions and Weight	Net Dimensions (W, D, H)	43.64cm x 10.00cm x 4.36cm (17.18" x 3.94" x 1.72")
	Net Weight	1.0kg (2.1lbs) approx.
	Shipping Dimensions (W, D, H)	55.00cm x 27.60cm x 10.70cm (21.65" x 10.87" x 4.21")
	Shipping Weight	1.9kg (4.1lbs) approx.
VS-8UFX — Dimensions and Weight	Net Dimensions (W, D, H)	43.64cm x 18.30cm x 4.36cm (17.18" x 7.20" x 1.72")
	Net Weight	1.7kg (3.7lbs) approx.
	Shipping Dimensions (W, D, H)	55.00cm x 27.60cm x 10.70cm (21.65" x 10.87" x 4.21")
	Shipping Weight	2.7kg (6.0lbs) approx.
Accessories	Included	Power adapter/ cord, rack ears
	Optional	For optimum range and performance use the recommended Kramer cables available at www.kramerav.com/product/ASPEN-32UFX
Specifications are subject to change without notice at www.kramerav.com		

Default Communication Parameters

RS-232 / Protocol 3000	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Command Example:	Route INPUT 1 to OUTPUT 5: `#X-ROUTE OUT.SDI.5.VIDEO.1,IN.SDI.1.VIDEO.1<CR>`
Ethernet	
IP Address:	192.168.1.39
Subnet mask:	255.255.0.0
Default gateway:	192.168.0.1
TCP Port #:	5000
Maximum TCP Ports:	1

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 input/output definitions, switching configuration, IP address and password.

Resetting the device can be accomplished by using:

- The Front Panel Reset button.

- Protocol 3000 commands (see System Commands on page 34).

- Web pages

The device must be powered ON when performing a reset.

To reset a device using the back panel:

- Press the RESET Button ⑨ with the tip of a paper clip:
    - For reboot, press and release.
    - For factory reset, press and hold for more than 5 seconds.

To perform a factory reset on the device using the web pages:

1. Click **Device Settings**.
   The Device Settings page appears (Figure 12).

2. Click **Factory reset**.

Protocol 3000

The **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX 12G SDI Matrix Switcher** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX**.

Generally, 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:
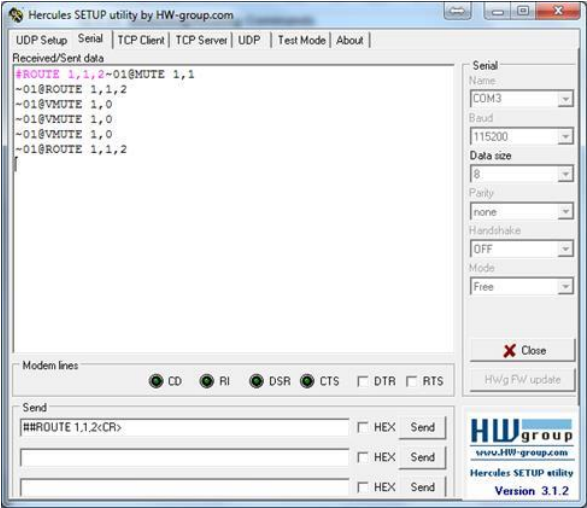
ℹ️ The framing of the command varies according to the terminal communication software.   .

- K-Touch Builder (Kramer software):
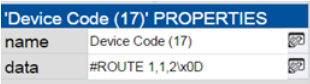
- K-Config (Kramer configuration software):
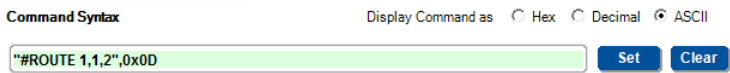
ℹ️ All the examples provided in this section are based on using the K-Config software.

You can enter commands directly using terminal communication software (e.g., Hercules) by connecting a PC to the serial or Ethernet port on the **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX**. 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 Protocol 3000 commands, see:

-
-
-

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
#	Device_id@	Message	$^{C}_{R}$

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

Start	Body	Delimiter
#	**Command** $_{SP}$ Parameter_1,Parameter_2,…	$^{C}_{R}$

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

Start	Address	Body	Delimiter
#	Device_id@	**Command_1** Parameter1_1,Parameter1_2,…| **Command_2** Parameter2_1,Parameter2_2,…| **Command_3** Parameter3_1,Parameter3_2,…|…	$^{C}_{R}$

- Device Message Format:

Start	Address (optional)	Body	Delimiter
~	Device_id@	Message	$^{C}_{R}$ $^{L}_{F}$

- Device Long Response – Echoing command:

Start	Address (optional)	Body	Delimiter
~	Device_id@	**Command** $_{SP}$ [*Param1,Param2 …*] **result**	$^{C}_{R}$ $^{L}_{F}$

Extended Protocol 3000

In addition to the standard Protocol 3000 syntax, newer Kramer products use extended syntax to improve user experience and provide easier deployment and configuration.

For products with many ports and of different types, the extended syntax describes commands and their parameters in a more intuitive, user-friendly format.

To identify devices supporting extended commands, use the `#HELP` command to list all supported commands. Commands that begin with the prefix '`X-`' use extended Protocol 3000 syntax. Extended commands use Port ID (see Port ID Format on page 31) and Signal ID (see Signal ID Format on page 32) instead of the old port naming parameters.

Port ID Format

The port ID is composed of three fields separated by a dot '.' (`<direction_type>`**.**`<port_type>`**.**`<port_index>`), where:

- `<direction_type>` – specifies the direction of the port (see Direction Types on page 32).

- `<port_type>` – identifies the port type (see Port Types on page 32).

- `<port_index>` – is a port index that always matches the port number printed on the front or rear panel of the product.

Examples:

`IN.SDI.1` (refers to SDI input port 1)

`OUT.HDMI.4` (refers to HDMI output port 4)

`BOTH.RS232.2` (refers to bidirectional RS-232 port 2)

Direction Types

The string representation is not case sensitive.

String	Meaning
IN	Input port
OUT	Output port
BOTH	Bi-directional port where the direction has no meaning

Port Types

The string representation is not case sensitive.

String	Meaning
HDMI	HDMI port
ANALOG_AUDIO	Any balanced or unbalanced audio ports
AMPLIFIED_AUDIO	Any analog outputs defined as amplified audio
RS232	Local control port used for data control
IR	Local IR input

Signal ID Format

The signal ID is composed of three fields separated by a dot '.'
(`<port_id>.<signal_type>.<index>`), where:

- `<port_id>` – Indicates the port ID, as described in Port ID Format on page 31.

- `<signal_type>` – Indicates the type of signal, as described in Extended Signal Types on page 33.

- `<index>` – Indicates a specific channel number when there are multiple channels of the same type

Signal ID: <port_id>.<signal_type>.<index>
also means: <<direction_type>**.**<port_type>**.**<index>>**.**<signal_type>.
<channel_index>

Examples:

`IN.HDMI.1.VIDEO.1` (refers to video channel 1 of HDMI input port 1)

`OUT.HDMI.1.AUDIO.1` (refers to audio channel 1 of HDMI output port 1)

Extended Signal Types

The string representation is non-case sensitive.

String	Meaning
VIDEO	Video signal of the port
AUDIO	Audio signal of the port
RS232	Data signal of the port (relevant for RS-232 ports for example)
IR	IR signal of the port (relevant for IR ports for example; available in future updates)

Examples

To understand the advantages of the extended Protocol 3000 syntax, compare the standard `MUTE` and `VMUTE` command syntax with the extended `X-MUTE` command syntax.

MUTE and VMUTE are dedicated commands to mute audio and video respectively. Both commands receive the index of the output to mute as a parameter. Two separate commands are used to mute different signal types and neither command enable muting the inputs and not the outputs.

However, the X-MUTE command can mute audio and/or video on either inputs or outputs:

- Mute video on OUT 1: #X-MUTE OUT.HDMI.1.VIDEO.1

- Mute audio on OUT 1: #X-MUTE OUT.HDMI.1.AUDIO.1

- Mute video on HDMI IN 1: #X-MUTE IN.HDMI.1.VIDEO.1

- Mute audio on HDMI IN 1: #X-MUTE IN.HDMI.1.AUDIO.1

The name of the action remains the same and what it affects is passed in parameters.

In another example, the `#ROUTE` command is extended by the command `#X-ROUTE`:

- To route a video signal to HDBT output #4 from HDMI input #1:
  #X-ROUTE OUT.HDBT.4.VIDEO.1,IN.HDMI.1.VIDEO.1
  ~01@X-ROUTE OUT.HDBT.4.VIDEO.1,IN.HDMI.1.VIDEO.1

- To route an audio signal to analog output #1 from the HDMI input #1:
  #X-ROUTE OUT.ANALOG_AUDIO.1.AUDIO.1,IN.HDMI.1.AUDIO.1
  ~01@X-ROUTE OUT.ANALOG_AUDIO.1.AUDIO.1,IN.HDMI.1.AUDIO.1

Other Rules

In routing commands, first specify the target output(s), then the source input.
Example: `#X-ROUTE OUT.ANALOG_AUDIO.1.AUDIO.1,IN.HDMI.1.AUDIO.1`

Brackets '[' and ']' are reserved Protocol 3000 characters that define a list of parameters as in [a,b,c,d].
Example: to route video input 3 to outputs 1,4,6,7: **ROUTE 1,[1,4,6,7],3<cr>**

Example illustrating brackets and commas:
```
#SIGNALS-LIST?
```

~01@SIGNALS-LIST
[IN.SDI.1.VIDEO.1,IN.SDI.2.VIDEO.1,IN.SDI.3.VIDEO.1,IN.SDI.4.VIDEO.1,IN.SDI.5.VIDEO.1,IN.SDI.6.VIDEO.1,IN.SDI.7.VIDEO.1,IN.SDI.8.VIDEO.1,OUT.SDI.1.VIDEO.1,OUT.SDI.2.VIDEO.1,OUT.SDI.3.VIDEO.1,OUT.SDI.4.VIDEO.1,OUT.SDI.5.VIDEO.1,OUT.SDI.6.VIDEO.1,OUT.SDI.7.VIDEO.1,OUT.SDI.8.VIDEO.1]

Protocol 3000 Commands

This section includes the following commands:

System Commands

Command	Description
#	Protocol handshaking
BUILD-DATE	Get device build date
FACTORY	Reset to factory default configuration
HELP	Get command list
LOCK-FP	Get front panel lock state
LOG-TAIL	Get the last "n" lines of message logs
MODEL	Get device model
NAME	Set/get unit name
NAME-RST	Reset unit name to factory default
PORT-DIRECTION	Set port direction for video port
PROT-VER	Get device protocol version
PRST-LOCK	Set/get a preset as read-only
PRST-RCL	Recall saved preset list
PRST-STO	Store current connections to preset
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	#`CR`	
Get:	-	-	
Response			
~`nn`@`SP`**OK**`CR` `LF`			
Notes			
Validates the Protocol 3000 connection and gets the device number. Used to identify the availability of the device.			
Example			
#<CR>			

Functions		Permission	Transparency
Set:	#	End User	Public

BUILD-DATE

Functions		Permission	Transparency
Set:	-	-	-
Get:	**BUILD-DATE?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device build date	#**BUILD-DATE?**⌷CR	
Response			
~nn@**BUILD-DATE**⌷SP *date* ⌷SP *time* ⌷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:	**FACTORY**	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device to factory default configuration	#**FACTORY**⌷CR	
Get:	-	-	
Response			
~nn@**FACTORY**⌷SP OK ⌷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:	**HELP**	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] *command*,[SP]*command...* [CR LF] 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 **ASPEN-32UFX, ASPEN-1616UX, VS-8UFX** commands: #HELP<CR> 2. Get help for the ETH-PORT command: #HELP ETH-PORT<CR>			

LOCK-FP

Command Name		Permission	Transparency
Set:	**LOCK-FP**	End User	Public
Get:	**LOCK-FP?**	End User	Public
Description		**Syntax**	
Set:	Lock the front panel	#**LOCK-FP**[SP]*Lock/Unlock*[CR]	
Get:	Get the front panel lock state	#**LOCK-FP?**[CR]	
Response			
~[nn]@**LOCK-FP**[SP]*Lock/Unlock*[CR LF]			
Parameters			
Lock/Unlock – 0 (unlock), 1 (lock)			
Response Triggers			
Notes			
Example			
Lock the front panel buttons: #LOCK-FP 1<CR>			

LOG-TAIL

Command Name		Permission	Transparency
Set:	–	–	–
Get:	**LOG-TAIL?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get the last "n" lines of message logs	**#LOG-TAIL?** `SP` *line_num* `CR LF`	

Response
Get: ~`nn`@**LOG-TAIL?** `CR LF`
Line content #1 `CR LF`
Line content #2 `CR LF`
Etc...

Parameters
`Line_num` – 1–X (see notes)

Response Triggers

Notes
The `Line_num` parameter is optional. If no value is entered, the default `Line_num` is 10. Used for advanced troubleshooting. Helps find error root causes and gets details not displayed in the error code number.

Example
Get the last 5 lines or the device log: `#LOG-TAIL? 5<CR>`

MODEL

Functions		Permission	Transparency
Set:	-	-	-
Get:	**MODEL?**	End User	Public

Description		Syntax	
Set:	-	-	
Get:	Get device model	#**MODEL?**[CR]	

Response

~[nn]@**MODEL**[SP]*model_name*[CR LF]

Parameters

model_name – String of up to 19 printable ASCII chars

Response Triggers

Notes

Example

Get device model:
#MODEL?<CR>

NAME

Functions		Permission	Transparency
Set:	**NAME**	Administrator	Public
Get:	**NAME?**	End User	Public

Description		Syntax	
Set:	Set unit name	#**NAME**[SP]*unit_name*[CR]	
Get:	Get unit name	#**NAME?**[CR]	

Response

Set: ~[nn]@**NAME**[SP]*unit_name*[CR LF]

Get: ~[nn]@**NAME?**[SP]*unit_name*[CR LF]

Parameters

unit_name – string of up to 63 alpha-numeric chars (can include hyphen, not at the beginning or end)

Response Triggers

Notes

The first 15 characters of the unit name are used by the NetBIOS protocol.

Example

Set the unit name to Alpha:
#NAME Alpha<CR>

NAME-RST

Command Name		Permission	Transparency
Set:	**NAME-RST**	Administrator	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset unit name to factory default	#**NAME-RST**`CR`	
Get:	-	-	
Response			
~`nn`@**NAME-RST**`SP`OK`CR LF`			
Parameters			
Response Triggers			
Notes			
Factory default unit name is "model_name-" + 5 last digits of unit serial number.			
Example			
Reset unit name to factory default: #NAME-RST<CR>			

PORT-DIRECTION

Command Name		Permission	Transparency
Set:	**PORT-DIRECTION**	End User	Public
Get:	**PORT-DIRECTION?**	End User	Public
Description		**Syntax**	
Set:	Set port direction for an interchangeable video port	#**PORT-DIRECTION**`SP`*port_index,direction*`CR LF`	
Get:	Get port direction for an interchangeable video port	#**PORT-DIRECTION?**`SP`port_index `CR LF`	
Response			
Set / Get: ~`nn`@**PORT-DIRECTION**`SP`*port_index,direction*`CR LF`			
Parameters			
port_index – port number from the front panel (1-n) *direction* – IN (input), OUT (output)			
Response Triggers			
Notes			
This command applies only to **ASPEN-32UFX** and **VS-8UFX**.			
Example			
Set port #5 to be an output: #PORT-DIRECTION 5,OUT<CR>			

PROT-VER

Functions			Permission	Transparency
Set:	-		-	-
Get:	**PROT-VER?**		End User	Public
Description			**Syntax**	
Set:	-		-	
Get:	Get device protocol version		#**PROT-VER?**[CR]	
Response				
~[nn]@**PROT-VER**[SP]3000:*version*[CR LF]				
Parameters				
version – *XX.XX* where *X* is a decimal digit				
Response Triggers				
Notes				
Example				
#PROT-VER?<CR>				

PRST-LOCK

Command Name			Permission	Transparency
Set:	**PRST-LOCK**		End User	Public
Get:	**PRST-LOCK?**		End User	Public
Description			**Syntax**	
Set:	Set a preset as read-only		#**PRST-LOCK**[SP]*preset_Index,mode*[CR LF]	
Get:	Get the preset read-only status		#**PRST-LOCK?**[SP]*preset_Index*[CR LF]	
Response				
Set / Get: ~[nn]@**PRST-LOCK**[SP]*preset_Index,mode*[CR LF]				
Parameters				
preset_Index- preset number 1–8 *mode* – ON, OFF				
Response Triggers				
Notes				
Prevents users from accidentally overwriting a preset.				
Examples				
Lock Preset 3: #PRST-LOCK 1,ON<CR>				

PRST-RCL

Command Name		Permission	Transparency
Set:	`PRST-RCL`	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Recall/load preset input/output definitions (for **ASPEN-32UFX** and **VS-8UFX)** and switching configuration	`#PRST-RCL`[SP]*preset*[CR]	
Get:	-	-	
Response			
~[nn]@**PRST-RCL**[SP]*preset*[CR LF]			
Parameters			
preset – preset number, 1–8			
Response Triggers			
Notes			
Examples			
Recall Preset 3: `#PRST-RCL 3<CR>`			

PRST-STO

Command Name		Permission	Transparency
Set:	`PRST-STO`	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Store (save) current input/output definitions (for **ASPEN-32UFX** and **VS-8UFX)** and switching configuration as a preset	`#PRST-STO`[SP]*preset*[CR]	
Get:	-	-	
Response			
~[nn]@**PRST-STO**[SP]*preset*[CR LF]			
Parameters			
preset – preset number, 1–8			
Response Triggers			
Notes			
Examples			
Save the current input/output definitions (for **ASPEN-32UFX** and **VS-8UFX)** and switching configuration under Preset 3: `#PRST-STO 3<CR>`			

RESET

Functions		Permission	Transparency
Set:	**RESET**	Administrator	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device to factory default	#**RESET**[CR]	
Get:	-	-	

Response

~[nn]@**RESET**[SP]**OK**[CR LF]

Parameters

Response Triggers

Notes

Example

Reset the device to factory default:
#RESET<CR>

SN

Functions		Permission	Transparency
Set:	–	-	-
Get:	**SN?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device serial number	#**SN?**[CR]	

Response

~[nn]@**SN**[SP]*serial_number*[CR LF]

Parameters

serial_number – 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:	**VERSION?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get firmware version number	#**VERSION?**[CR]	
Response			
~[nn]@**VERSION**[SP]*firmware_version*[CR LF]			
Parameters			
firmware_version – *XX.XX.XXXX* where the digit groups are: major.minor.build version			
Response Triggers			
Notes			
Example			
#VERSION?<CR>			

Authentication Commands

Command	Description
LOGIN	Set/get protocol permission
LOGOUT	Cancel current permission level
PASS	Set/get password for login level
SECUR	Set/get current security state

LOGIN

Functions		Permission	Transparency
Set:	**LOGIN**	Not Secure	Public
Get:	**LOGIN?**	Not Secure	Public
Description		**Syntax**	
Set:	Set protocol permission	#**LOGIN**[SP]*login_level,password*[CR]	
Get:	Get current protocol permission level	#**LOGIN?**[CR]	
Response			
Set: ~[nn] @**LOGIN**[SP]*login_level,password*[SP]**OK**[CR LF] or ~[nn]@**LOGIN**[SP]ERR[SP]004[CR LF] (if bad password entered) Get: ~[nn]@**LOGIN**[SP]*login_level*[CR LF]			
Parameters			
login_level – level of permissions required: User, Admin *password* – predefined password (by PASS command). Default password is an empty string			
Response Triggers			
Notes			
When the permission system is enabled, LOGIN enables running commands with the User or Administrator permission level. When set, login must be performed upon each connection. The permission system works only if security is enabled with the SECUR command. It is not mandatory to enable the permission system in order to use the device.			
Example			
Set the protocol permission level to Admin (when the password defined in the PASS command is 33333): #LOGIN Admin,33333<CR>			

LOGOUT

Functions		Permission	Transparency
Set:	**LOGOUT**	Not Secure	Public
Get:	–	-	-
Description		**Syntax**	
Set:	Cancel current permission level	#**LOGOUT**[CR]	
Get:	-	-	
Response			
~[nn]@**LOGOUT**[SP]**OK**[CR LF]			
Parameters			
Response Triggers			
Notes			
Logs out from User or Administrator permission levels			
Example			
#LOGOUT<CR>			

PASS

Functions		Permission	Transparency
Set:	**PASS**	Administrator	Public
Get:	**PASS?**	Administrator	Public
Description		**Syntax**	
Set:	Set password for login level	#**PASS** `SP` *login_level,password* `CR`
Get:	Get password for login level	#**PASS?** `SP` *login_level* `CR`
Response			
~`nn`@**PASS** `SP` *login_level,password* `CR LF`			
Parameters			
login_level – level of login to set: User, Admin *password* – password for the *login_level*. Up to 15 printable ASCII chars.			
Response Triggers			
Notes			
The default password is an empty string			
Example			
Set the password for the Admin protocol permission level to 33333: #PASS Admin,33333<CR>			

SECUR

Functions		Permission	Transparency
Set:	**SECUR**	Administrator	Public
Get:	**SECUR?**	Not Secure	Public
Description		**Syntax**	
Set:	Start/stop security	#**SECUR** SP *security_mode* CR	
Get:	Get current security state	#**SECUR?** CR	
Response			
~ nn @**SECUR** SP *security_mode* CR LF			
Parameters			
security_mode – 1 (On / enable security), 0 (Off / disable security)			
Response Triggers			
Notes			
The permission system works only if security is enabled with the SECUR command			
Example			
Enable the permission system: #SECUR 0<CR>			

Switching/Routing Commands

Command	Description
MATRIX-STATUS	Get routing status of all output ports
PORTS-LIST	Get the port list of this device
SIGNALS-LIST	Get the signal ID list of this device
X-ROUTE	Send routing command to matrix / Get routing status

MATRIX-STATUS

Command Name		Permission	Transparency
Set:	-	–	–
Get:	**MATRIX-STATUS?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get routing status of all output ports	**#MATRIX-STATUS?** CR LF	
Response			
Multi-line: ~nn@**MATRIX-STATUS** SP *[[out_signal_id,IN_signal_id],..]* CR LF			
Parameters			
out_signal_id – format for identifying specific outputs: OUT.SDI.X.VIDEO.1 (X = port/output # as written on the device panel), for example, OUT.SDI.5.VIDEO.1 (PORT/OUTPUT 5). *in_signal_id* – format for identifying specific inputs: IN.SDI.X.VIDEO.1 (X = port # as written on the device panel), for example, IN.SDI.1.VIDEO.1 (PORT/INPUT 1).			
Response Triggers			
Notes			
In the response, each input/output pair is enclosed in square brackets "[ ]". For the devices with interchangeable ports, this command only shows status for those ports that are currently defined as outputs.			
Example			
Get the routing status of all output ports: #MATRIX-STATUS?<CR>			

PORTS-LIST

Command Name		Permission	Transparency
Set:	–	–	–
Get:	**PORTS-LIST?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get the port list of this device	**#PORTS-LIST?** CR LF	
Response			
~nn@**PORTS-LIST** SP *[port_id,..,]* CR LF			
Parameters			
port_id – format for identifying specific ports: OUT/IN.SDI.X (X = port/input/output # as written on the device panel), for example IN.SDI.1 (PORT/INPUT 1), OUT.SDI.5 (PORT/OUTPUT 5).			
Response Triggers			
Notes			
The response is returned in one line and terminated with CR LF. The response format lists port IDs separated by commas. This is an Extended Protocol 3000 command.			
Example			
Get the list of ports for this device: #PORTS-LIST?<CR>			

SIGNALS-LIST

Command Name		Permission	Transparency
Set:	–	–	–
Get:	**SIGNALS-LIST?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get signal ID list of this device	**#SIGNALS-LIST?** `CR LF`	
Response			
~`nn`@**SIGNALS-LIST**`SP`*[signal_id,..,]*`CR LF`			
Parameters			
signal_id – format for identifying specific ports: `OUT/IN.SDI.X.VIDEO.1` (X = port/input/output # as written on the device panel), for example, `IN.SDI.1.VIDEO.1` (PORT/INPUT 1), `OUT.SDI.5.VIDEO.1` (PORT/OUTPUT 5).			
Response Triggers			
Notes			
The response is returned in one line and terminated with `CR LF`			
The response format lists signal IDs separated by commas. This command returns all possible signals for the device, therefore, for the devices with interchangeable ports it returns 2 signal ids for each physical port, one as an input and one as an output. This is an [Extended Protocol 3000](#) command.			
Example			
Get signal ID list for this device: `#SIGNALS-LIST?<CR>`			

X-ROUTE

Command Name		Permission	Transparency
Set:	**X-ROUTE**	End User	Public
Get:	**X-ROUTE?**	End User	Public
Description		**Syntax**	
Set:	Send routing command to matrix	**#X-ROUTE**[SP]*out_signal_id,in_signal_id*[CR LF]	
Get:	Get routing status	**#X-ROUTE?**[SP]*out_signal_id*[CR LF]	
Response			
Set / Get: ~[nn]@**X-ROUTE**[SP]*OUT_signal_id,in_signal_id*[CR LF]			
Parameters			
out_signal_id – format for identifying specific outputs: OUT.SDI.X.VIDEO.1 (X = port/output # as written on the device panel), for example, OUT.SDI.5.VIDEO.1 (PORT/OUTPUT 5). *in_signal_id* – format for identifying specific inputs: IN.SDI.X.VIDEO.1 (X = port # as written on the device panel), for example, IN.SDI.1.VIDEO.1 (PORT/INPUT 1).			
Response Triggers			
Notes			
It is recommended to use the command #SIGNALS-LIST? to get the list of all signal IDs available in the system and which can be used in this command. VIDEO and 1 are, respectively, the default <signal_type> and <index> in this command and are implied even if not written: #X-ROUTE OUT.SDI.5,IN.SDI.1 is interpreted as: #X-ROUTE OUT.SDI.5.VIDEO.1,IN.SDI.1.VIDEO.1 This is an [Extended Protocol 3000](#) command.			
Example			
Route INPUT 1 to OUTPUT 5: #X-ROUTE OUT.SDI.5.VIDEO.1,IN.SDI.1.VIDEO.1<CR> -OR- #X-ROUTE OUT.SDI.5,IN.SDI.1<CR>			

Video Commands

Command	Description
GENLOCK-MODE	Set/get genlock sync mode
GENLOCK-TIME-MICROSEC	Set/get genlock delay in microseconds
VMUTE	Set/get enable/disable video on output

GENLOCK-MODE

Command Name		Permission	Transparency
Set:	**GENLOCK-MODE**	End User	Public
Get:	**GENLOCK-MODE?**	End User	Public
Description		**Syntax**	
Set:	Set genlock sync mode	**#GENLOCK-MODE** `SP` *mode* `CR LF`	
Get:	Get genlock sync mode status	**#GENLOCK-MODE?** `CR LF`	
Response			
Set / Get: ~`nn`@**GENLOCK-MODE** `SP` *mode* `CR LF`			
Parameters			
mode – ON, OFF (not case sensitive)			
Response Triggers			
Notes			
This command synchronizes the routing action with sync frames. Routing does not occur until a sync frame is detected and delay is defined in the GENLOCK-TIME-MICROSEC command. This mode affects the whole system and is not configurable per output/input.			
Examples			
Set the genlock sync to ON: `#GENLOCK-MODE ON<CR>`			

GENLOCK-TIME-MICROSEC

Command Name		Permission	Transparency
Set:	**#GENLOCK-TIME-MICROSEC**	End User	Public
Get:	**#GENLOCK-TIME-MICROSEC?**	End User	Public
Description		**Syntax**	
Set:	Set genlock delay in microseconds	**#GENLOCK-TIME-MICROSEC** `SP` *value* `CR`	
Get:	Get genlock delay in microseconds	**#GENLOCK-TIME-MICROSEC?** `SP` *value* `CR`	
Response			
Set / Get: ~`nn`@**GENLOCK-TIME-MICROSEC** `SP` *value* `CR LF`			
Parameters			
value – time in microseconds, 0–99999			
Response Triggers			
Notes			
Configures the maximum delay in microseconds between arrival of a picture frame and its routing is executed			
Examples			
Set the genlock delay to 20 microseconds: `#GENLOCK-TIME-MICROSEC 20<CR>`			

VMUTE

Functions		Permission	Transparency
Set:	**VMUTE**	End User	Public
Get:	**VMUTE?**	End User	Public

Description		Syntax
Set:	Set enable/disable video on output	**#VMUTE**[SP]*output_id,flag*[CR]
Get:	Get video on output status	**#VMUTE?**[SP]*output_id*[SP][CR]

Response
Set / Get: ~[nn]@**VMUTE**[SP]*output_id,flag*[CR LF]

Parameters
output_id – format for identifying specific outputs: OUT.SDI.X.VIDEO.1 (X = port/output # as written on the device panel), for example, OUT.SDI.5.VIDEO.1 (PORT/OUTPUT 5).   *flag* – 0 (disable video on output), 1 (enable video on output)

Response Triggers

Notes

Example
Disable the video output on OUTPUT 8:   #VMUTE OUT.SDI.8.VIDEO.1,0<CR>

Communication Commands

Command	Description
ETH-PORT	Set/get Ethernet port protocol.
NET-CONFIG	Set/get a network configuration.
NET-DHCP	Set/get DHCP mode
NET-DNS	Get DNS address
NET-GATE	Set/get gateway IP
NET-IP	Set/get IP address
NET-MAC	Get MAC address
NET-MASK	Set/get subnet mask

ETH-PORT

Functions		Permission	Transparency
Set:	**ETH-PORT**	Administrator	Public
Get:	**ETH-PORT?**	End User	Public
Description		**Syntax**	
Set:	Set Ethernet port protocol	#**ETH-PORT** SP *portType,ETHPort* CR	
Get:	Get Ethernet port protocol	#**ETH-PORT?** SP *portType* CR	
Response			
~ nn @**ETH-PORT** SP *portType,ETHPort* CR LF			
Parameters			
portType – string of 3 letters indicating the port type: TCP, UDP *ETHPort* – 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-(2^16-1).			
Example			
Set the Ethernet port protocol for TCP to port 12457: #ETH-PORT TCP,12457<CR>			

NET-CONFIG

Functions		Permission	Transparency
Set:	**NET-CONFIG**	End User	Public
Get:	**NET-CONFIG?**	End User	Public
Description		**Syntax**	
Set:	Set a network configuration.	#**NET-CONFIG** SP *id,ip,net_mask,gateway* CR LF	
Get:	Get a network configuration.	#**NET-CONFIG?** SP *id* CR LF	
Response			
Get: ~ nn @**NET-CONFIG** SP SP *id,ip,net_mask,gateway* CR LF			
Parameters			
id – Ethernet connection ID number: 0 *ip* – network IP address, in the following format: xxx.xxx.xxx.xxx *net_mask* – network mask, in the following format: xxx.xxx.xxx.xxx *gateway* – network gateway, in the following format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
Example			
Set the device network parameters to IP address 192.168.113.10, net mask 255.255.0.0, and gateway 192.168.0.1: #NET-CONFIG 0,192.168.113.10,255.255.0.0,192.168.0.1<CR>			

NET-DHCP

Functions		Permission	Transparency
Set:	**NET-DHCP**	Administrator	Public
Get:	**NET-DHCP?**	End User	Public

Description		Syntax
Set:	Set DHCP mode	**#NET-DHCP**[SP]*mode*[CR]
Get:	Get DHCP mode	**#NET-DHCP?**[CR]

Response

~[nn]@**NET-DHCP**[SP]*mode*[CR LF]

Parameters

mode – 0 (do not use DHCP. Use the IP address set by the factory or the NET-IP command), 1 (try to use DHCP. If unavailable, use the IP address set by the factory or the NET-IP command)

Response Triggers

Notes

Connecting Ethernet to devices with DHCP may take more time in some networks.
To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the NAME command. You can also get an assigned IP by direct connection to RS-232 protocol port.
Consult your network administrator for correct settings.

Example

Enable DHCP mode, if available:
#NET-DHCP 1<CR>

NET-DNS

Functions		Permission	Transparency
Set:	-	-	-
Get:	**NET-DNS?**	End User	Public

Description		Syntax
Set:	-	-
Get:	Get DNS address	**#NET-DNS?**[CR]

Response

~[nn]@**NET-DNS**[SP]*dns_id,ip*[CR LF]

Parameters

dns_id – ID of the DNS name server to retrieve, indexing starts at "0"
Iip – IP address of the DNS server

Response Triggers

After execution, response is sent to the com port that sent the Get command.
There is no Set command.
Use **NET-CONFIG** to set up network, including DNS name servers.
If *dns_id* is out of the defined DNS range, Error Code #3 (ERR_PARAMETER_OUT_OF_RANGE) is returned.
If no *dns_id* is defined, Error Code #3 is returned for any *dns_id*.

Notes

Example

Get the DNS address for this device:
#NET-DNS?<CR>

NET-GATE

Functions		Permission	Transparency
Set:	**NET-GATE**	Administrator	Public
Get:	**NET-GATE?**	End User	Public

Description		Syntax
Set:	Set gateway IP	#**NET-GATE**[SP]*ip_address*[CR]
Get:	Get gateway IP	#**NET-GATE?**[CR]

Response
~[nn]@**NET-GATE**[SP]*ip_address*[CR LF]

Parameters
ip_address – 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:	**NET-IP**	Administrator	Public
Get:	**NET-IP?**	End User	Public

Description		Syntax
Set:	Set IP address	#**NET-IP**[SP]*ip_address*[CR]
Get:	Get IP address	#**NET-IP?**[CR]

Response
~[nn]@**NET-IP**[SP]*ip_address*[CR LF]

Parameters
ip_address – 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:	**NET-MAC?**	End User	Public

Description		Syntax	
Set:	-	-	
Get:	Get MAC address	#**NET-MAC?** `CR`	

Response
~`nn`@**NET-MAC**`SP`*mac_address*`CR LF`

Parameters
mac_address – unique MAC address. Format: *XX-XX-XX-XX-XX-XX* where *X* is hex digit

Response Triggers

Notes

Example
Get the MAC address for this device: #NET-MAC?<CR>

NET-MASK

Functions		Permission	Transparency
Set:	**NET-MASK**	Administrator	Public
Get:	**NET-MASK?**	End User	Public

Description		Syntax	
Set:	Set subnet mask	#**NET-MASK**`SP`*net_mask*`CR`	
Get:	Get subnet mask	#**NET-MASK**`CR`	

Response
~`nn`@**NET-MASK**`SP`*net_mask*`CR LF`

Parameters
net_mask - format: *xxx.xxx.xxx.xxx*

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<CR>

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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.

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KRAMER

P/N: 2900- 300846   Rev: 1

⚠ **SAFETY WARNING**
Disconnect the unit from the power supply before opening and servicing

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www.KramerAV.com
info@KramerAV.com