4K 8-CHANNEL

DIGITAL VIDEO SWITCHER

# HS-4000

## Instruction Manual

# Table of Contents

**Disclaimer of Product & Services**

The information offered in this instruction manual is intended as a guide only. At all times, Datavideo Technologies will try to give correct, complete and suitable information. However, Datavideo Technologies cannot exclude that some information in this manual, from time to time, may not be correct or may be incomplete. This manual may contain typing errors, omissions or incorrect information. Datavideo Technologies always recommend that you double check the information in this document for accuracy before making any purchase decision or using the product. Datavideo Technologies is not responsible for any omissions or errors, or for any subsequent loss or damage caused by using the information contained within this manual. Further advice on the content of this manual or on the product can be obtained by contacting your local Datavideo Office or dealer.

# FCC Compliance Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

# Warnings and Precautions

1. Read all of these warnings and save them for later reference.
2. Follow all warnings and instructions marked on this unit.
3. Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this unit in or near water.
5. Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage.
6. Slots and openings on the cabinet top, back, and bottom are provided for ventilation. To ensure safe and reliable operation of this unit, and to protect it from overheating, do not block or cover these openings. Do not place this unit on a bed, sofa, rug, or similar surface, as the ventilation openings on the bottom of the cabinet will be blocked. This unit should never be placed near or over a heat register or radiator. This unit should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should only be operated from the type of power source indicated on the marking label of the AC adapter. If you are not sure of the type of power available, consult your Datavideo dealer or your local power company.
8. Do not allow anything to rest on the power cord. Do not locate this unit where the power cord will be walked on, rolled over, or otherwise stressed.
9. If an extension cord must be used with this unit, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord rating.
10. Make sure that the total amperes of all the units that are plugged into a single wall outlet do not exceed 15 amperes.
11. Never push objects of any kind into this unit through the cabinet ventilation slots, as they may touch dangerous voltage points or short out parts that could result in risk of fire or electric shock. Never spill liquid of any kind onto or into this unit.
12. Except as specifically explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks, and will void your warranty. Refer all service issues to qualified service personnel.
13. Unplug this product from the wall outlet and refer to qualified service personnel under the following conditions:
    a. When the power cord is damaged or frayed;

b. When liquid has spilled into the unit;

c. When the product has been exposed to rain or water;

d. When the product does not operate normally under normal operating conditions. Adjust only those controls that are covered by the operating instructions in this manual; improper adjustment of other controls may result in damage to the unit and may often require extensive work by a qualified technician to restore the unit to normal operation;

e. When the product has been dropped or the cabinet has been damaged;

f. When the product exhibits a distinct change in performance, indicating a need for service.

# Warranty

## *Standard Warranty*

- Datavideo equipment is guaranteed against any manufacturing defects for one year from the date of purchase.
- The original purchase invoice or other documentary evidence should be supplied at the time of any request for repair under warranty.
- The product warranty period beings on the purchase date. If the purchase date is unknown, the product warranty period begins on the thirtieth day after shipment from a Datavideo office.
- All non-Datavideo manufactured products (product without Datavideo logo) have only one year warranty from the date of purchase.
- Damage caused by accident, misuse, unauthorized repairs, sand, grit or water is not covered under warranty.
- Viruses and malware infections on the computer systems are not covered under warranty.
- Any errors that are caused by unauthorized third-party software installations, which are not required by our computer systems, are not covered under warranty.
- All mail or transportation costs including insurance are at the expense of the owner.
- All other claims of any nature are not covered.
- All accessories including headphones, cables, batteries, metal parts, housing, cable reel and consumable parts are not covered under warranty.
- Warranty only valid in the country or region of purchase.
- Your statutory rights are not affected.

## *Three Year Warranty*

- All Datavideo products purchased after July 1st, 2017 qualify for a free two years extension to the standard warranty, providing the product is registered with Datavideo **within 30** days of purchase.

- Certain parts with limited lifetime expectancy such as LCD panels, DVD drives, Hard Drive, Solid State Drive, SD Card, USB Thumb Drive, Lighting, Non-PCIe Card and third party provided PC components are covered for 1 year.

- The three-year warranty must be registered on Datavideo's official website or with your local Datavideo office or one of its authorized distributors within 30 days of purchase.

# Disposal
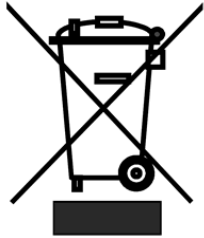
**For EU Customers only - WEEE Marking**

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

*CE Marking* is the symbol as shown on the left of this page. The letters "**CE**" are the abbreviation of French phrase "Conformité Européene" which literally means "European Conformity". The term initially used was "EC Mark" and it was officially replaced by "CE Marking" in the Directive 93/68/EEC in 1993. "CE Marking" is now used in all EU official documents.

# Chapter 1     Introduction

The HS-4000 is an 8-input live production switcher supporting the real 4K60/50P video resolution. With a variety of video input and output ports such as 12G-SDI and HDMI 2.0 interface, you will be able to easily produce a sophisticated and professional live event.

With a built-in 5-inch LCD touch panel, the HS-4000 provides a user friendly user interface, which is very easy to operate and set up. The HS-4000 switcher also has powerful and easy-to-use effects such as Chroma/Luma Key, DSK, PIP, Wipe Generator, still stores and logo insertion.

The Crosspoint assignment (XPT) provides alternative I/O combinations by allowing you to reroute physical I/O ports to the corresponding control panel buttons.
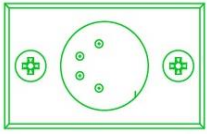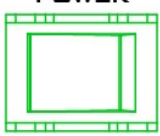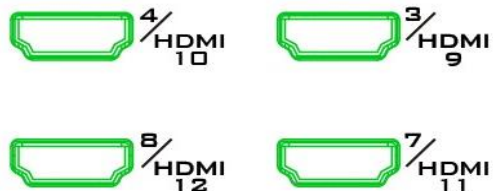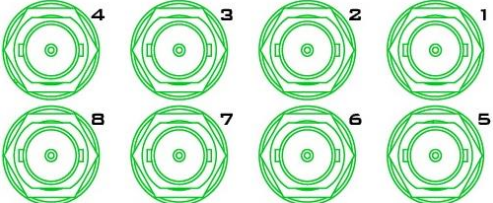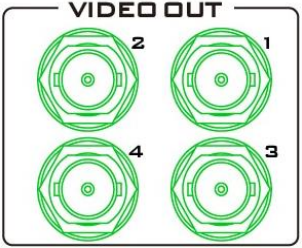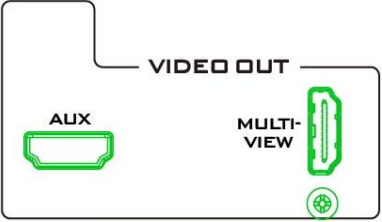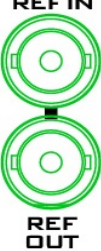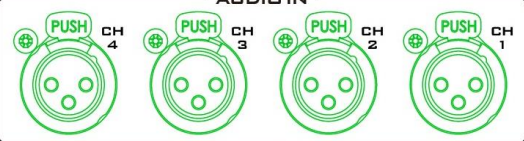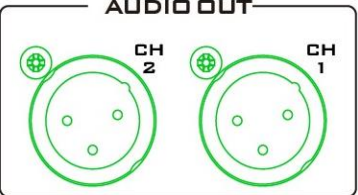
## Features
- UHD 4K60/50p signals on input and output
- 8 live channels: 8x 12G-SDI + 4x HDMI (select 8 from 12)
- 7 outputs: 4x 12G-SDI +3x HDMI
- Variety of video and audio input/output
- Supports 4K60/50P with scaling on each available input
- 4 x XLR Analogue Audio Inputs
- 2 x XLR Analogue Audio Outputs
- Integrated 5" Touchscreen Display, easy to operate.
- 4 x Upstream Keyers and 2 x Downstream Keyers
- 2 x Picture-in-Picture (supported resolutions are 4K, 1080p and 1080i)
- Crosspoint assignment (XPT)
- Wipe, Mix, Cut Transitions
- CG Title Creator
- Tally output

## 1.1 Rear Panel

*With USB Control Port*

| Power | |
|---|---|
| DC IN 48-56V  | **1. DC IN**<br>Connect the supplied 48-56V PSU to this 4 PIN XLR socket<br>Pin 1 = GND ( - )<br>Pin 2 = NC<br>Pin 3 = NC<br>Pin 4 = VCC ( + ) |
| POWER  | **2. Power Button**<br>The power button starts and shuts down the machine. |
| Video Input | |
|  | **3. HDMI Video Inputs 9 – 12**<br>The HDMI inputs are labelled. The numbers 3/4/7/8 are the respective SDI counterparts of the HDMI video inputs 9 – 12. |
|  | **4. SDI Video Inputs 1 – 8**<br>The upper row of 12G-SDI inputs are labelled 1~4. The lower row of SDI inputs are labelled 5~8. |
| Video Output | |
| VIDEO OUT  | **5. SDI Video Outputs**<br>The SDI video outputs are user-defined outputs. Each of these outputs has the option to be:<br>• Multiview<br>• Program<br>• Preview<br>• Program + DSK<br>• Clean Program<br>• Clean Preview<br>• Input 1 – 8 |
| PGM 2      PGM 1  | **6. HDMI Video Outputs**<br>Connect external monitors to display the program view video. |

| | |
|---|---|
|  | **7. HDMI AUX and Multiview**<br>The HDMI Multiview port is designed to output the Multiview screen only. The HDMI AUX video output, however, is user-defined. The available options are listed as follows:<br>(1) Multiview<br>(2) Program<br>(3) Preview<br>(4) Program + DSK<br>(5) Clean Program<br>(6) Clean Preview<br>(7) Input 1 – 8 |
| **SYNC I/O** ||
|  | **8. REF IN/OUT**<br>The HS-4000 can be synchronized with other studio equipment such as cameras. **REF IN** accepts Tri-level or Black Burst sync. **REF OUT** can be used to pass the sync signal to other studio equipment such as cameras or recorders.<br>See the section on ***Genlock*** for details. |
| **Audio** ||
|  | **9. AUDIO IN**<br>Supports four channels of the XLR Balanced Audio Input.<br><br>See ***Section 5.7 Audio*** for audio setup. |
|  | **10. AUDIO OUT**<br>Supports two channels of the XLR Balanced Audio output.<br><br>See ***Section 5.7 Audio*** for audio setup. |
| **Control** ||
|  | **11. GPI OUT**<br>The ***GPI socket*** can be used for simple external control.<br><br>See ***Appendix 2*** for more details. |
|  | **12. RS-232 REMOTE**<br>Connect a custom keyboard controller to this port.<br><br>See ***Appendix 3*** for details or contact your local Datavideo distributors. |

| | |
|---|---|
| TALLY OUT | **13. TALLY OUT**<br>The HS-4000 Tally Output port provides bi-colour tally information to a number of other Datavideo products, such as the ITC-100 eight channel talkback system or the Datavideo TLM range of monitors.<br><br>See *Appendix 1 and Section 5.6* for more details. |
| LAN/DVIP | **14. Ethernet Port**<br>The DVIP port is designed for the user to access the switcher's settings as well as the streaming server. You can either use a static IP address to connect or connect with DHCP. See *Section 2.2 Network Setup* to set up your network for accessing the switcher and *Chapter 9* for streaming server setup.<br><br>Please note that the switcher uses a static IP address by default which is 192.168.100.101. You can use the reset hole next to the USB FW Upgrade port to restore the default IP address. Use a needle to push the reset hole then hold for about 5 to 10 seconds until the machine reboots itself to restore the switcher's default IP address. |
| | **15. USB Control Port**<br>Connect the RMC-2 Camera Controller to the USB control port for remotely operating the cameras that are on the same network as the HS-4000.<br><br>**Note: Refer to the RMC-2's user manual for instructions on operation of the camera controller.** |
| **General** ||
| MONITOR HDMI IN | **16. Monitor HDMI IN (External Video Input)**<br><br>The HS-4000 provides a useful connection for confidence monitoring of HDMI sources on location.<br><br>Connect one external HDMI input source for monitoring the live show. |

| | |
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|  | **17. USB FW Upgrade Port**<br>Connect the USB drive containing the switcher's latest firmware files to this port and start the firmware upgrade process on the GUI. See *Firmware Update* **section for details.** |
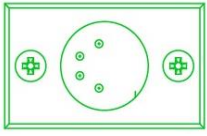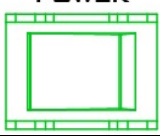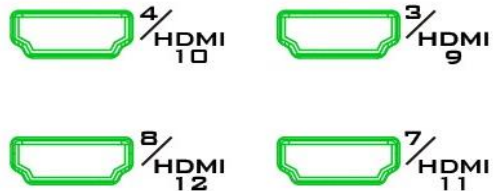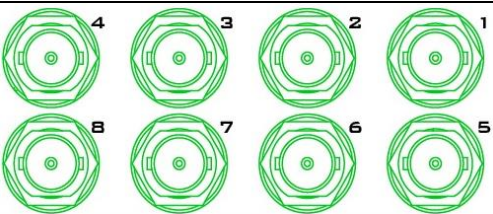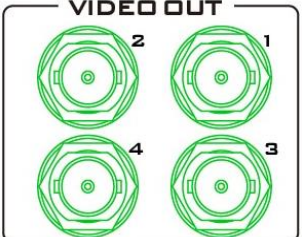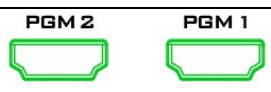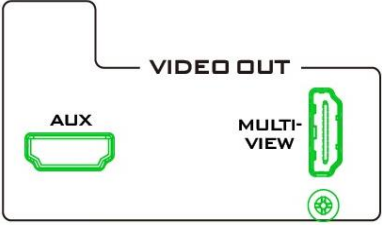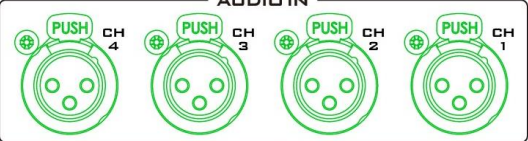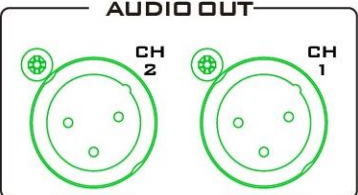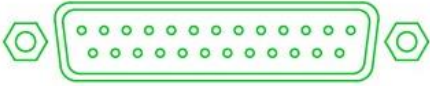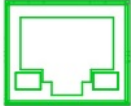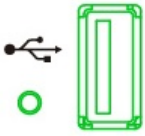
## Without USB Control Port

| Power | |
|---|---|
|  | **1. DC IN** <br> Connect the supplied 48-56V PSU to this 4 PIN XLR socket <br> Pin 1 = GND ( - ) <br> Pin 2 = NC <br> Pin 3 = NC <br> Pin 4 = VCC ( + ) |
|  | **2. Power Button** <br> The power button starts and shuts down the machine. |
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| SERVICE | **16. USB FW Upgrade Port**<br>Connect the USB drive containing the switcher's latest firmware files to this port and start the firmware upgrade process on the GUI. **See *Firmware Update* section for details.** |
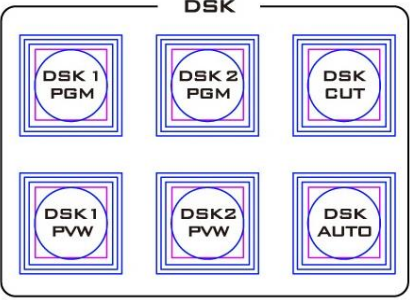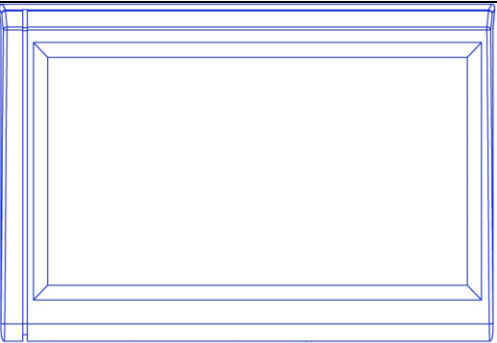
## 1.2 Control Panel
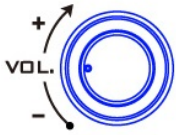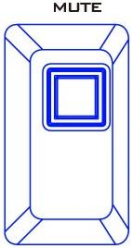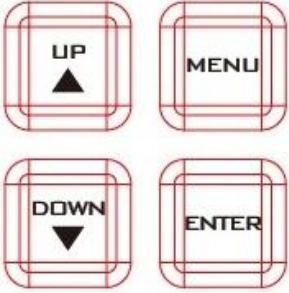
Perform video switching and other relevant controls on the **Control Panel**.
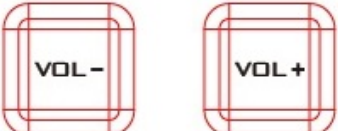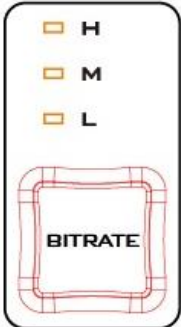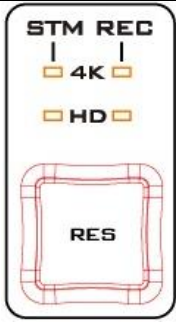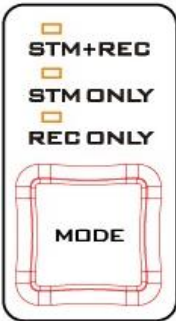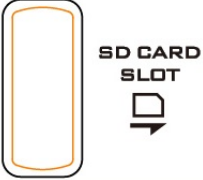
| Video Switching | |
|---|---|
| **1. Program row** | Selection of a program video source (**see *Section 6.1 Video Switching* for detailed instructions**). |



| | |
|---|---|
| **2. Preview row** | Selection of a preview video source (**see *Section 6.1 Video Switching* for detailed instructions**). |



| | |
|---|---|
| **3. Source row** | Select a video source for Program/Preview channels (**see *Section 6.1 Video Switching* for detailed instructions**). |



| | |
|---|---|
|  | **4. SHIFT Button**<br>Press the **SHIFT** button to activate the Source row for switching channels 3/4/7/8 between SDI and HDMI interfaces.<br>**Note: See the *Source Row* section for detailed instructions.** |
|  | **5. AUX Button**<br>Press the AUX button to activate the Source row for assigning a video source to an output channel.<br>**Note: See the *Source Row* section for detailed instructions.** |
| Transitions | |
|  | **6. MIX Button**<br>Selection of MIX transition effect (**See the *Mix Button* section for detailed instructions**). |
|  | **7. WIPE Button**<br>Selection WIPE transition effect (**See the *WIPE Button* section for detailed instructions**). |
|  | **8. STINGER Button**<br>Selection of animated transition effect (**See the *STINGER Button* section for detailed instructions**).<br><br>**Note: The Stinger button function is currently disabled and will be available in future firmware upgrades.** |
|  | **9. TRANS BG Button**<br>Turning on the Trans BG button allows you to activate the MIX, WIPE or Stinger transition with the background image/video (**See the *TRANS BG Button* section for detailed instructions**). |

| | |
|---|---|
| | **10. TRANS PVW Button**<br>Once enabled, you can then test the effect of a chosen **MIX**, **WIPE** or **Stinger** transition on the Preview Monitor (**See the** *TRANS PVW Button* **section for detailed instructions**). |
| | **11. T-Bar – Manual Transition**<br>Move the T-Bar up or down to switch between Preview and Program videos (**See the** *T-Bar* **section for detailed instructions**). |
| | **12. CUT Button**<br>A hard cut between video sources (**See the** *CUT Button* **section for detailed instructions**). |
| | **13. Auto Take**<br>Press to trigger automatic transition (**See the** *AUTO Button* **section for detailed instructions**). |
| | **14. FTB Button (Fade to Black)**<br>Fades the program view to black once pressed (**See the** *FTB Button* **section for detailed instructions**). |
| **Keyers** | |
| | **15. Keyer Selection**<br>Enabling the pre-assigned keyers (Chroma, Luma, Linear, DSK and PIP) on Program and Preview views.<br><br>**Note: See** *Chapter 7 Advanced Operation* **for detailed descriptions of various keyer functions.** |
| **Logo** | |
| | **16. Logos 1 & 2**<br>Logo insertion on preview and program outputs once enabled.<br><br>**Note: Logos will not be transitioned as the CUT or AUTO button is pressed, nor will it be transitioned as the T-bar is pushed. See** *Section 6.4 Enabling Still Logo* **and** *Section 6.5 Enabling Logo Animation* **for detailed descriptions of the logo function.** |

| DSK | |
|---|---|
| | **17. DSK Selection**<br>Enabling DSK on preview and program outputs.<br><br>**Note: See *Chapter 7 Advanced Operation* for detailed descriptions of the DSK function.** |
| **Still Grab and Save** | |
| | **18. Frame Store Button**<br>Press and hold the FS button then press a channel button on the Preview row to switch the selected channel to a pre-loaded still picture.<br><br>**Note: See *Section 6.3 Managing Still Pictures* for detailed instructions.** |
| | **19. Grab Button**<br>Press to capture images from the Program output.<br><br>**Note: See *Section 6.3 Managing Still Pictures* for detailed instructions.** |
| **Graphical User Interface** | |
| **20. GUI Control (Menu Selection)** | The GUI control buttons are designed for opening the GUI on the built-in 5 inch monitor and navigating through the sub menus. Press the HOME button to open the Home Menu page or the sub menu buttons to directly access the corresponding sub menus. |
| MENU SELECTION: HOME, WIPE, KEYER, CHROMA, MASK, PIP, AUDIO, FILES, INPUT, OUTPUT, AUX, SETUP | |
| | **21. 5 inch LCD Screen**<br>A touchscreen user interface allowing you to access various functions of the switcher via the GUI menu (**See *Chapter 5 Graphical User Interface* for detailed instructions**). |
| **Audio Control** | |
| **HEADPHONE** | **Headphone Jack**<br>Headphone jack accepts the mini jack plug of the stereo headphone. The volume is controlled by the volume adjustment knob. |

| | |
|---|---|
| | **Volume Adjustment Knob**<br>Rotate the knob to adjust the headphone's audio volume. |
| | **Mute Button**<br>Press to mute the headphone. |
| **Monitor Control** | |
| | **Power**<br>Turn on/off the built-in monitor. |
| | **Menu Navigation Buttons**<br>Press the MENU button to display the monitor's setup menus.<br>Press the UP and DOWN buttons to navigate the displayed menu.<br>Press the ENTER button to select the highlighted option.<br><br>*See **Chapter 8 Monitor** for more details.* |
| | **Video Mode Buttons**<br>Press the corresponding video mode buttons to enable different video modes on the built-in monitor.<br>HDMI: External HDMI video IN<br>MV: Multiview mode<br>PGM: Program video |
| | **ZOOM**<br>This feature is designed for use with the 12G-SDI and HDMI sources above 720p resolution. Press this button to zoom in to the video on the display. This is strictly a zoom-in function and does not alter the native aspect ratio of the source pixels to fill the screen.<br><br>The **ZOOM** button allows you to toggle between **zoom ratios x1, x2, x4** and **x8**. |

| | |
|---|---|
| | **Aspect Ratio Button**<br>Sets the aspect ratio to 16:9 or 4:3. |
| | **PTN**<br>Press to display internally generated SMPTE 75% Colour Bars. Press again to return to the previously selected video input. |
| | **Check Field**<br>The check field function offers the user Red-Only, Green-Only, Blue-Only and Mono modes for screen calibration. |
| | **Mute**<br>Press to mute the monitor's internal speakers. |
| | **Volume Buttons**<br>Press VOL+/VOL- to increase/decrease the internal speakers' volume. |
| **Stream Control** ||
| | **Start/Stop Button**<br>Press and hold for at least 2 seconds to enable/disable live streaming/recording depending on the operation mode selected. |
| | **BITRATE**<br>Use the **BITRATE** button to switch between **high (H)**, **moderate (M)** and **low (L)** bitrates for the selected operation mode (**RECORD only**, **STREAM only** and **RECORD and STREAM hybrid** modes).<br><br>See *Encoder* and *Section 9.4* for details. |

| | |
|---|---|
|  | **Resolution Button**<br>Press the **RES** button to switch between 4K and HD resolutions for the live stream output.<br><br>The LED indicators will show you the resolution selected for the stream and record modes.<br><br>See *Section 9.4* for details. |
|  | **MODE**<br>Press the **MODE** button to select the mode of operation for the video streaming server. The available modes are listed as follows:<br><br>**STM+REC:** Stream and record simultaneously<br>**STM ONLY:** Stream only<br>**REC ONLY:** Record only<br><br>The LED indicators will show you the selected mode of operation.<br><br>See *Section 9.4* for details. |
| **External Storage** | |
|  | **SD Card Slot**<br>Insert an SD card into the SD card slot for video recording.<br><br>**Note that you should only use Class 10 SD card or above. See the Appendix, *Recommended SD Cards*, for a list of SD cards recommended by Datavideo.**<br><br>**Note: Do not remove SD card while recording is in progress as doing so may result in corrupted video files.** |

## 1.3 Connecting the Power Supply

Connect the DC output plug of the supplied AC adapter to the DC IN 48 – 56V connector on the rear panel of the switcher and then connect the AC adapter plug to the mains power socket.
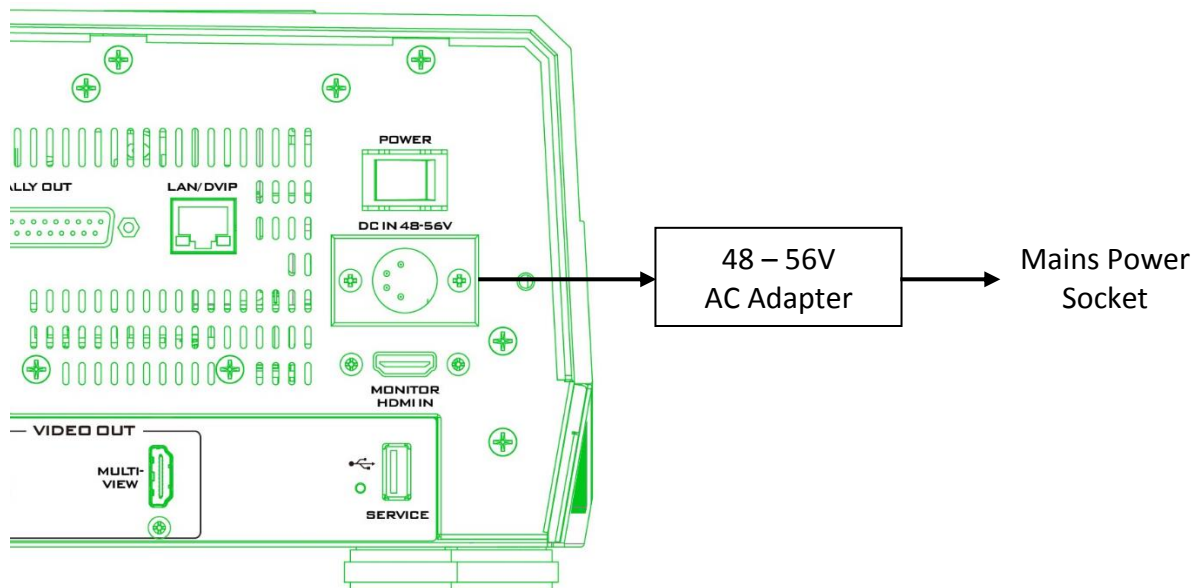


To start the machine, locate and turn **ON** the power switch on the rear panel.

To shut off the switcher, simply turn **OFF** the power switch.

# Chapter 2    Preparation

In this chapter, we will describe various essential devices to be connected to the switcher in order to complete the system setup. If you possess the skills for setting up the production system, feel free to skip this chapter and proceed to *Chapter 6: Basic Operation*.

## 2.1    Connecting Devices

In this section, we will provide brief descriptions of various connections for your video production setup. We will discuss connections listed as follows:

- Input devices
- Tally connection
- Output devices

### *Connecting Video and Audio Input Devices*

Connect cameras, computers and other video input devices to the video input connectors at the rear of the unit and connect an audio mixer to audio input connectors.



Computer for text input

Connect the switcher to the network for remote control
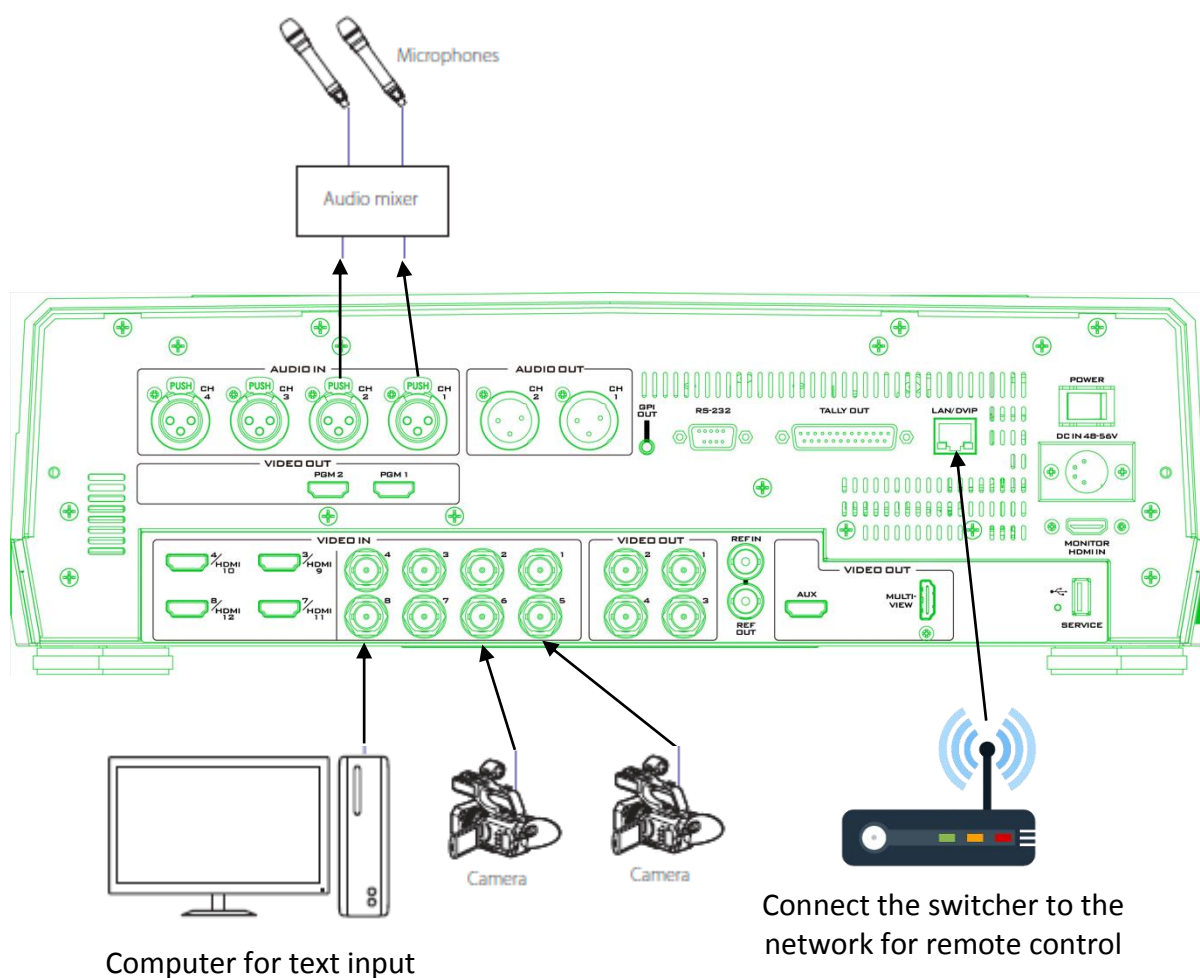
## *When Linking via Tally Connection*

Connect the switcher's tally OUT port to a commercially available tally box. The tally pinout information can be found in *Appendix 1*.
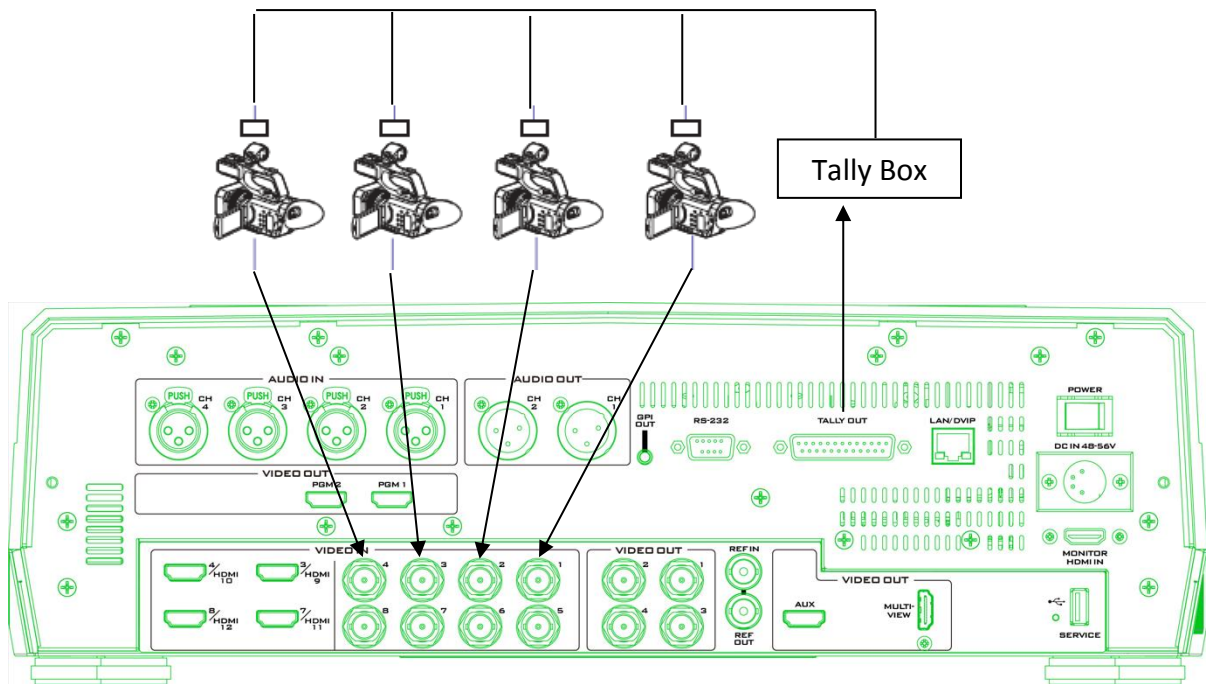


## *Connecting Video and Audio Output Devices*

Connect projectors, large displays and other video output devices to the video output ports at the rear of the switcher.
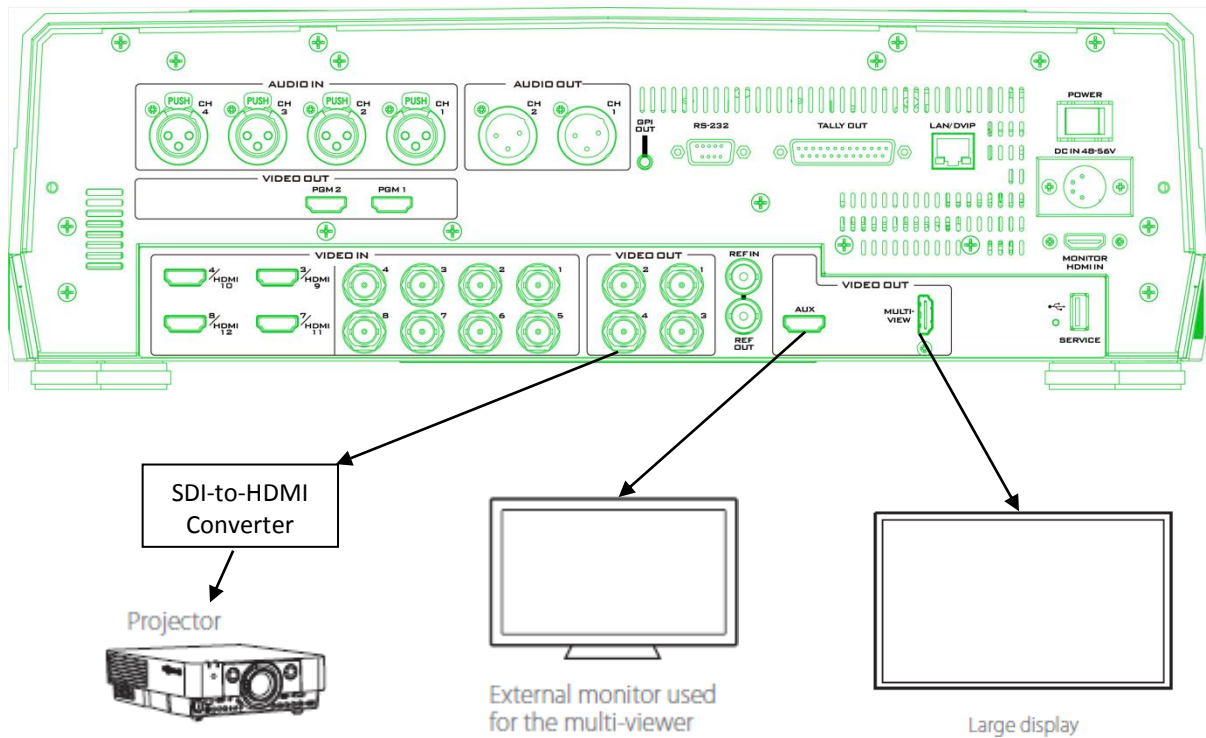
## 2.2 Network Setup

**LAN/DVIP**
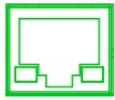
The Ethernet-based DVIP port on the back panel of the HS-4000 allows you to access the switcher and the NVS-32 streaming server from other devices such as a PC or an external controller. You can either use a static IP address to connect or connect via a router with DHCP.

The first sub-section discusses how you can connect directly to the switcher from a PC. In the second sub-section, we will show you how to connect via a DHCP router.

For information about NVS-32's network setup, see *Section 9.1*. Please note that when using static IP to connect, you have to make sure the PC/controller, the switcher and the NVS-32 are given the IP addresses that have the same first three octets.

### *Static IP Configuration*

**When new from the factory the HS-4000 will initially have a static IP address of 192.168.100.101.** The switcher can be directly connected to a Windows-based computer using any standard Ethernet cables. The following should guide you to initially configure static IP settings for the PC as well as the HS-4000.



Ethernet Connection

**192.168.100.102 (Arbitrary)**
(Subnet Mask: 255.255.255.0)

**192.168.100.101 (Default)**
(Subnet Mask: 255.255.255.0)
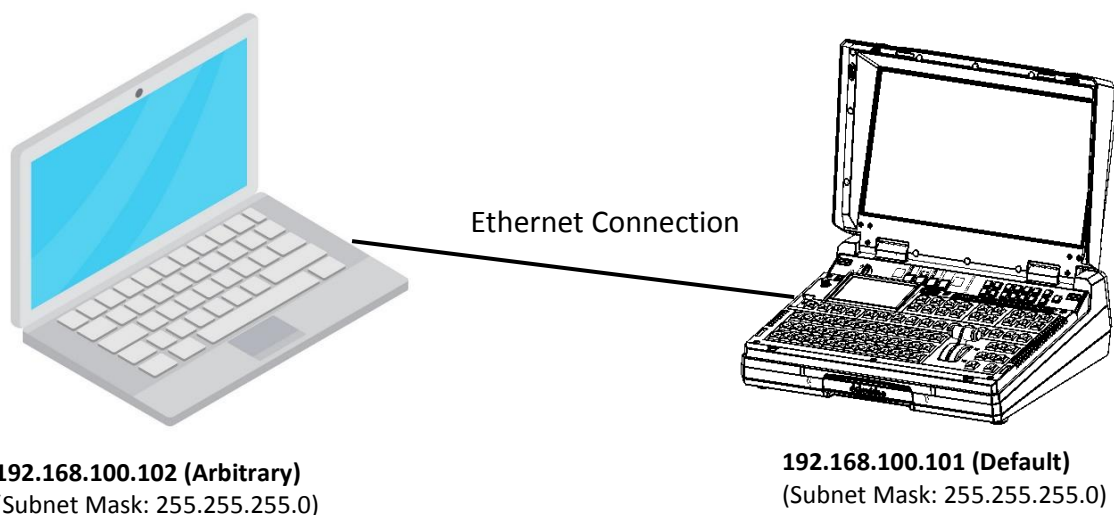
**Instructions**

1. First use an Ethernet cable to physically connect the HS-4000 to a Windows computer with the **Switcher Image Import/Export software** installed. If the **Switcher Image Import/Export software** is not installed on your PC, see *Chapter 4* of this manual for instructions on how to install and use the software.

2. Turn on the Windows computer and set it to **static IP setup** within the **Windows Network and Sharing Centre**. In our example, the computer is given the following IP settings so that the computer matches the same IP range as the switcher.
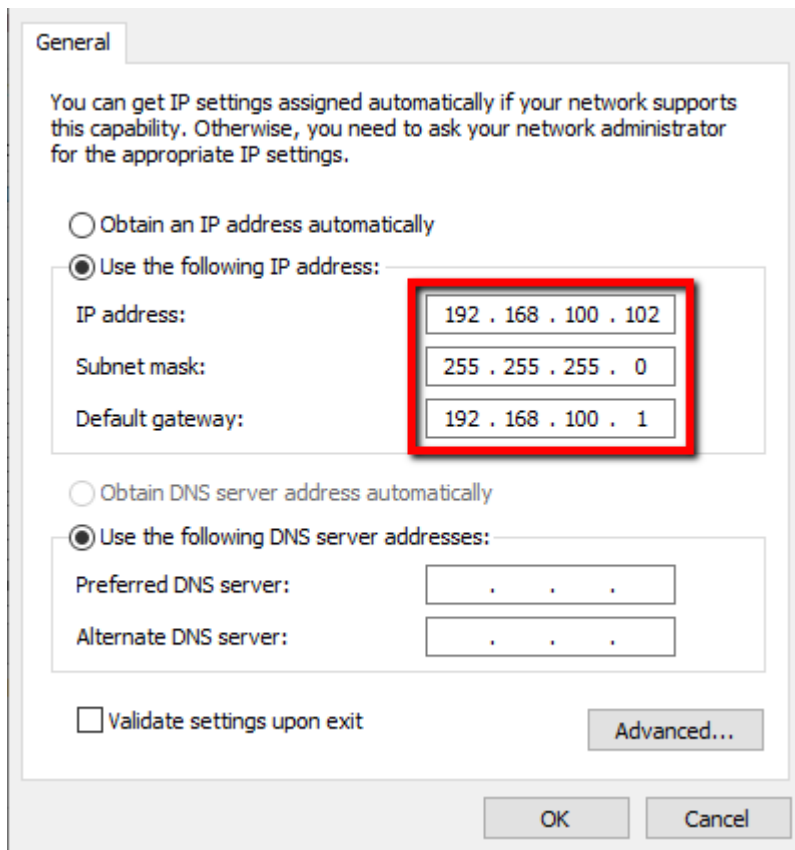
3. Now open the **Switcher Image Import/Export software** to establish connection with the switcher.

**Tip: You can also modify the switcher's IP address on the *Graphical User Interface* such that it matches the network IP range or the IP assigned to your PC. See the *Network* Section for details. This is also the place where you will be able to check or reset your device IP address. If you need to subnet your network which can be advanced to some, please consult your IT specialist for assistance if necessary. After changing your network settings, always reboot your switcher to apply new settings.**

## *DHCP Mode*

Dynamic Host Configuration Protocol (DHCP) is a network management protocol used to automate the process of configuring devices on IP networks. Once configured to DHCP, the device will be assigned an IP address by a DHCP server upon connection to the network.

Follow the steps below to set the switcher to DHCP:

1. Open the **SETUP** sub menu on the LCD screen by pressing the **SETUP** button on the HS-4000's control panel.

2. Tap the **Network** tab then turn ON **DHCP**. Tap the **Save** button to save the change.

| < Menu | **Setup** | |
| --- | --- | --- |
| ◀ **Language** | **Network** | **Software** ▶ |

DHCP :                    IP Address :                    Network Mask :

| OFF | **192.168.100.101** > | 255.255.255.0 |

Network Def                                                    **Save**
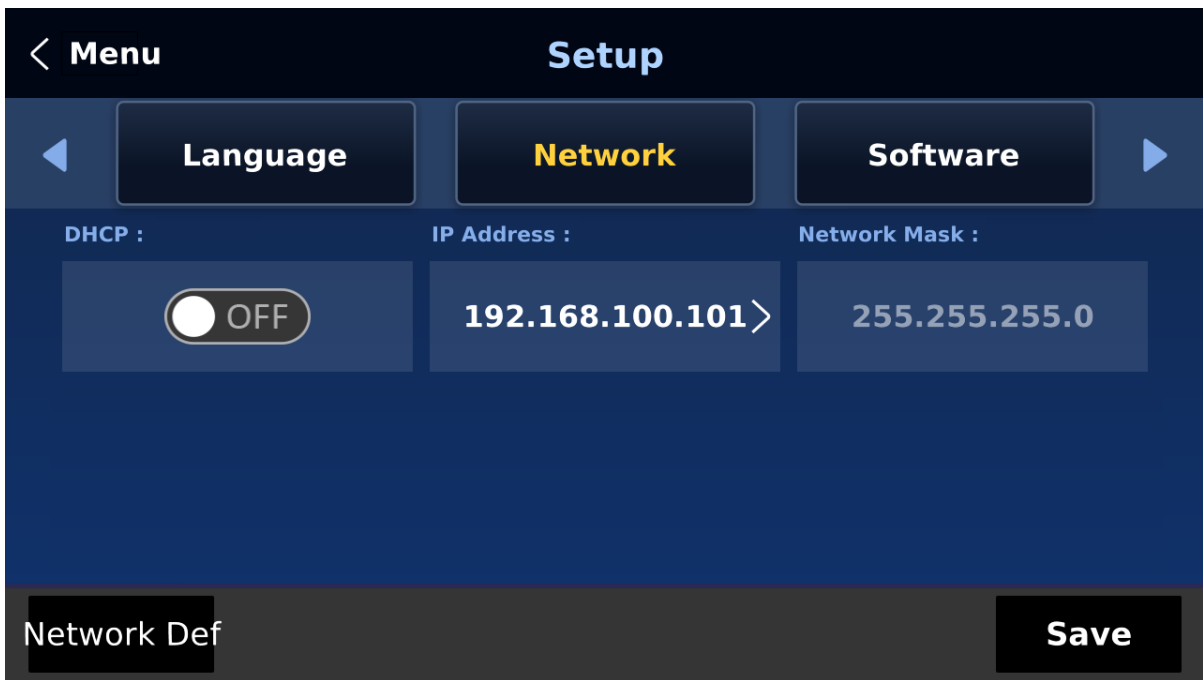
3. After you've been prompted that the save is successful, reboot the HS-4000 then physically connect the device to a DHCP network or a router to receive an IP address assigned by a DHCP server.



**DHCP**                                                              **DHCP**

Internet
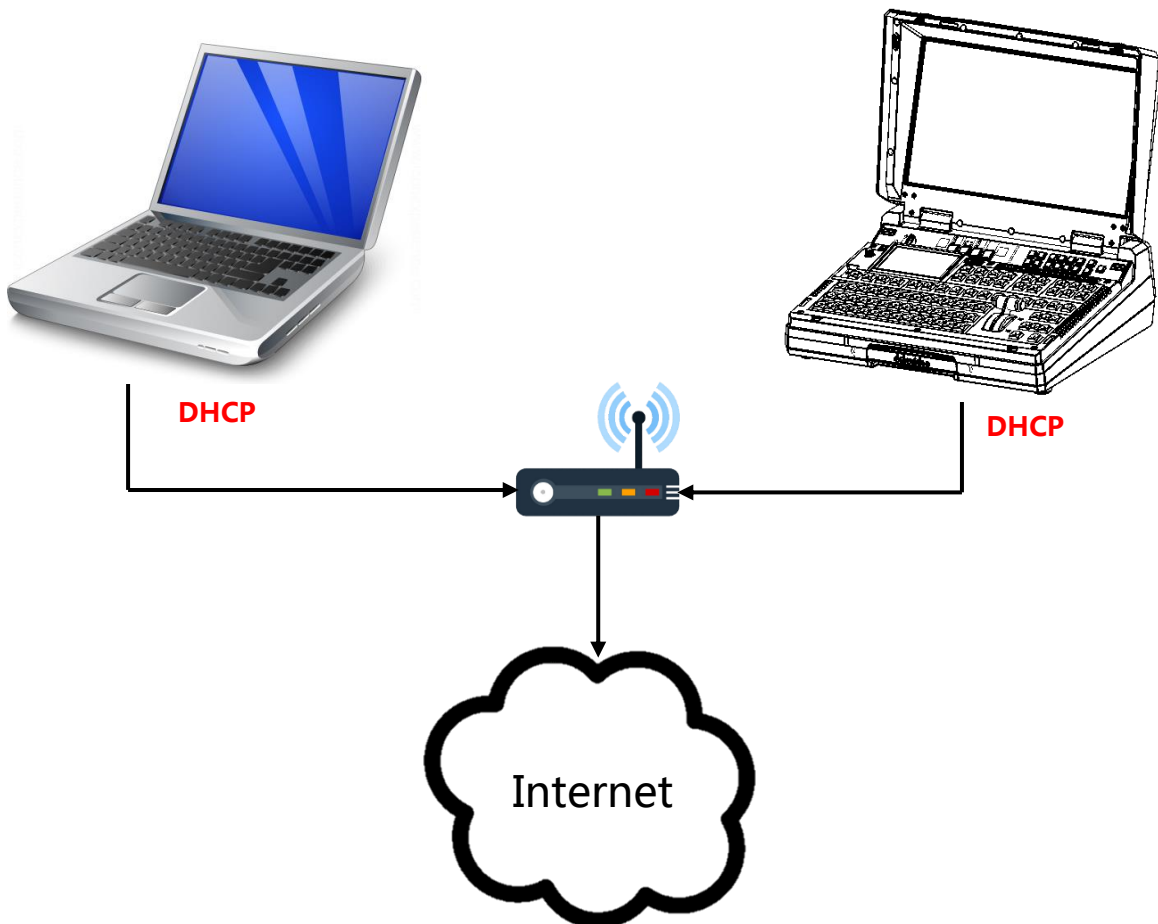
### *DVIP*

DVIP is an Ethernet-based protocol designed by Datavideo to connect a network of Datavideo devices. DVIP Configuration Tool is a special network configuration software tool designed for DVIP device search on the same network and configuring device network settings such as Hostname, DHCP mode, IP address, subnet mask, gateway IP, and primary and secondary DNS.

Depending on your operating system, download DVIP Configuration Tool from the respective sites listed as follows:

PC: https://www.microsoft.com/en-us/p/dvip-network-config/9p6gtz839k6s?activetab=pivot%3Aoverviewtab

Android: https://play.google.com/store/apps/details?id=com.datavideo.dvipnetconfig&hl=en_US

iOS: https://itunes.apple.com/tw/app/dvip-network-config/id1177895983?mt=8

After you've installed the DVIP Network Configuration Tool, follow the steps outlined below to scan for online DVIP devices and configure their corresponding settings.

Step 1: Open the DVIP Network Configuration Tool then select your PC or laptop's network interface card from the drop-down menu as shown in the diagram below.
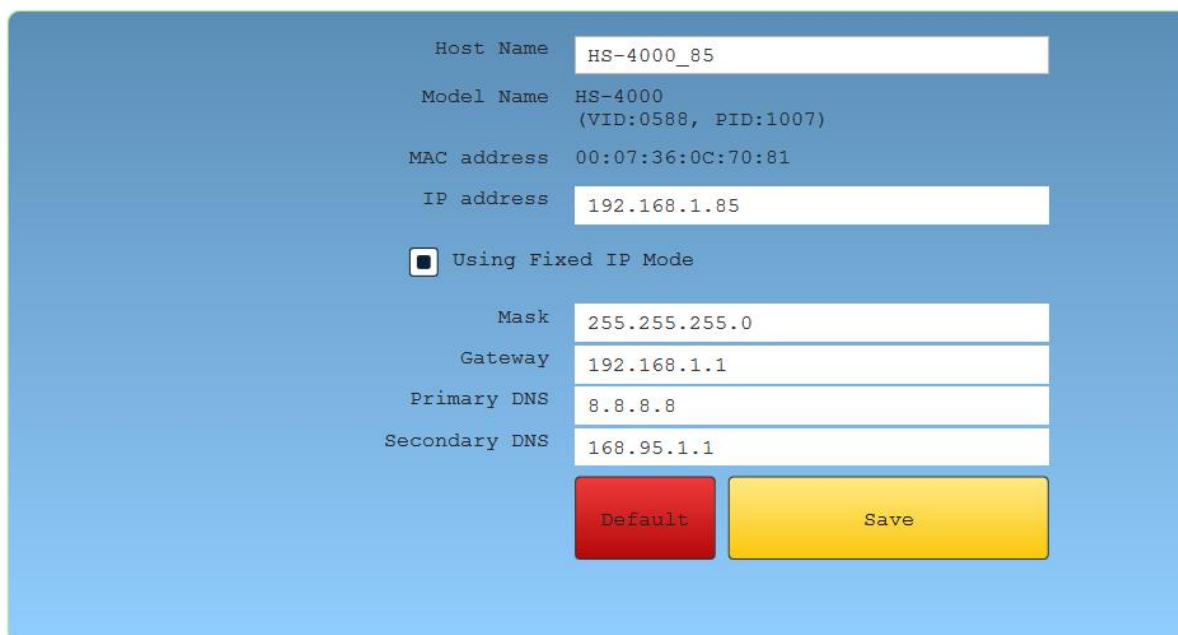
Step 2: The DVIP Network Configuration Tool interface is shown below and you should see a list of the connected devices.
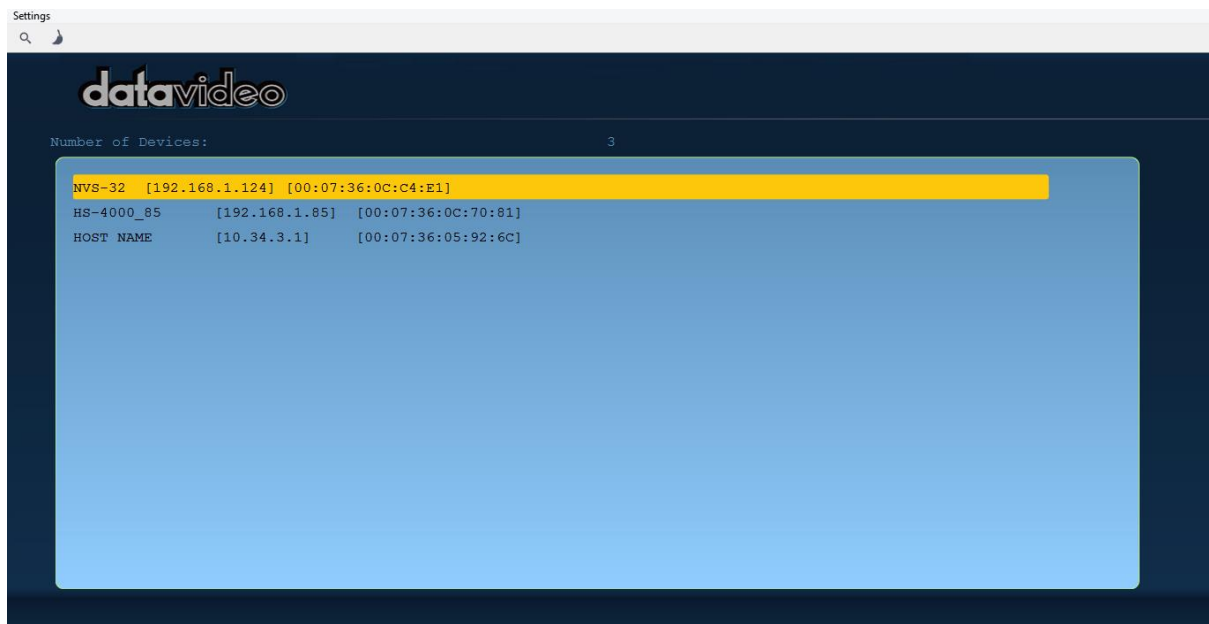


Step 3: Click one of the connected device to show its information and network settings in the pop-up window shown in the diagram below.
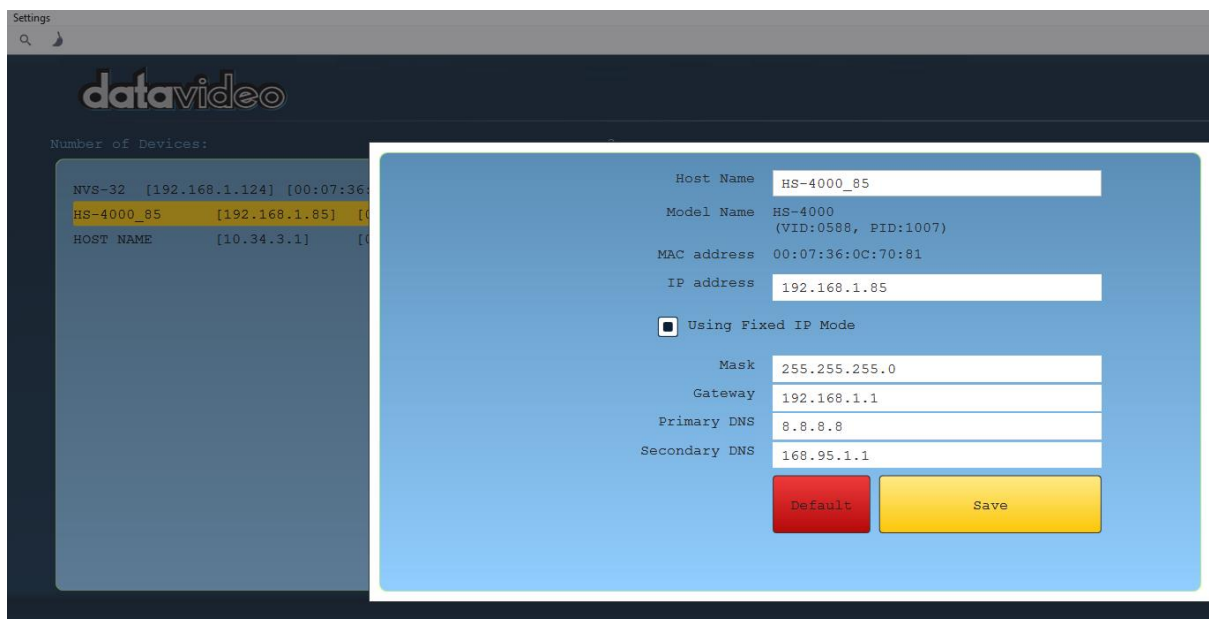
Step 4: You are allowed to change the device name in the Host Name field and modify the device's network settings accordingly. Click the Save button to confirm the change. To reset, simply click the Default button.



## 2.3  Multi View

The HS-4000 Multi view output can be supplied from the HDMI or SDI outputs, see Chapter 5 (5.6) for configuring the outputs.  The Multi view shows monitoring images for **Preview** (PVW), **Program** (PGM) and **Inputs 1~8**.  The Multi view can also show **audio level bars** overlaid on the Program image. This confirms that the analogue XLR audio input is being received and embedded to the selected Program output(s). The HS-4000 also has a proprietary Multi-view port which is an HDMI connector on the rear panel, delivering the multi-view screen to the connected HDMI monitor (not supplied).

The layout of the multi view can also be changed. The sources can be swapped around using the cross point function (See *cross point* of the *Inputs* menu for details). For each setup, embedded audio level indication is available on the Preview and Program windows.

There are six different multi-view layouts available on the HS-4000. See *Multiviewer* in *Section 5.6* for setup instructions.

**Note: A Red tally indication box** will be shown around the sources selected for Program OUT and these selected sources should be displayed at the switcher's selected Program output(s). **A Green tally indication box** is shown around the sources selected for Preview. These are the next image sources to be mixed to, wiped in or cut to the Program OUT depending on the user's preference.

# Chapter 3    Device Initialization

After the HS-4000 is booted up, there are initial settings that you should configure on the GUI. These initial settings will be discussed in this chapter.

You should see the GUI shown below on the LCD screen.
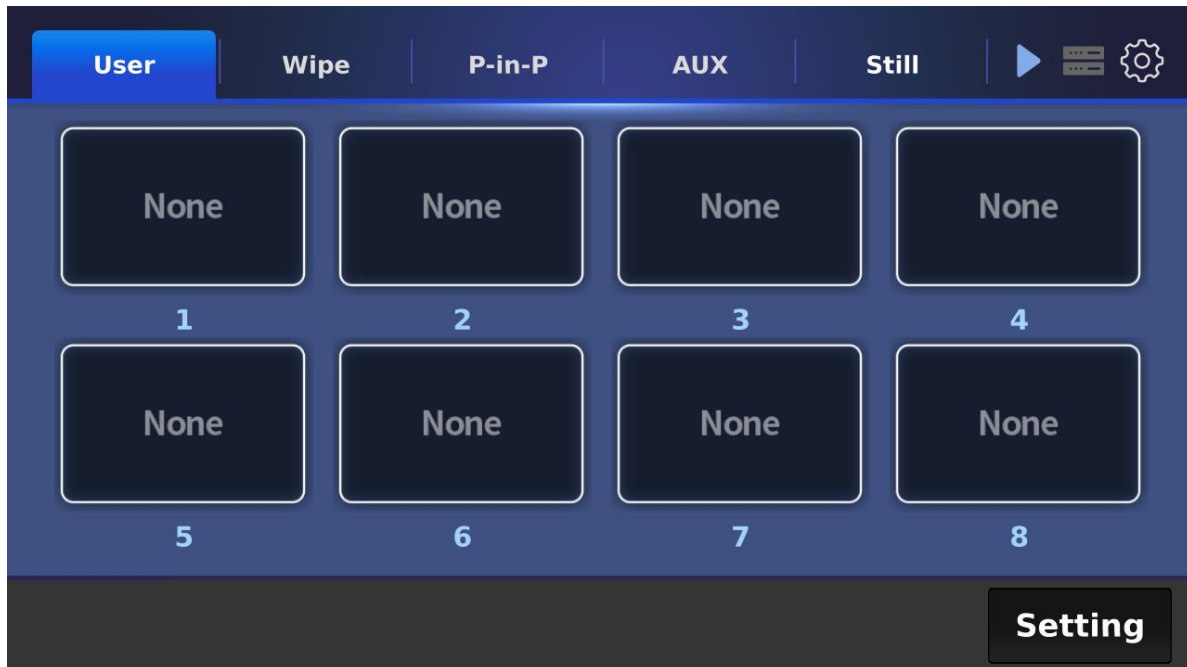


Various initial settings are listed as follows:

- User memory
- Wipe effects
- Picture in picture
- Audio
- AUX
- Still pictures
- Keyer
- Cross Point
- Audio

Tap the gear icon at the top right corner to open the main menu of the *graphical user interface*.

## 3.1 User Memory

The user memory allows you to load pre-saved settings configured for a specific scenario. Simply tap one of the buttons to immediately load the settings. The button icons should allow you to identify the settings saved therein.
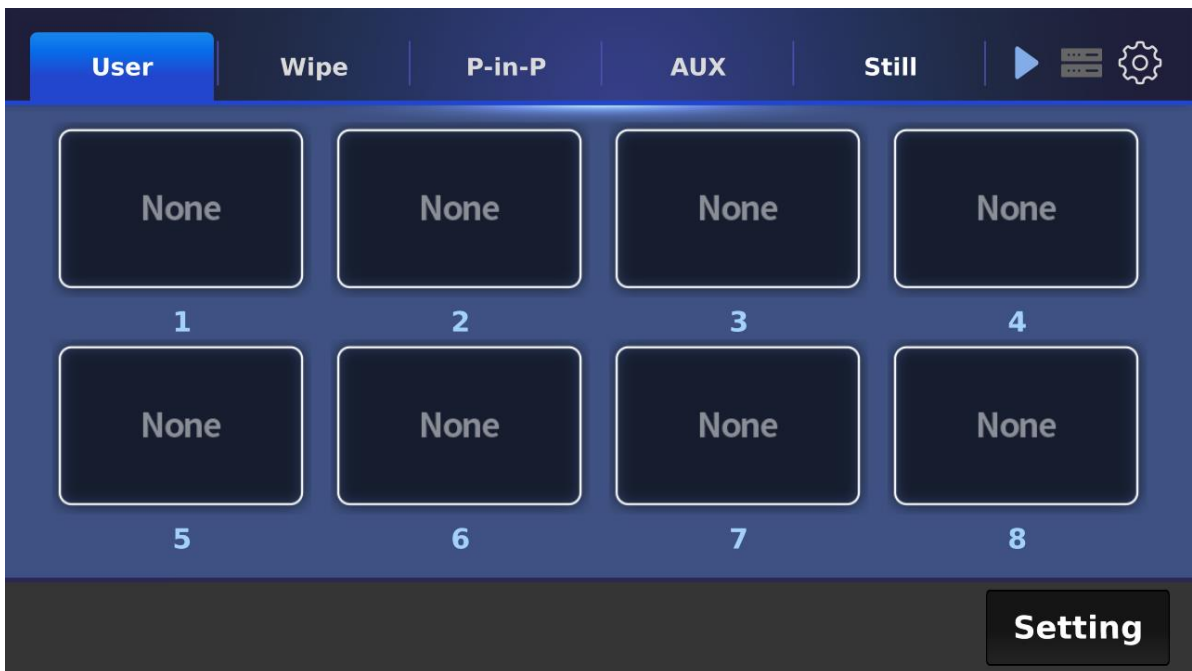
Tap the **Setting** button to change the button icons or swap the settings between the selected user memory slots.
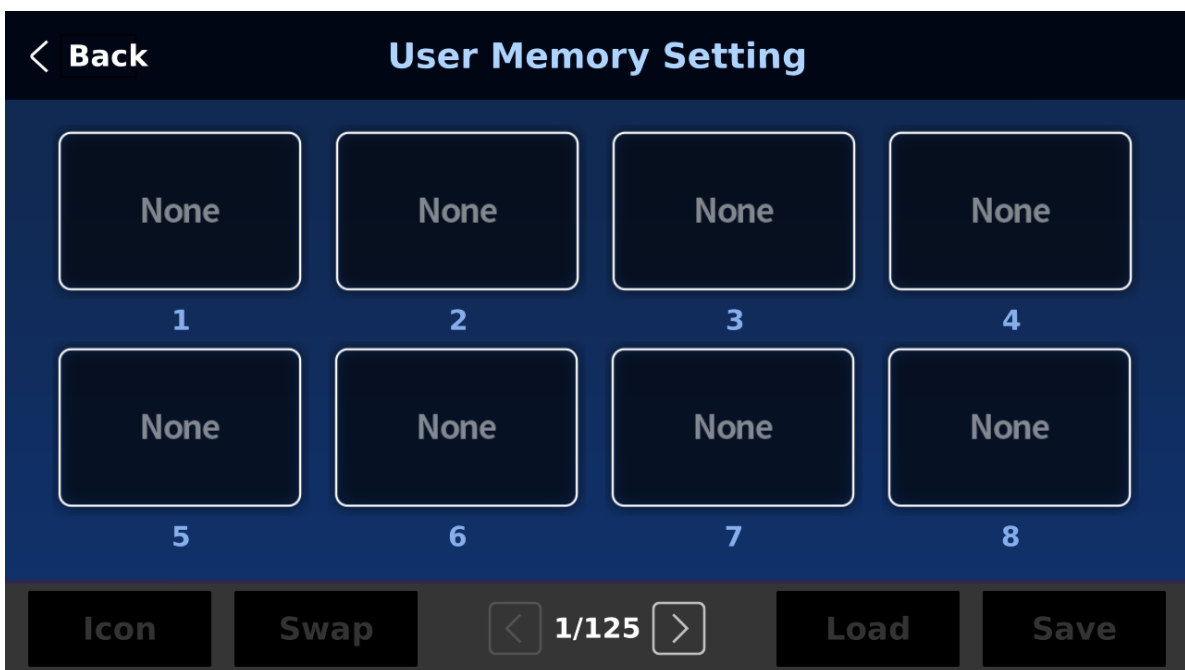


**Icon:** Tap to select an icon for the selected user memory slot.

**Swap:** Follow the steps outlined below to swap the contents of two user memory slots.

1. First tap a user memory slot.
2. Tap the Swap button.
3. Tap another user memory slot.
4. Lastly confirm the swap.

**Load:** Tap to load the settings in the selected user memory slot.

**Save:** Tap to save the current device settings in the selected user memory slot.

## 3.2 WIPE Effects

Open the Wipe page to select a wipe effect. Tap the REV button to reverse the default wipe direction.



Tap the Setting button to configure the wipe borders. Enable the border first then adjust its hue, softness and width.
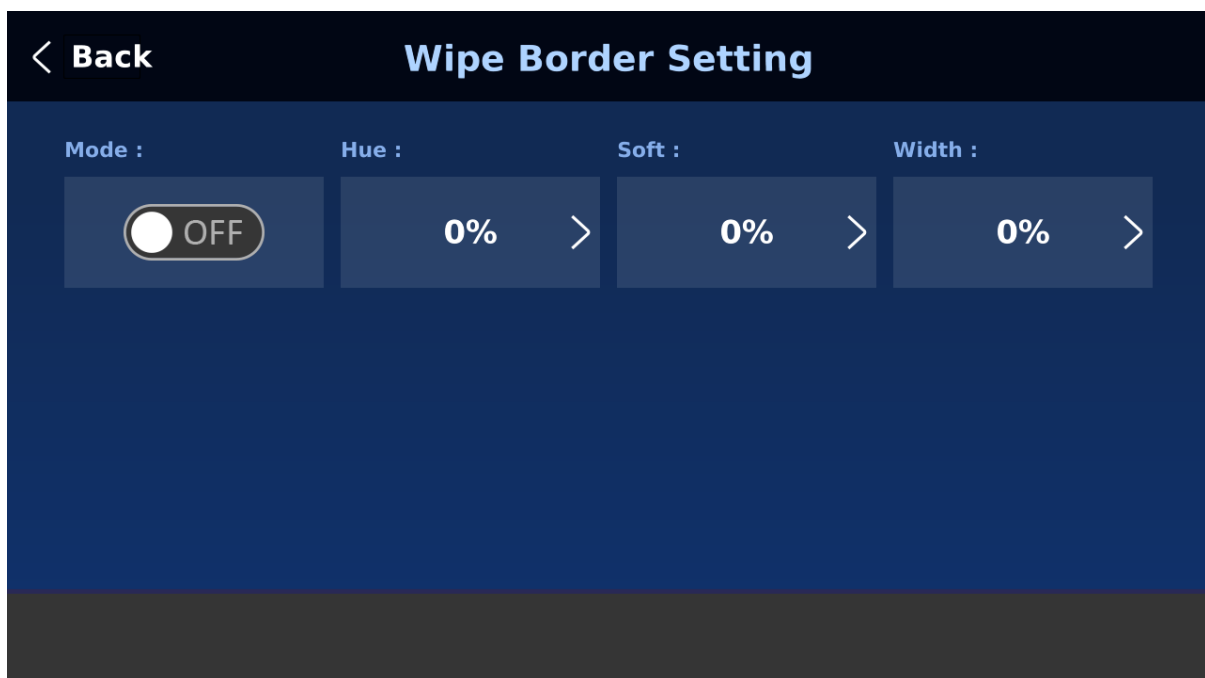


## 3.3 PIP

In the P-in-P tab, you will be allowed to select how you would like to position the PIP window on the Preview and Program screens. Tap the **PIP Icon** button to select an icon for the PIP window options. To configure the PIP window, tap the **Setting** button.

## PIP Icon

Tap the Edit button to select an icon. To restore the defaults, simply tap the Reset button.
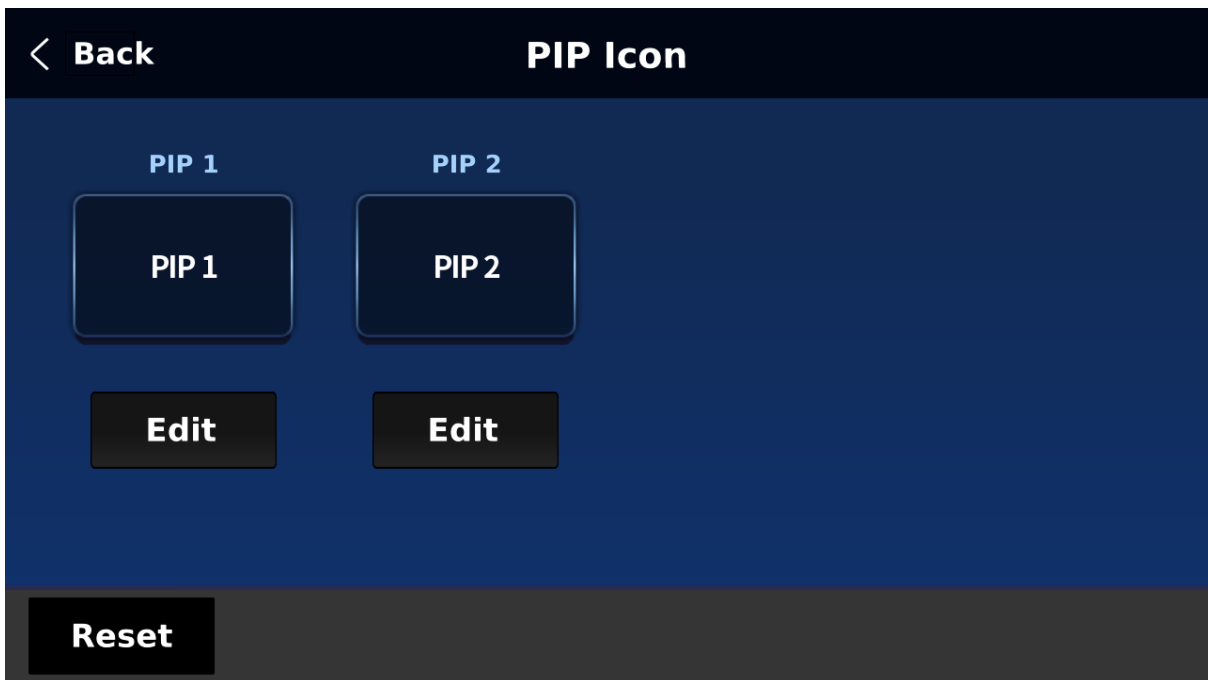


## PIP Setting

On the PIP Setting page, you can select a video source for the PIP window and set the window position and size.
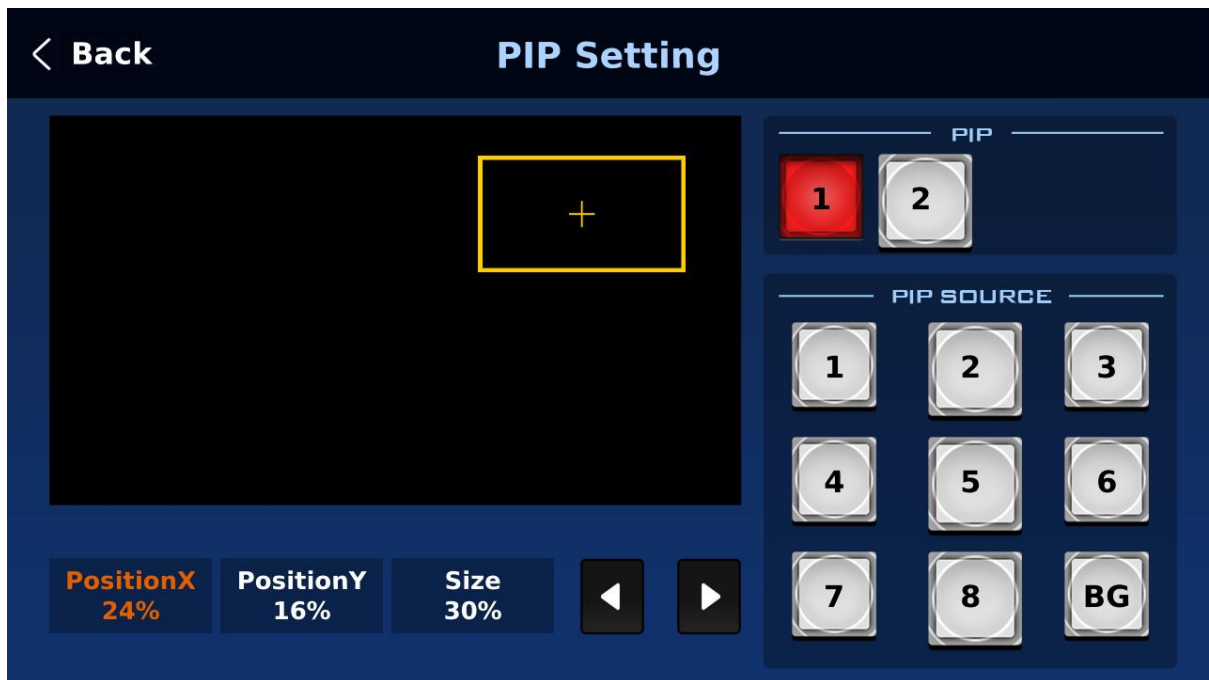
## 3.4 AUX

In AUX tab, you will be allowed to assign a video source for the output ports. See all available options in the **Source** pane.



## 3.5 Still

On the **Still** page, you can assign different still images to the input channels. Follow the steps below to make the selection:

1. First select an input channel then a still image.
2. Tap the **Load** button to confirm the selection.
3. Lastly tap **Save** to save the settings.
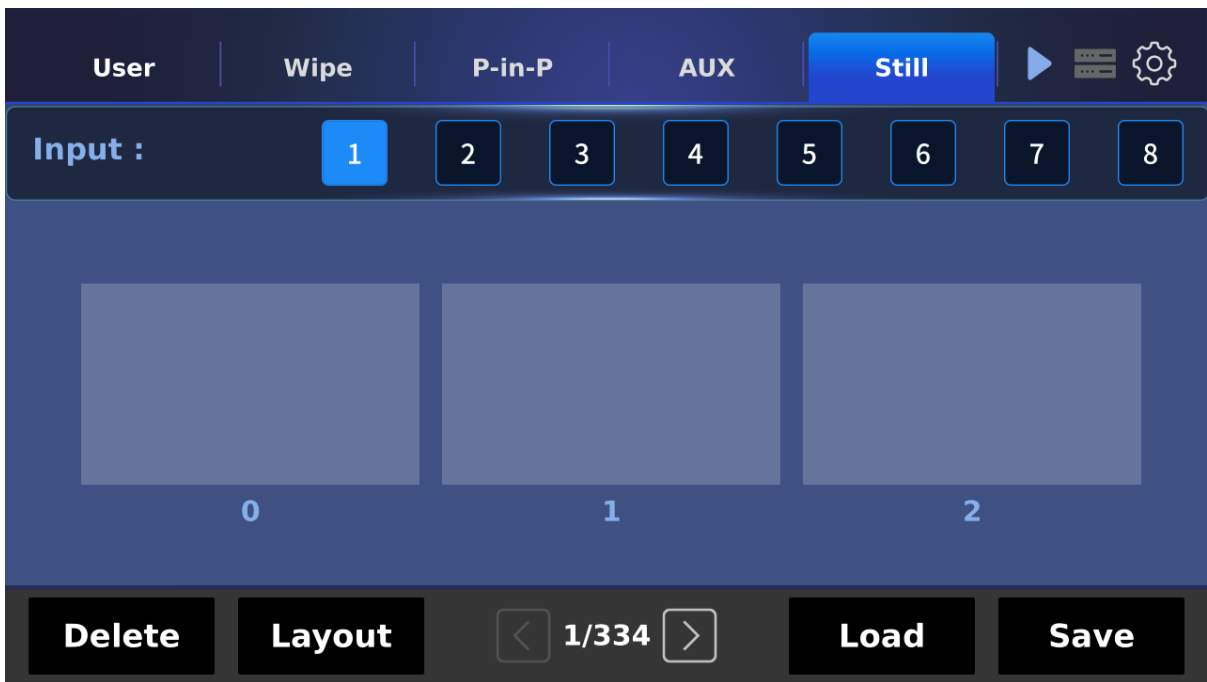
Delete and Layout buttons are described below:

**Delete:** Tap to delete the selected still image.

**Layout:** Tap to select the still image pane layout. You can either display three (1 x 3) or eight (2 x 4) thumbnails at the same time.



## 3.6 Keyer

On the Keyer page, you can configure Keyers 1 – 4 and DSK 1/2. The available keyer options are chroma, luma, linear and none (full).

The CK Auto button performs auto chromakeying, which can be activated for chroma keyers.

For luma keyers, the Invert button allows you to select the background color to be keyed. When the Invert button is disabled, the luma keyer removes the black background; when the Invert button is enabled, the luma keyer removes the white background.

DSK 1/2 are usually set to **Linear** keying mode which is chosen for professional graphic design.



### *Adjust*

Tap the Adjust button to set the **Opacity**, **Lift** and **Gain** parameters for the luma keyer.
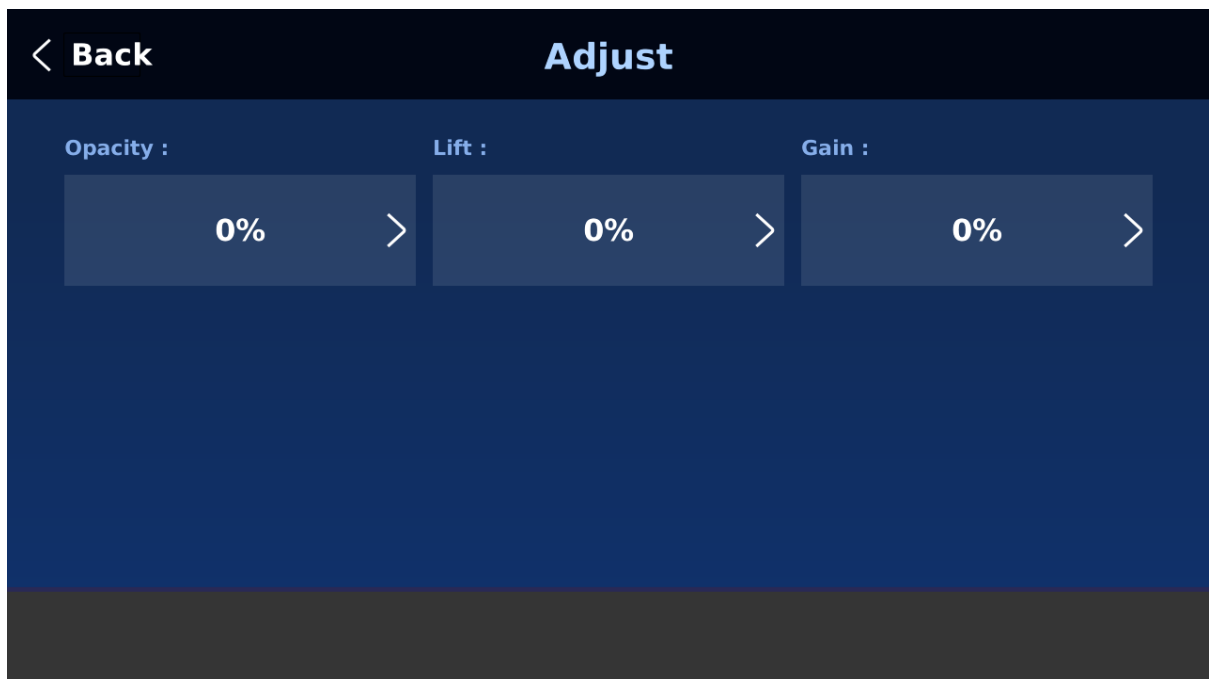
## 3.7 Cross Point

The Cross Point function allows the user to shuffle contents of Inputs 1 – 8 without changing physical connections at the back of the machine.

First select an input channel then tap Video XPT or Audio XPT to set the respective sources.



In Audio XPT, if "**FOL.**" is selected, the audio will enter Audio follow Video mode, i.e. playback of the audio of the output video **without audio output delay**. If "**EXT.**" is selected, the external audio, i.e. audio from **AUDIO IN** port, will be played.

In Audio Setting, you will be allowed to adjust audio gain and delay.
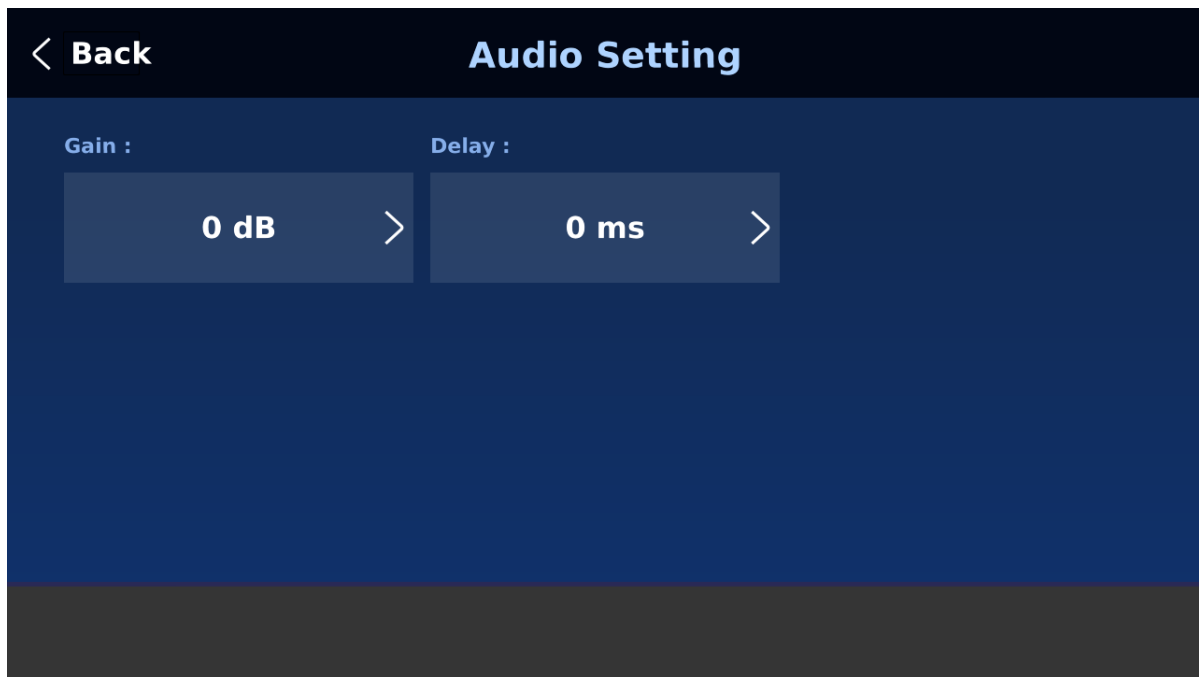


## 3.8 Audio

In Audio tab, you will be allowed to select the audio source for the input video channels. You can either use the video channel's own audio or a mixed audio from selected video channels.
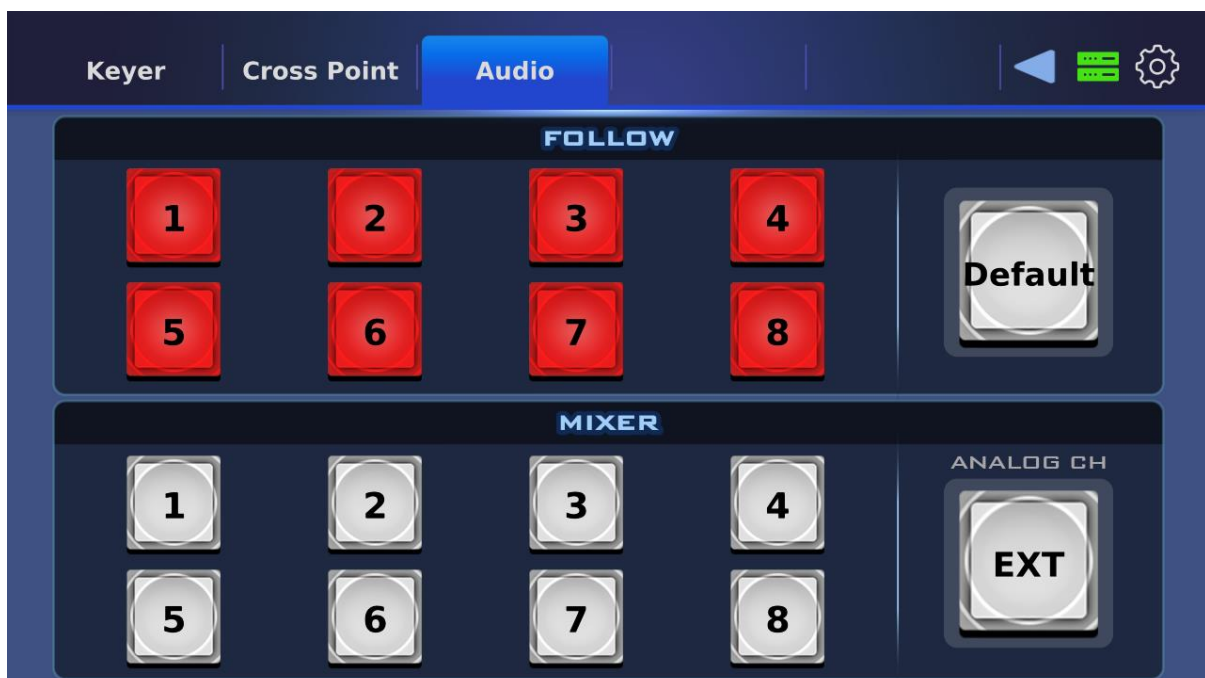


By default, all video channels will be enabled in the Follow frame, which means that all of them will use its own audio.

To assign the mixed audio from the Mixer frame to the video channels, first click the desired channel numbers for the mixer then disable the video channels that you would like to assign

the mixed audio to. For example, in the diagram below, channel 6 will use the mixer audio which is a combination of audio sources of channels 1, 4 and 7.

**Note: In addition to audios of the input video channels, you can also mixed external audio sources by enabling the EXT button in the Mixer.**
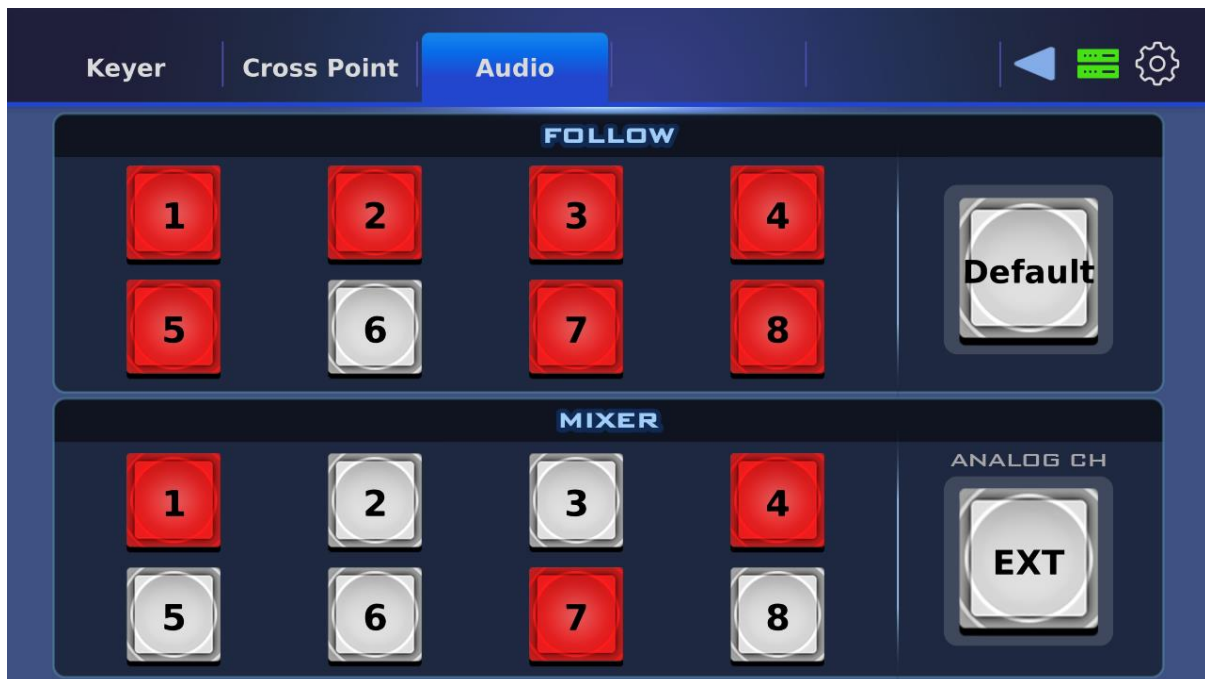
# Chapter 4    Software Setup for Switcher

The **Switcher Image Import/Export software** allows the user to import still images, animated clips, still logos, animated logos and custom user settings to the HS-4000 from a laptop/PC. To use the Switcher Image Import/Export software, you should connect the laptop/PC to the DVIP port of the switcher. You can either establish direct connection with the switcher or use a router to network your devices. See *Section 2.2 Network Setup* for details of the two connection types.

**Please first download the software to your PC or laptop from the product page (https://www.datavideo.com/tw/product/HS-4000) before using this feature.**

On the PC to which the software is downloaded, unzip the downloaded file then in the unzipped folder, double click the software icon to open the program.

The **Switcher Image Import/Export software** has a built-in IP finder, which is designed for PCs with multiple Ethernet cards or any DHCP network. Upon launch of the software, you will be prompted to select one Ethernet Interface Card. **Please note that the IP finder can only find devices connected to the same network as the PC.**
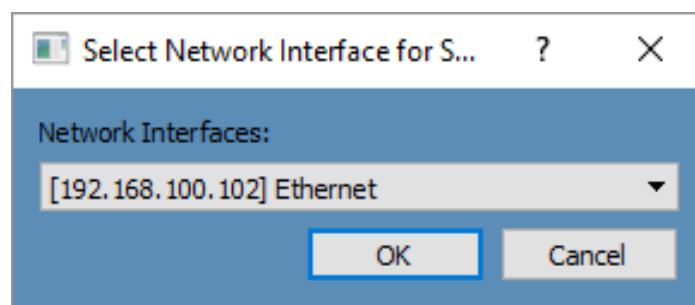


Once selected, click **OK** to start the scanning process.

**Note: Please make sure that the selected interface card and the HS-4000 are on the same subnet.**

The software should connect with the switcher over the IP set up in *Section 2.2*. If the connection is successfully established, on the software user interface, the **Connect Status** will show "**Connected**" (will display **Not Connected** if disconnected).

Brief descriptions of buttons on the **MENU SELECT** pane are outlined as follows:

- **Home:** Interface main page showing connection status and transition time settings.
- **User:** User memory import
- **Still:** Still image import
- **Clip:** Clip file import
- **Logo:** Still logo import
- **Ani-Logo:** Animated logo import
- **Setup:** Software settings

## 4.1 Home

As soon as the program is opened, you will see the interface home as shown in the diagram below. The function items are described as follows:

- Connect Status: Shows "**Connected**" if the program establishes connection with the switcher successfully; shows "**Not Connected**" otherwise.
- ME Trans: Sets MIX EFFECT transition time in frames. See also GUI Menu → *Start* → **M/E**.
- DSK Trans: Sets DSK transition time in frames. See also GUI Menu → *Start* → **DSK**.
- FTB Trans: Sets Fade-to-Black transition time in frames. See also GUI Menu → *Start* → **FTB**.



## 4.2 User

Click the **User** button to view all the .mem files saved on the switcher.

To import .mem files from your PC, click "**User**" then enter a memory location. Click "**Import User**" to browse your hard drive and select the user memory file that you would like to import.

See section 5.8, *User Mems*, for more details.

## 4.3 Still

Click the **Still** button to view all the still images saved on the switcher.

To import still image files from your PC, click "**Still**" then enter a memory location. Click "**Import Still**" to browse your hard drive and select the image file that you would like to import.

See section 5.8, *Still*, and section 6.3, *Managing Still Pictures*, for more details.

## 4.4 Clip

Click the **Clip** button to view all the clips saved on the switcher.

To import clip files from your PC, click "**Clip**" then enter a memory location. Click "**Import Clip**" to browse your hard drive and select the clip file that you would like to import.

Please note that the Stinger transition effect is currently unavailable but if you are interested, you may refer to section 5.8 *Stinger* for more details.



## 4.5 Logo

Click the **Logo** button to view all the still logo images saved on the switcher.

To import still logo image files from your PC, click "**Logo**" then enter a memory location. Click "**Import Logo**" to browse your hard drive and select the logo image file that you would like to import.

See section 5.8, *Logo*, and section 6.4, *Enabling Still Logo*, for more details.

## 4.6 Ani-Logo

Click the **Ani-Logo** button to view all the animated logos saved on the switcher.

To import animated logo files from your PC, click "**Ani-Logo**" then enter a memory location. Click "**Import Ani-Logo**" to browse your hard drive and select the animated logo that you would like to import.

See section 5.8, *Ani-Logo*, and section 6.5, *Enabling Logo Animation*, for more details.



## 4.7 Setup

On the **Setup** page, you will be able to view the software version, network connect status, firmware version installed and the available space on the switcher.

The **Setup** page allows you to reset the software to its defaults, and change the interface language. The available languages are **English**, **Traditional Chinese**, and **Simplified Chinese**. Click **Save Setup** to apply the new settings.

The **Target IP Address** is the IP address of the switcher that you would like to connect. Enter the IP then click **SCAN** to connect to the switcher.

DIGITAL VIDEO SWITCHER

Image Import/Export
Software Version                        0.0.3.0

Network connect status                  Connected
Processor Unit
software version                        v0.9.9.9
FPGA Version                            2019-7-22
Target IP Address                       192.168.100.101
Network Mask                            255.255.255.0
Gateway                                 192.168.1.254
Free Space                              1073 frames

| Target IPAddr | Search Device | Select | Language | Select |
|---|---|---|---|---|
| 192.168.100.101 | Scan | Factory Def | English | Save Setup |

MENU SELECT

| Home | User | Still | Clip | Logo | Ani-Logo | Setup |

# Chapter 5    Graphical User Interface



The switcher's GUI menu allows the user to perform several configurations of image effects, such as Picture-in-Picture, chroma key, subtitle overlay, transition effects, still pictures, etc. The user can also configure the I/O by selecting different input and output combinations. In addition, in the setup menu, the user is allowed to adjust the keyboard brightness, set the menu language, reset the device, customize network settings and upgrade the firmware.

The GUI control buttons are designed for opening the GUI on the built-in 5 inch monitor and navigating through the sub menus. Press the HOME button to open the Home Menu page or the sub menu buttons to directly access the corresponding sub menus.

**Please note that after pressing the power button on the rear panel while the machine is still running, you will be prompted on the 5 inch touch screen to confirm the shutdown. Select YES if you would like to shut down the machine and the last device settings will be automatically saved before it's turned off.**
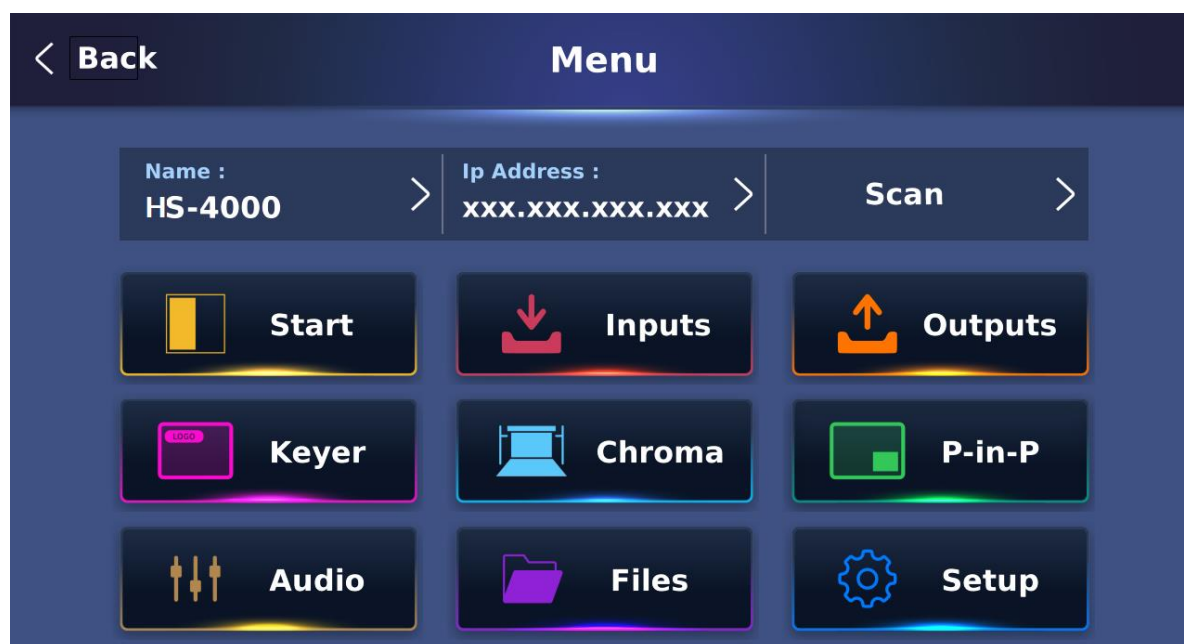


| Main | Sub | Options and Parameters | |
|------|-----|-----------------------|---|
| Start | Transition (Duration) | M/E | Mix Effect (0 - 999 Default: 0) |
| | | DSK | Downstream Key (0 - 999 Default: 0) |
| | | FTB | Fade-to-Black (0 - 999 Default: 0) |
| | Type | Mix | |
| | | Wipe | |
| | | Clip | Default |
| | Matte | Luma | Background Matte Luma (0 – 100% Default: 0%) |
| | | Sat | Background Matte Saturation (0 – 100% Default: 0%) |
| | | Hue | Background Matte Hue (0 – 359 Default: 0) |
| | Wipe Effects | Wipe | Wipe Effect Presets (1 - 32 Default: 1) |

| Main | Sub | Options and Parameters | | |
|---|---|---|---|---|
| | | Soft | | Border Softness (0 - 100% Default: 0%) |
| | | Width | | Border Width (0 - 100% Default: 0%) |
| | Border | Luma | | Border Color Luma (0 - 100% Default: 0%) |
| | | Sat | | Border Color Saturation (0 - 100% Default: 0%) |
| | | Hue | | Border Color Hue (0 - 359 Default: 0) |
| | Position | X | | Horizontal Position (-100 - 100% Default: 0%) |
| | | Y | | Vertical Position (-100 - 100% Default: 0%) |
| Keyer | Keyer | Key 1<br>Key 2<br>Key 3<br>Key 4<br>DSK 1<br>DSK 2 | | Keyer Selection (Default: Key 1) |
| | | Fine / Normal | | Fine: High keying quality<br>Normal: Original keying quality |
| | Keyer Ctrl | Mode | Linear<br>Luma<br>Chroma<br>Full | Type of Keyer (Default: Linear) |
| | | Source Mode | Self<br>Split<br>P-in-P | Self: One input keyer (Default)<br>Split: Dual input keyer<br>P-in-P: Apply the keying effect to the PIP window. |
| | | Opac | | Parameter for transparency of the overall foreground key image, ranging from 0% to 100% (Default: 0%). |
| | | Lift | | Parameter for dark/black areas of the overall foreground key image, ranging from -100% to +100% (Default: 0%). |
| | | Gain | | Parameter for light/white areas of the overall foreground key image, ranging from 0 to 16.8 (Default: 0). |
| | | Invert | | OFF: Luma key removes black background by default<br>ON: Luma key removes white background after **INVERT** is turned **ON**. |
| | Key Source | Key Source | | Select key source from the list below:<br>Bars<br>Matte<br>Input 1<br>Input 2<br>Input 3<br>Input 4<br>Input 5<br>Input 6<br>Input 7<br>Input 8<br>Black (Default) |
| | | Fill Source | | Select fill source from the list below:<br>Bars<br>Matte<br>Input 1 |

| Main | Sub | | Options and Parameters |
|---|---|---|---|
| | | | Input 2 |
| | | | Input 3 |
| | | | Input 4 |
| | | | Input 5 |
| | | | Input 6 |
| | | | Input 7 |
| | | | Input 8 |
| | | | Black (Default) |
| | Mask | Left | Left sets the left edge of the keyer mask (0 – 100%; Default: 0%). |
| | | Right | Right sets the right edge of the keyer mask (0 – 100%; Default: 0%). |
| | | Top | Top sets the top edge of the keyer mask (0 – 100%; Default: 0%). |
| | | Bottom | Bottom sets the bottom edge of the keyer mask (0 – 100%; Default: 0%). |
| Chroma | Keyer | Key 1<br>Key 2<br>Key 3<br>Key 4 | Keyer Selection (Default: Key 1) |
| | | Quality | Fine: High image quality<br>Normal: Original image quality |
| | Key Source | Bars<br>Matte<br>Input 8<br>Input 7<br>Input 6<br>Input 5<br>Input 4<br>Input 3<br>Input 2<br>Input 1<br>Black | Key Source Selections (Default: Black) |
| | Key Tie | Mode | ON/OFF |
| | | Background Image | Input 1 – 8<br>Off |
| | CK Setup | CK Auto | Calculation of the best Hue & Luma values for the current Keyer source |
| | | Hue | Parameter for color of the chroma key, ranging from 0 to 359 (Default: 0). |
| | | Luma | Parameter for luma of the chroma key, ranging from 0 to 100% (Default: 0%). |
| | | K Range | Setting the range of colors that match the background color to be keyed, ranging from 0 to 359 (Default: 0). |
| | | K Fgnd | Adjusts the performance of the chroma key in dark or black areas, ranging from -100% to 100% (Default: 0%). |
| | | K Bgnd | Adjusts the performance of the chroma key in light or white areas, ranging from K Fgnd value (min = 0) to 100% (Default: 0%). |

| Main | Sub | | Options and Parameters |
|---|---|---|---|
| | | Hi-Light | Boosts the foreground key in high luminance area, ranging from 0 to 100% (Default: 0%). |
| | | Lo-Light | Boosts the foreground key in low luminance area, ranging from 0 to 100% (Default: 0%). |
| | | Bg-Supp | Bg-Supp turns ON/OFF background suppress (Default: OFF). |
| | | Left | Trims the left edge of the key object (0 - 100% Default: 0%). |
| | | Right | Trims the right edge of the key object (0 - 100% Default: 0%). |
| | | Soft | Distinctiveness of key edge (0 - 100% Default: 0%) |
| | Mask | Left | Left sets the left edge of the keyer mask (Default: 0%). |
| | | Right | Right sets the right edge of the keyer mask (Default: 0%). |
| | | Top | Top sets the top edge of the keyer mask (Default: 0%). |
| | | Bottom | Bottom sets the bottom edge of the keyer mask (Default: 0%). |
| P-in-P | P-in-P | Source | Selection of PIP windows<br>Key 1<br>Key 2<br>Key 3<br>Key 4 (Default) |
| | | Quality | Normal<br>Fine |
| | Position | X | Horizontal PIP Position (-100 - 100% Default: 0%) |
| | | Y | Vertical PIP Position (-100 - 100% Default: 0%) |
| | | Size | PIP Size (0 - 100% Default: 0%) |
| | Crop | Left | Left Edge of the Crop (0 - 100% Default: 0%). |
| | | Right | Right Edge of the Crop (0 - 100% Default: 0%). |
| | | Size | Size of the Crop (0 - 100% Default: 0%). |
| | | Top | Top Edge of the Crop (0 - 100% Default: 0%). |
| | | Bot | Bottom Edge of the Crop (0 - 100% Default: 0%). |
| | | Soft | Transparency and range of the crop edge (0 - 100% Default: 0%). |
| | Border | Border Off<br>Normal<br>Shaded<br>3D Bevel<br>Bevel Shaded<br>Dual Bevel<br>Bevel Flat<br>Flat Bevel<br>3D Glass<br>Glass Shaded<br>Dual Glass<br>Glass Flat<br>Flat Glass<br>Circle | Selection of border style (Default: Border OFF) |

| Main | Sub | Options and Parameters | | |
|------|-----|------------------------|---|---|
| | | Circle Shaded Rounded Rounded Shaded | | |
| | | Luma | PIP Border Luma (0 - 100% Default: 0%) | |
| | | Sat | PIP Border Color Saturation (0 - 100% Default: 0%) | |
| | | Hue | PIP Border Color Hue (0 - 359 Default: 0) | |
| | | Width | PIP Border Width (0 - 100% Default: 0%) | |
| | | Soft | Distinctiveness of Border Edge (0 - 100% Default: 0%) | |
| | | Opac | Border transparency (0 - 100% Default: 0%) | |
| | | Direction | Direction of light source (0 - 359 Default: 0). | |
| | Shade Matte | Luma | Shade Matte Luma (0 - 100% Default: 0%). | |
| | | Sat | Shade Matte Saturation (0 - 100% Default: 0%). | |
| | | Hue | Shade Matte Color (0 - 359 Default: 0). | |
| | | Shade Soft | This blurs or softens the Shade Matte area (0 - 100% Default: 0%). | |
| | | Shade Pos | Sets position of the boundary line between Shade Matte and Border Matte (0 - 100% Default: 0%). | |
| Inputs | Input | Source | Selection of an input to set the mode (Default: Input 1). Input 1 - 8 | |
| | | Mode | Three input modes are Live, Freeze, and Still (Default is Live). | |
| | | Type | HDMI SDI Auto | **Channels 3, 4, 7 and 8 are SDI/HDMI shared input channels, Depending on the physical connections at the rear, select the input interface accordingly.** |
| | | Color Space | Auto | |
| | | | REC709 | |
| | | | BT2020 | |
| | | Mode **(Note: This option is currently disabled and will be available in future firmware upgrades.)** | OFF | Mode disabled |
| | | | CG Md | Enables the CG mode **Note: This option is only available on HDMI inputs (HDMI 9 (CH3), 10 (CH4), 11 (CH7) and 12 (CH8)) so select HDMI in Type after selecting input 3, 4, 7 or 8.** |
| | Proc Amp | Black | Black level (0 - 100% Default: 0%) | |
| | | White | White level (0 - 100% Default: 0%) | |
| | | Chrom | Chroma level (0.0 - 16.0 Default: 0) | |
| | Audio | Gain | Audio volume of a selected video input (-64 – 24 dB Default: 0 dB). | |
| | | Delay | Audio delay of a selected video input (0 – 340 ms Default: 0 ms). | |
| | Crosspoint | Input 1-8 Off | Assign the selected input source to an input button (Default is Input 1). | |

| Main | Sub | | Options and Parameters |
|---|---|---|---|
| | Audio XPT | Input 1-8<br>External<br>Follow | Associate the audio component of a selected input source to an input button (Default is Follow). |
| Outputs | Output | SDI 1 | Input 1 – 8<br>CLN PVW (Clean PVW)<br>CLN PGM (Clean PGM)<br>PG + DSK<br>PVW<br>PGM<br>MultiV (Multi view)<br>(SDI / HDMI default: None) |
| | | SDI 2 | |
| | | SDI 3 | |
| | | SDI 4 | |
| | | HDMI (AUX) | |
| | | HDMI | YUV444<br>YUV422<br>RGB444 |
| | Multiviewer | AutoNum | Auto number input labels  (ON/**OFF (Default)**) |
| | | Label Inf | Input label is followed by information which describes the input as still, live or frozen image (ON**/OFF (Default)**).<br>**Please note that the label content cannot be modified.** |
| | | Trns Lab | Turn the background of the label from a solid colour to transparent  (ON**/OFF (Default)**). |
| | | MV1 | Multiview Layout Modes<br>Preset 1 – 6 |
| | | L: PGM / R: PVW<br>L: PVW / R: PGM | **Default: L: PVW / R: PGM** |
| | Tally Mode | Audio Mixer | Selection of tally light mode (Default: Normal) |
| | | Normal | |
| | GPI Out | ON/OFF | GPI Enable/Disable (Default: OFF) |
| | | Mode | Level/Pulse (Default: Pulse) |
| | | Width | Pulse width (Default: 1) |
| | | GPI-out assignment | Input 1-8 (Default: Input 1) |
| | | Delay | 0-99 (Default: 0) |
| Audio | Audio | Mode | Turns **ON/OFF** embedded component at SDI-out and HDMI-out. |
| | | Src | Selection of audio out source:<br>**External (Default)** / Follow / Input 1-8 |
| | PGM Audio | Mode | Audio transition style: X Fade / **V Fade (Default)** |
| | | Gain | Audio volume of a selected video input<br>Range: -60 – 24 (dB) with **default = 0 dB** |
| | | Delay | Audio delay of a selected video input<br>Range: 0 – 340 ms with **default = 0 ms** |
| | Analog Out | Src | Selection of audio out source:<br>**PGM Audio (Default)** / Follow / Input 1-8 |
| | | Gain | Audio out volume<br>Range: -60 – 24 (dB) with **default = 0 dB** |
| | | Delay | Audio out delay<br>Range: 0 – 340 ms with **default = 0 ms** |
| Files – User | Load Memory | Opens a numeric keypad to enter a memory location | Memory Selection from 1 to 1000 (Default: None) |

| Main | Sub | Options and Parameters | |
|------|-----|------------------------|---|
| | | OK | Tap OK to load the memory location entered |
| | Save Memory | Opens a numeric keypad to enter a memory location | Memory Selection from 1 to 1000 (Default: None) |
| | | OK | Tap OK to save to the memory location entered |
| Files – Stills | Load Still | Destination | Input 1 – 8 |
| | | Still Number | 0 – 999 |
| | | Load Button | Tap Load to load from the selected still number |
| | Save Still | Source | Input 1 – 8 |
| | | Still Number | 0 – 999 |
| | | Save Button | Tap Save to save to the selected still number |
| | Grab Still | Grab Destination | Input 1 – 8 |
| | | Grab | Tap Grab to grab the current program view to the selected destination |
| | Delete Still | Still Number | 0 – 999 |
| | | Delete Button | Tap Delete to remove the still picture from the selected still number |
| Files – Stinger | Load Stinger | Clip Memory Locations | 0 – 999 |
| | | Load Button | Tap Load to load the selected clip |
| | Stinger Settings | Start Frm | Sets the clip's start and end frames and the transition frame. |
| | | Mid Frm | |
| | | End Frm | |
| | Clear Stinger | Clear | Clear the loaded clip |
| | Delete Stinger | Clip Memory Locations | 0 – 999 |
| | | Delete Button | Tap to remove the selected clip |
| | **Note: The Stinger transition effect is currently unavailable and will be added in future firmware upgrades.** | | |
| Files – Logo | Load Logo | Logo Destination | Logo 1 Logo 2 |
| | | Logo Memory Location | Memory locations from 0 to 999 |
| | | Load Button | Loads the selected logo |
| | Clear Logo | Clear | Clear the loaded logo |
| | Delete Logo | Logo Memory Location | Memory locations from 0 to 999 |
| | | Delete Button | Remove logo from a memory location |
| | Logo 1 | X | X coordinate from -50 to +50 |
| | | Y | Y coordinate from -50 to +50 |
| | Logo 2 | X | X coordinate from -50 to +50 |
| | | Y | Y coordinate from -50 to +50 |
| Files – Ani-Logo | Load Ani Logo | Ani Logo Destination | Logo 1 Logo 2 |
| | | Ani Logo Memory Location | Memory locations from 0 to 999 |
| | | Load Button | Loads the selected ani logo |
| | Clear Ani Logo | Clear | Clear the loaded ani logo |
| | Delete Ani Logo | Ani Logo Memory Location | Memory locations from 0 to 999 |

| Main | Sub | Options and Parameters | | |
|---|---|---|---|---|
| | | Delete Button | Remove animated logo from a memory location | |
| | Logo 1 | X | X coordinate from -50 to +50 | |
| | | Y | Y coordinate from -50 to +50 | |
| | Logo 2 | X | X coordinate from -50 to +50 | |
| | | Y | Y coordinate from -50 to +50 | |
| Setup | Standard | Resolution | **3840x2160p**60/59.94/50/ 30/29.97/25 **1080p**60/59.94/50/ 30/29.97/25 | Resolution Selection |
| | | | Save Button | Saves the selected resolution |
| | | Level | Audio Standards EBU SMPTE AUTO (Default) | |
| | Genlock | On/Off | Default: Off | |
| | | H Phase | -2190 – 2190 ms (Default: 0) | |
| | | V Phase | -1124 – 1124 ms (Default: 0) | |
| | OutConv | Off 1080p 1080i | Resolutions available for downconvert at SDI Out 4 | |
| | Keyboard | Brightness | 1 – 7 | |
| | Auto Save | ON / OFF | Automatically saves the last settings before the machine is shut down; once turned ON auto save also occurs upon every Still Load. | |
| | Factory Def | Factory Default | Factory Default Reset loads the default configuration from memory point 0 for all configuration options except for the Setup. | |
| | | Reset Input Names | Resets the Multiviewer labels to the default settings | |
| | Language | English Traditional Chinese Simplified Chinese | | |
| | Network | DHCP | On/Off (Default: Off) | |
| | | IP Address | 192.168.100.101 (Default) | |
| | | Network Mask | 255.255.255.0 (Default) | |
| | Software | Software | Tap Upgrade to start the FW upgrade process See the ***Firmware Upgrade*** section for the USB firmware update process. | |
| | | App Version | Display of version numbers only | |
| | | SW Version | | |
| | | Firmware | | |
| | | OS Version | | |

The following sub-sections will show you various options available in the menu.

## 5.1 Start

The Start menu allows the user to set the transition time, the transition type as well as various wipe effects. The menu options are described below.

### *Transition*
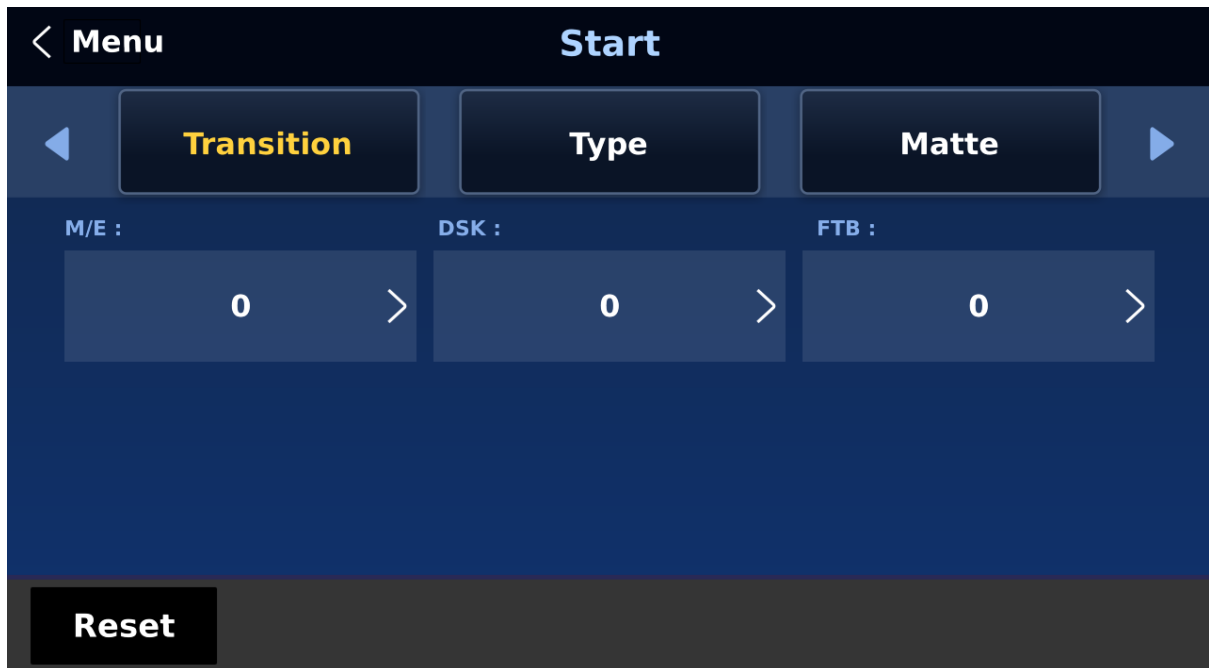


The **Transition** option allows the user to set the transition duration, in frames, for switching the PGM view when using the **MIX**, **DSK AUTO** and **FTB** buttons.

For example, if the **M/E** is set to a value of 50, then the transition will take effect over a period of 50 frames or roughly 2 seconds. When the **AUTO button** is pressed, the transition will take the current M/E value defined by the user setting.

### *Type*

The HS-4000 provides four major types of transition effect, which are **Clip (Stinger)**, **WIPE (2D)** and **Mix**. Please note in addition to selecting the transition effect in the menu, you can also press **MIX**, **WIPE** or **STINGER button** to enable the respective transition effects.

**Note: The Stinger transition is currently under development so the function cannot be used.**

| ◀ | Transition | Type | Matte | ▶ |
|---|---|---|---|---|

| Mix | Wipe | Clip |
|---|---|---|

**Reset**
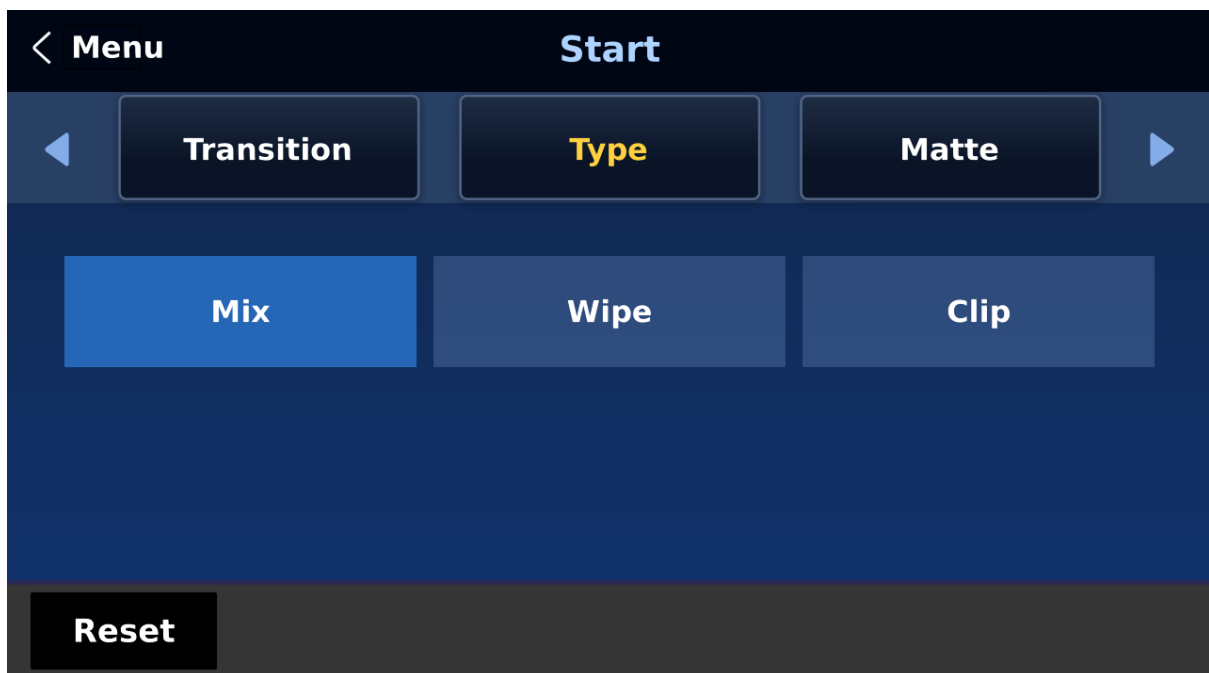
- For **MIX** effect, set the transition time in "**Start → Transition → M/E**."

- For **WIPE** effect, set the relevant WIPE settings in "**Start → WIPE Effects**."

## *Matte*

The user can open the Matte view by pressing the **BG** button of the **Program** and **Preview** button rows. The color of the Matte is configurable in this option by adjusting **Luma**, **Saturation** and **Hue**.
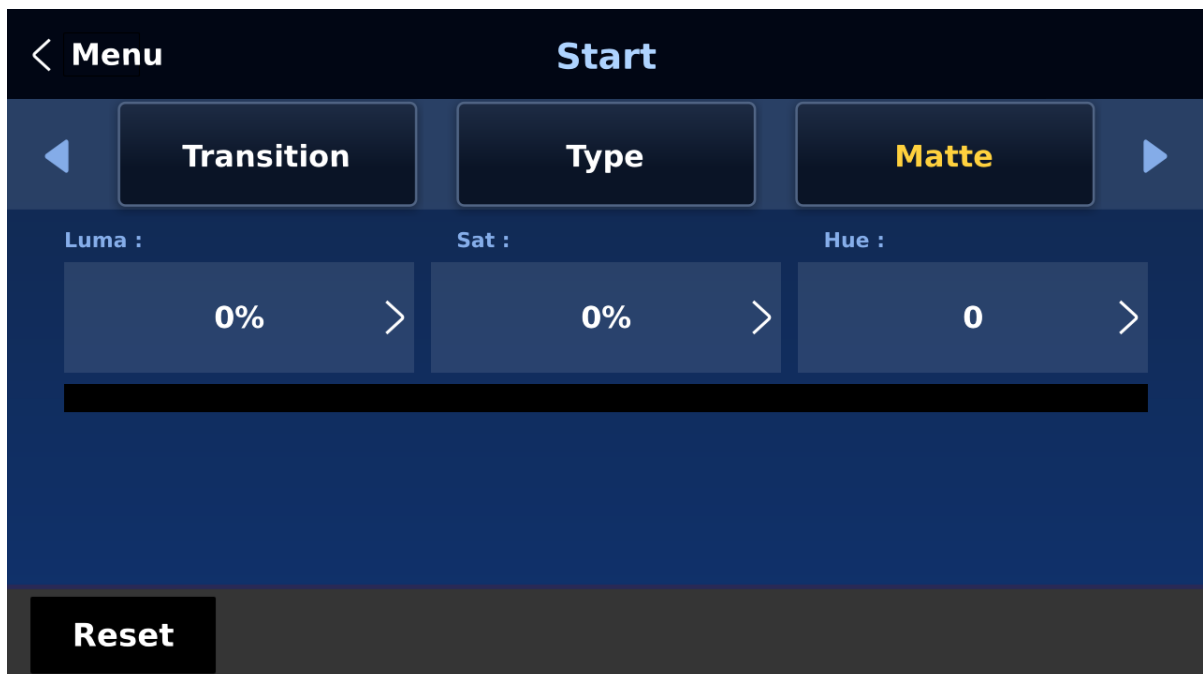
| ◀ | Transition | Type | Matte | ▶ |
|---|---|---|---|---|

| Luma : | Sat : | Hue : |
|---|---|---|
| 0%    > | 0%    > | 0    > |

**Reset**

For **Hue** value, **Red** is 0, **Green** is approximately 120 and **Blue** is approximately 240. For secondary colors, **Yellow** is approximately 60, **Cyan** is approximately 180 and **Violet** is approximately 300.

The **Sat** or **Saturation value** refers to the intensity of the color selected in **Hue**. As the saturation increases, the color appears to be more pure. As the saturation decreases, the color appears to be more washed-out or pale.

**The Luma value** relates to how bright or dark the selected color or hue is. The higher the **Luma** value, the brighter the color selected in **Hue**.

## *Wipe Effects*

In "**WIPE Effects**," the user is allowed to select the Wipe style and configure the wipe's border softness and width.

- **Wipe** – Selection of a WIPE effect from a set of 32 WIPE transition effects.
- **Soft** – A low value results in a solid edge and a high value gives a soft diffused edge.
- **Width** – A low value results in a thin edge and a high value gives a wide edge.
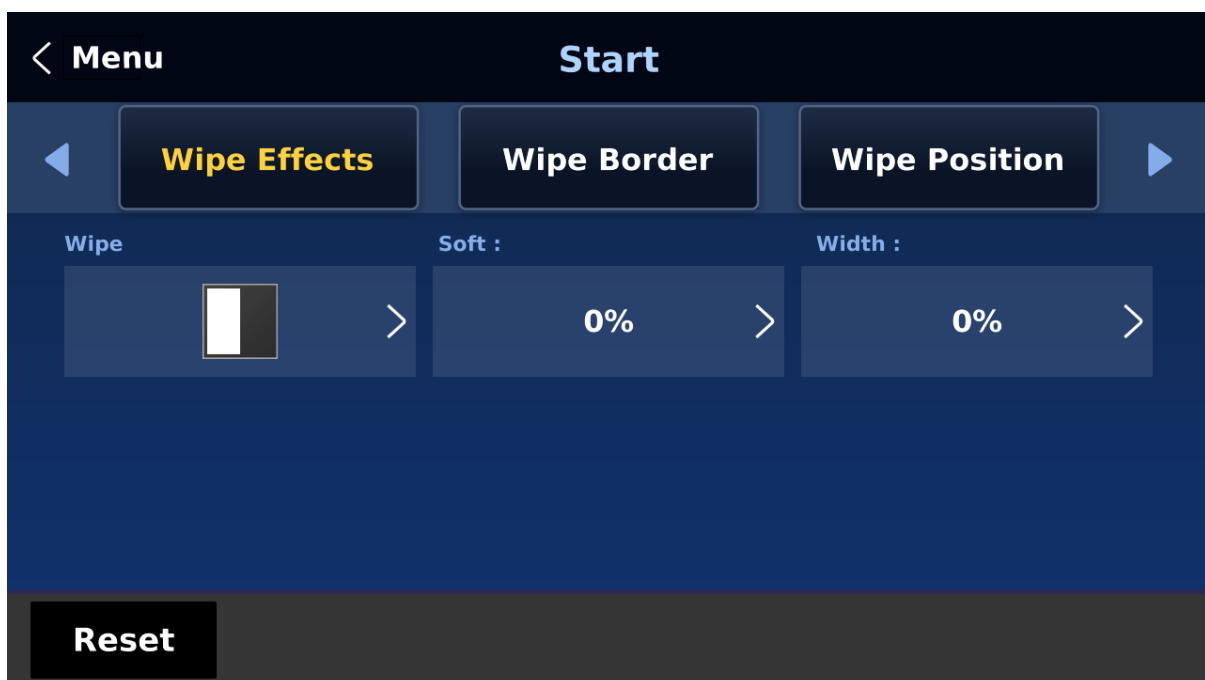


## *Wipe Border*

In this option, the user will be allowed to fine-tune the border color by adjusting the **Luma**, **Saturation** and **Hue** values.

**Note: Enable the WIPE border by setting the border width (Width) to a value greater than 0. The WIPE border is disabled when the border width is set to 0.**
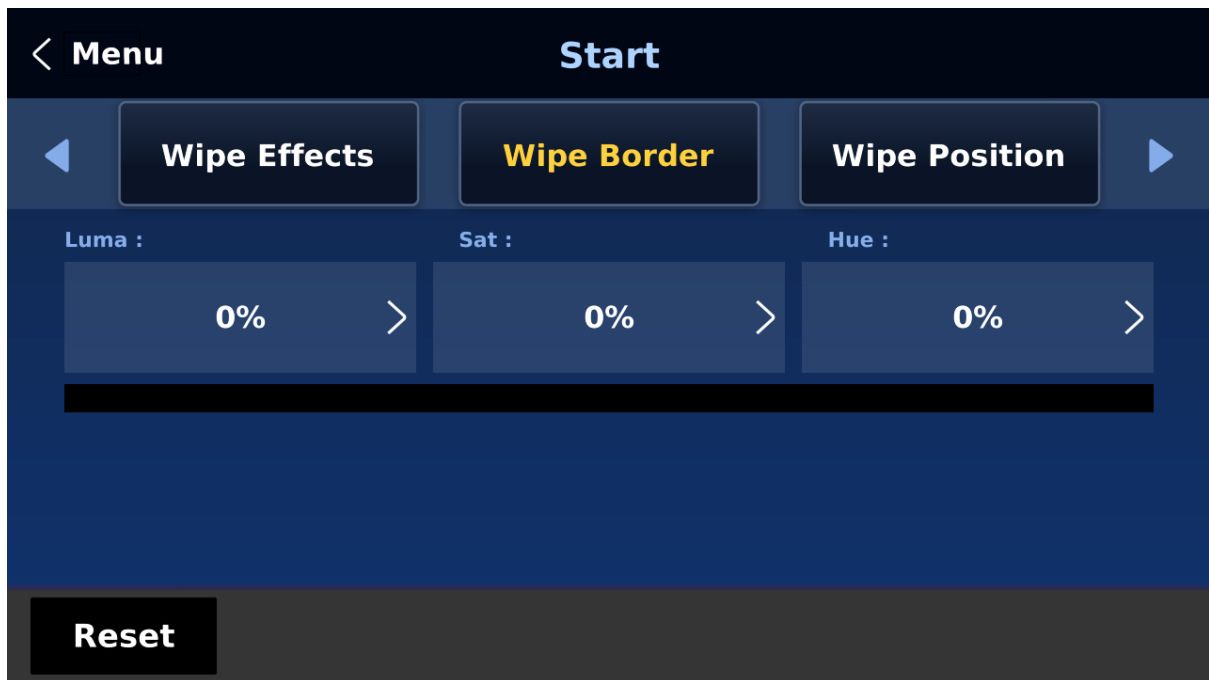
## *Wipe Position*

Position allows the user to adjust the center position of certain wipes (e.g Circle & Elipse). **X** represents the horizontal position and **Y** is the vertical position.
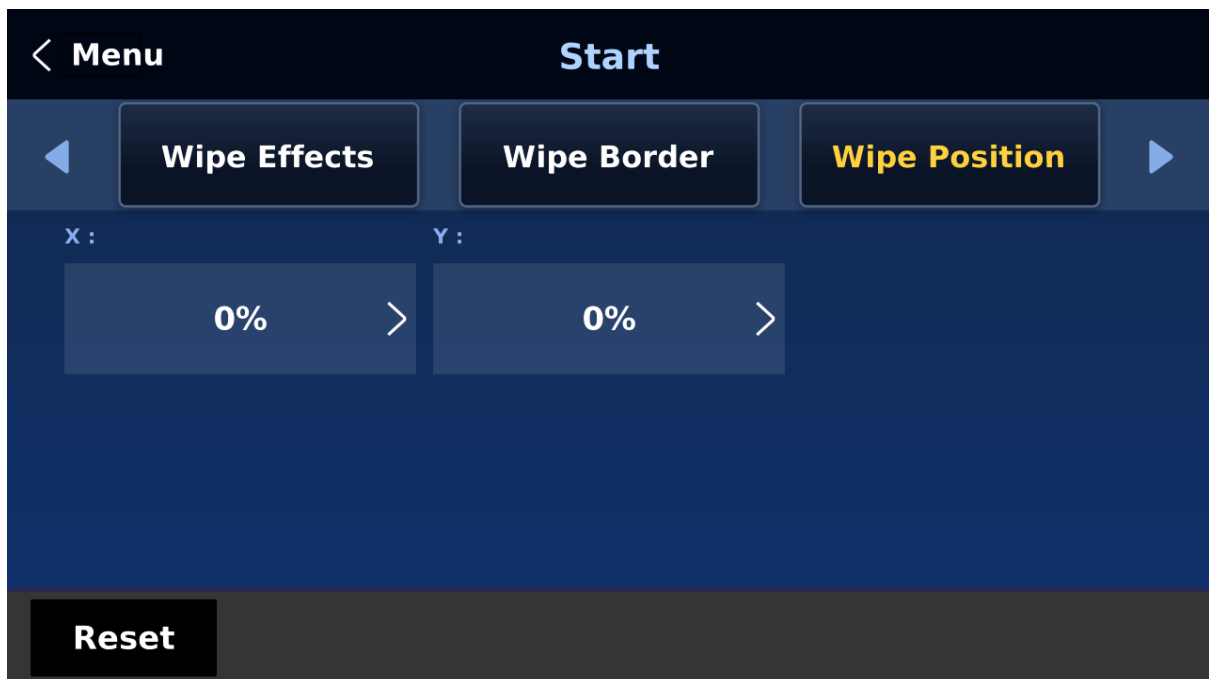


**Horizontal Position (X)**

Positive value moves the wipe center to the right.

Negative value moves the wipe center to the left.

Zero value positions the wipe center at the screen center

**Vertical Position (Y)**

Positive value moves the wipe center up.

Negative value moves the wipe center down.

Zero value positions the wipe center at the screen center.

## 5.2 Keyer

Keyer of the HS-4000 provides the user with the capability of image keying. In this sub menu, the user will be able to configure the eight keyers available on the HS-4000.

### *Keyer*

The 6 keyer options are **Key 1**, **Key 2**, **Key 3**, **Key 4**, **DSK 1**, and **DSK 2**.
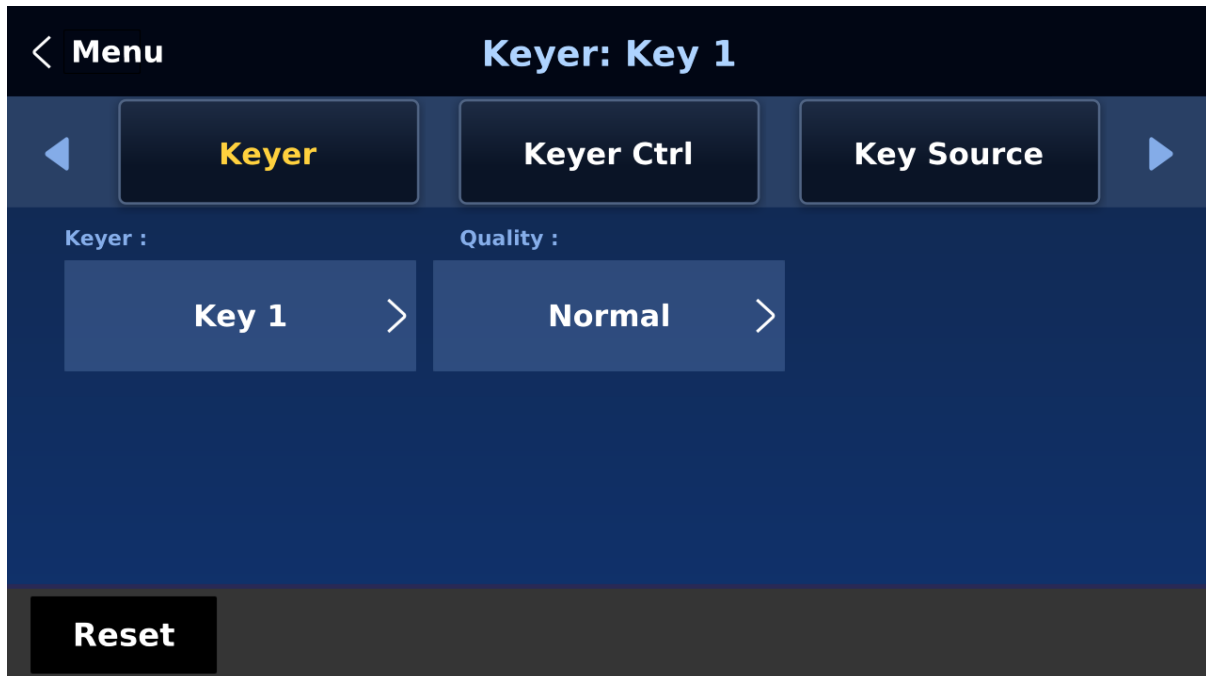


Key 1 – 4 are usually configured for luma and chroma keyers so select **Self** since only one source is enabled for such keyers.

The DSK keyer options are **Linear** and **Luma**. After the DSK keyer option is chosen, select **Self** if only one source is enabled for DSK keyer, which is the Key source. Select **Split** if two sources are enabled for the DSK keyer, which are Fill and Key sources. An example of a Linear DSK self setup could be using an HDMI input from a Windows laptop running Datavideo's CG-250 Character Generator software; see *Character Generator* for more information.

Once configured, the keyers can be activated by pressing the corresponding keyer buttons on the switcher's control panel.

Select **Fine** if you require high keying quality and **Normal** for original keying quality.

### *Keyer Control*

There are three keying modes available: **Linear**, **Luma**, and **Chroma**.

**Linear** keying mode is usually chosen for sharp images as it is usually used in professional graphic design. For non-sharp images, please select **Luma** keying for basic text images. **Chroma** keying mode allows you to remove the green or blue backdrop from the image and is usually used in overlapping talent on a background image.

**Please note that if you select Full, the keying effect will be disabled, keeping the original source image. For example, if you select Full → PIP, no keying effect will be applied to the PIP image source.**



After the keying mode is chosen, select **Self** if only one source is required for the keyer, which is Key source. Select **Split** if two sources are required for the keyer (DSK), which are Key and Fill sources. You can also select **P-in-P** to apply the keying effect to the PIP image source.

If **Luma** keying is selected, the key image (**Key Source**) is configured by adjusting **lift**, **gain** and **opacity** parameters.

**Lift** adjusts the dark/black areas of the key image. **Reducing the value of Lift** will make dark areas of the key image more transparent. The background image will be showing only through the transparent areas.

**Gain** adjusts the light/white areas of the key image. **Increasing the value of Gain** will make light areas of the key image more solid. The background image will be showing only through the transparent areas.

**Opac** adjusts the transparency of the overall foreground key image. **Increasing the value of Opacity** will make the overall key image less transparent.

**Invert** configures the luma key color. Turning it on allows the luma key to remove the white background and turning it off allows the luma key to remove the black background.

**Please note:**
**If Chroma is selected, adjust the Chroma Keyer parameters in the Chroma sub menu.**

**If P-in-P is selected, adjust its parameters in the P-in-P sub menu.**

For example, if the user selects **Key 1 → Chroma → P-in-P**, you will then be able to apply the chroma key effect to the P-in-P window after configuring the corresponding chroma keyer

parameters in the **Chroma** sub menu. To enable the P-in-P window with the chroma key effect applied, press **Key 1 PGM or PVW** button on the switcher's control panel.

## *Key Source*

This option allows you to select the key and fill sources.
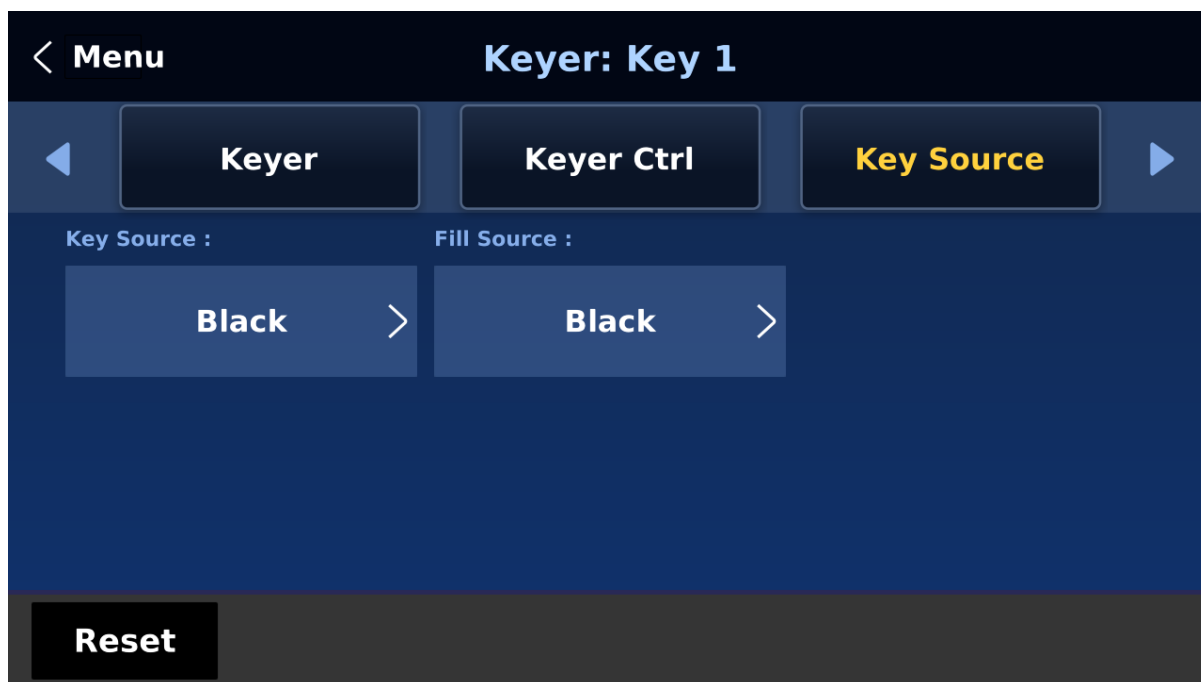


Select the key source from the list below:

- Bars: Color bars
- Matte: A configurable color screen and the Matte value can be set in **Matte** option of the **Start** menu
- Input 1 – 8: Image source loaded to channel buttons 1 – 8
- Black: Black Screen

Select the fill source from the list below:

- Bars: Color bars
- Matte: A configurable color screen and the Matte value can be set in **Matte** option of the **Start** menu
- Input 1 – 8: Image source loaded to channel buttons 1 – 8
- Black: Black Screen

## *Mask*

The Mask feature basically shrinks the source image by removing borders of the final image. In this option, the user is allowed to configure the Mask in chroma, luma or linear mode by adjusting **Left**, **Right**, **Top** and **Bottom** parameters.
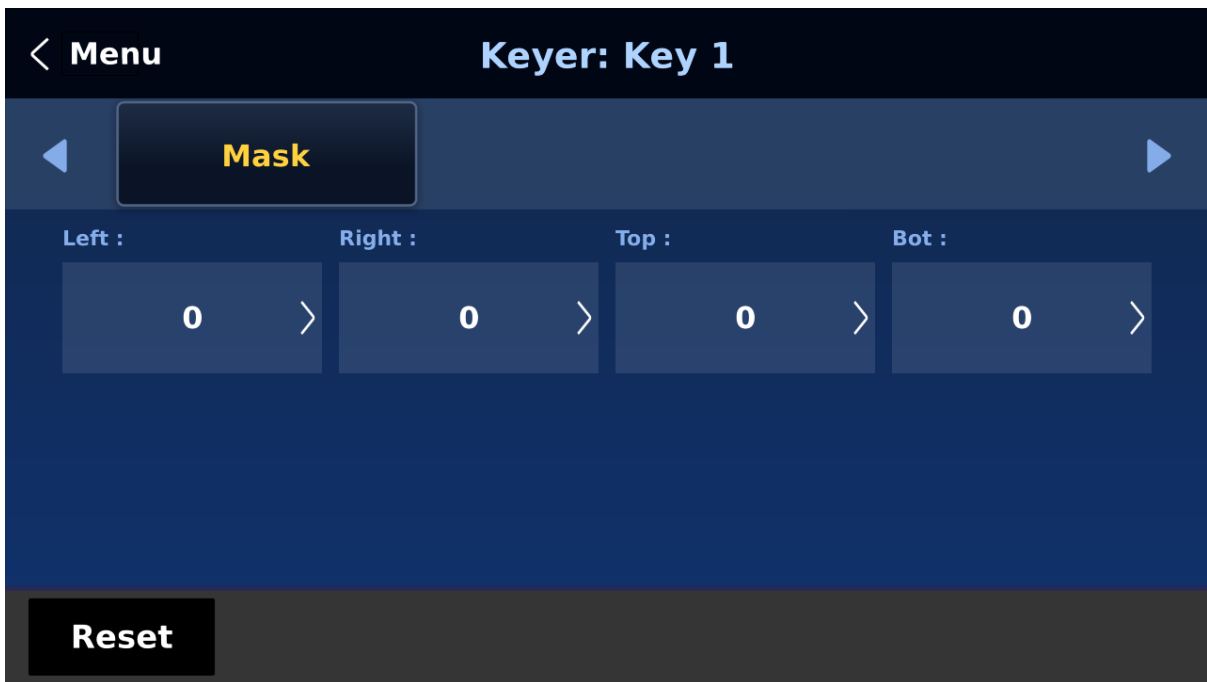
- **Left** – Left sets the left edge of the keyer mask.
- **Right** – Right sets the right edge of the keyer mask.
- **Top** – Top sets the top edge of the keyer mask.
- **Bottom** – Bottom sets the bottom edge of the keyer mask.

## 5.3 Chroma

The Chroma Keyer removes the green background of the key image. If **Chroma** is selected in **Keyer**, this option menu allows you to configure the corresponding parameters.

### *Keyer*

First, select the **Keyer** (**Key 1**, **Key 2**, **Key 3** or **Key 4**) that has been set to the chroma key.
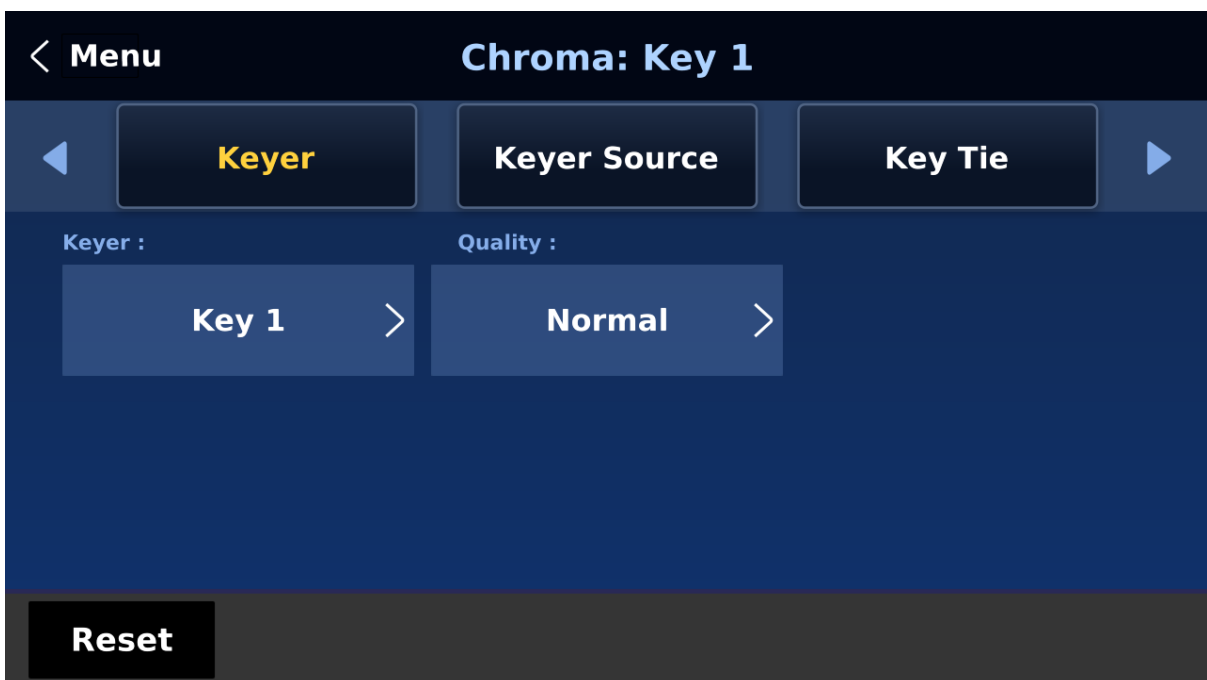
Select **Fine** if you require high keying quality and **Normal** for original keying quality.

Next, select one video source from all available options in **Key Source**.

## *Key Source*

Assign a key source to the keyer selected.



Various options are listed below:

- Bars: Color bars
- Matte: A configurable color screen and the Matte value can be set in **Matte** option of the **Start** menu
- Input 1 – 8: Image source loaded to channel buttons 1 – 8
- Black: Black Screen

## *Key Tie*

Key tie is a feature that allows you to overlay a foreground image on a background image. The key tie image can then be opened by pressing the corresponding input button of the background image. **Note that if key tie is enabled for a particular keyer, the corresponding keyer button will be disabled.**
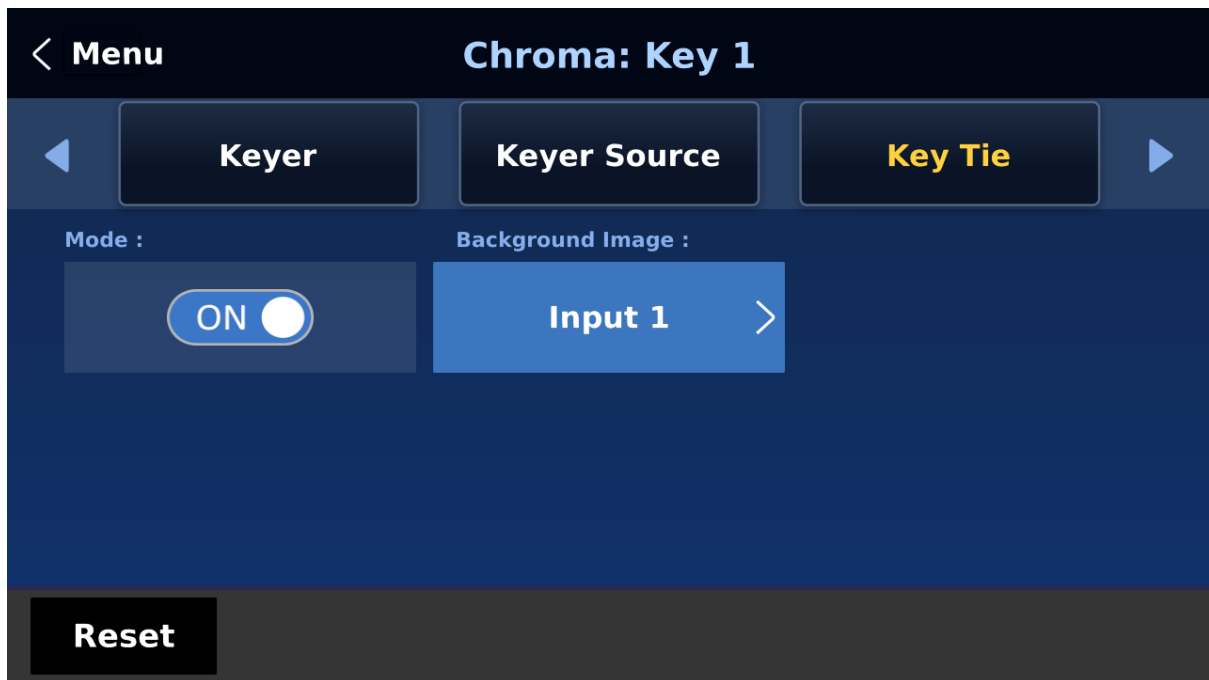
Outlined below are steps to set key tie with the chroma keyer.

1. First, in the Keyer menu, select the keyer and set it to Chroma. We used Key 1 in this example.
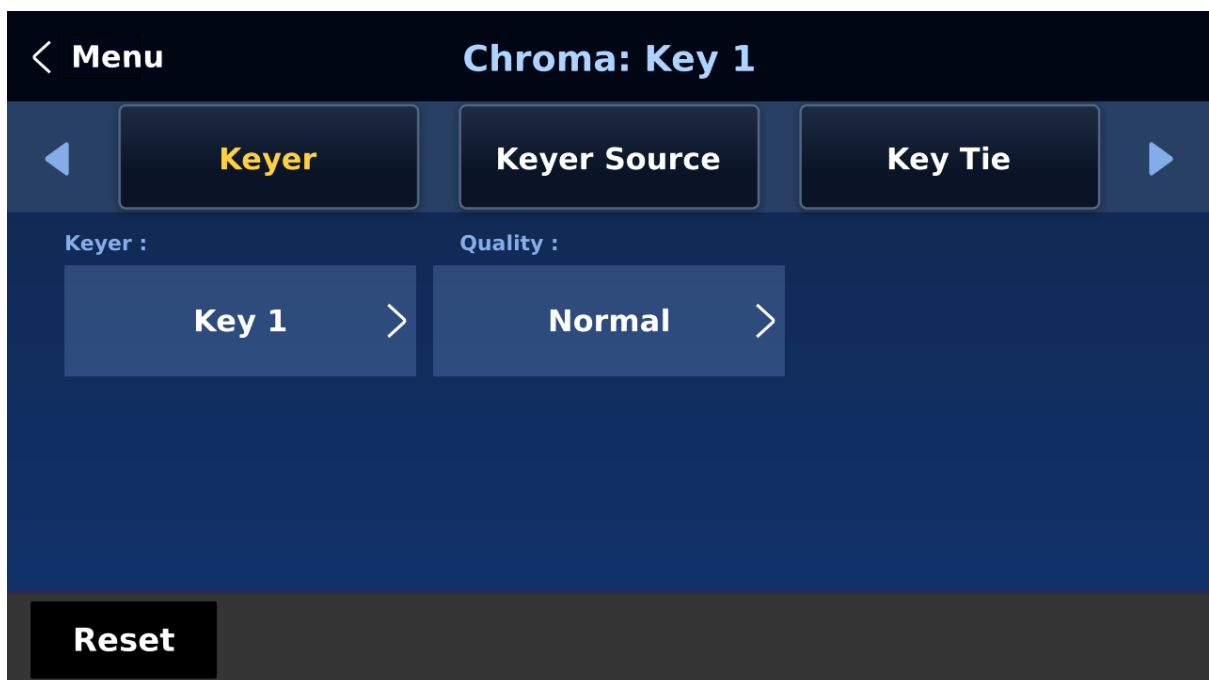


2. Open the Chroma menu and select Key 1. Select a foreground image from the Key Source list (the foreground image is usually a person or an object against a green backdrop).

3. Enable Key Tie and on the right, select a background image.

Below are available sources of the background image:

- Input 1 – 8
- Off

**Note: You will not be able to use the keyer button once key tie is enabled. Use the input button that is assigned the background image to open the key tie image.**
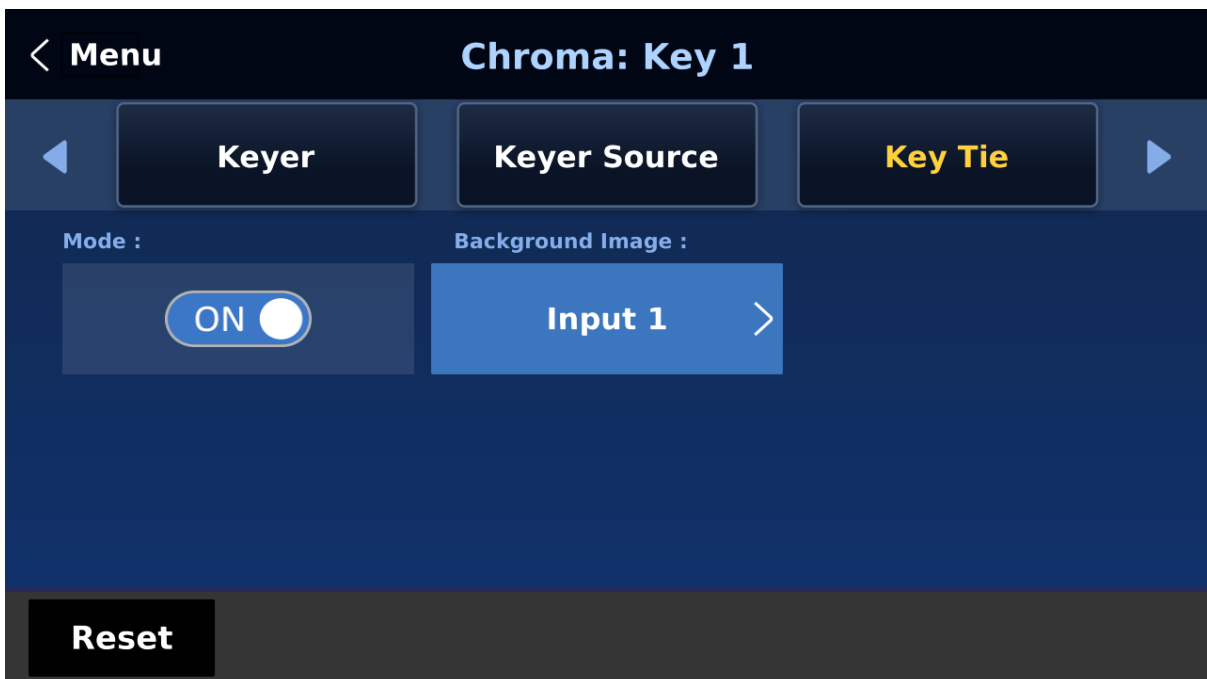


4. After key tie is configured, to open the key tie image, simply press the corresponding input button of the background image selected at Step 3. In this example, input 1 is selected as the background so press button 1 of either the Preview or Program row to open the key tie image on the respective views.

## *CK Setup*

In CK Setup, the user will be able to find all the parameters needed to perform chromakeying of the green or blue backdrop.
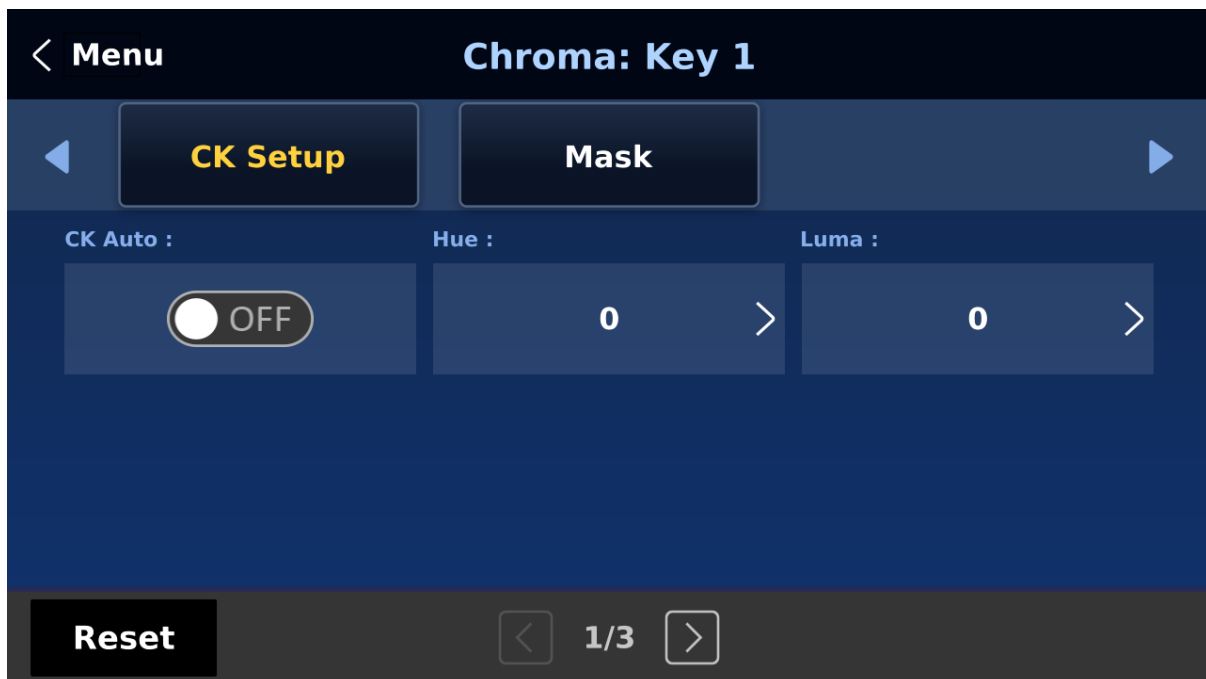


**CK Auto**: This function automatically calculates the best Hue & Luma values for the current Keyer source. After applying the CK Auto effect, the result can be fine-tuned by adjusting the Luma and Hue values.

**Hue**: This parameter adjusts the color of the chroma key. A typical green screen value will be around 120. Blue screen value will be around 240.

**Luma**: This parameter adjusts the luma value of the chroma key

**K Range** (Key Range): Key Acceptance sets the range of hues or colors (0 – 360 degrees) that closely match the background color to be keyed. The user can start with a value of 120 degrees and this value can be fine-tuned up or down depending on the setup of the green or blue screen studio.

**K Fgnd** (Key Foreground): **Key Foreground** adjusts the performance of the chroma key in light or white areas. Apply more **Key Foreground** if the light areas are becoming too transparent.

**K Bgnd** (Key Background): **Key Background** adjusts the performance of the chroma key in dark or black areas. Apply more **Key Background** if the dark areas are becoming too transparent.

**Hi-Light**: Hi-light boosts the foreground key in high luminance area.

**Lo-Light**: Lo-light boosts the foreground key in low luminance area.

**Bg-Supp: Background Suppress** removes the Luma (Brightness) of the background from the final image. **Bg-Supp** turns ON/OFF background suppression.
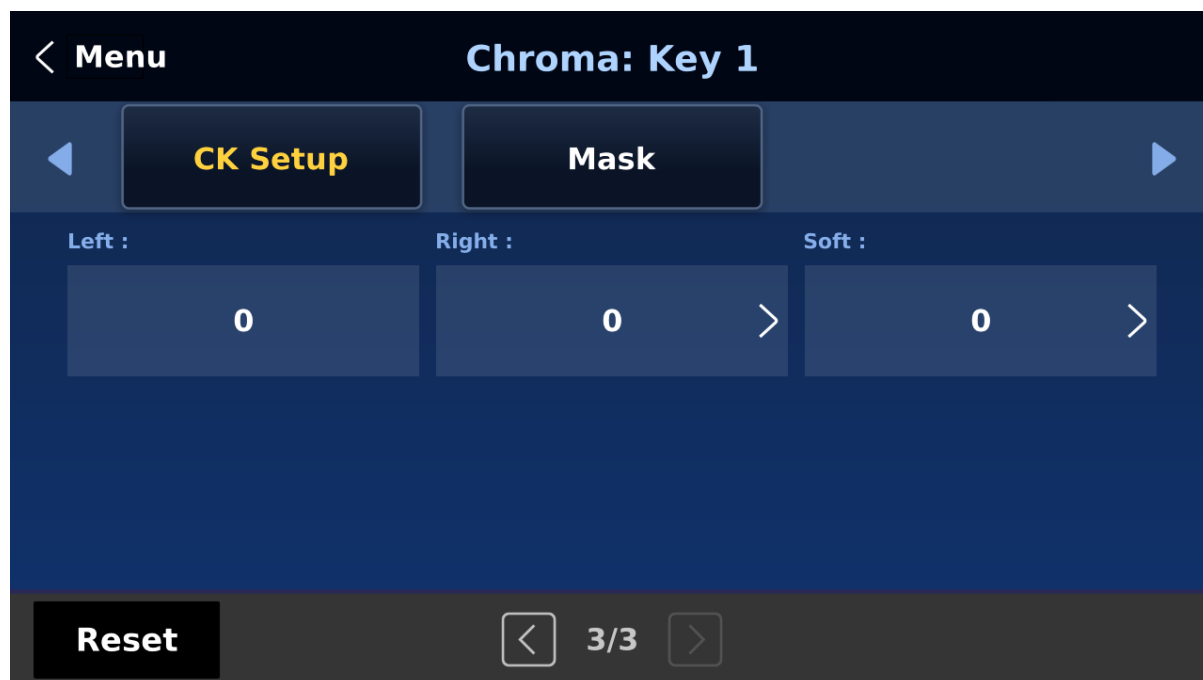


**Left:** Trims the left edge of the key object.

**Right:** Trims the right edge of the key object.

**Soft:** Determines the distinctiveness of key edge

## *Mask*

The Mask feature basically shrinks the camera image by removing the borders from the final image. This feature allows the user to configure the Mask in chroma, luma or linear mode.
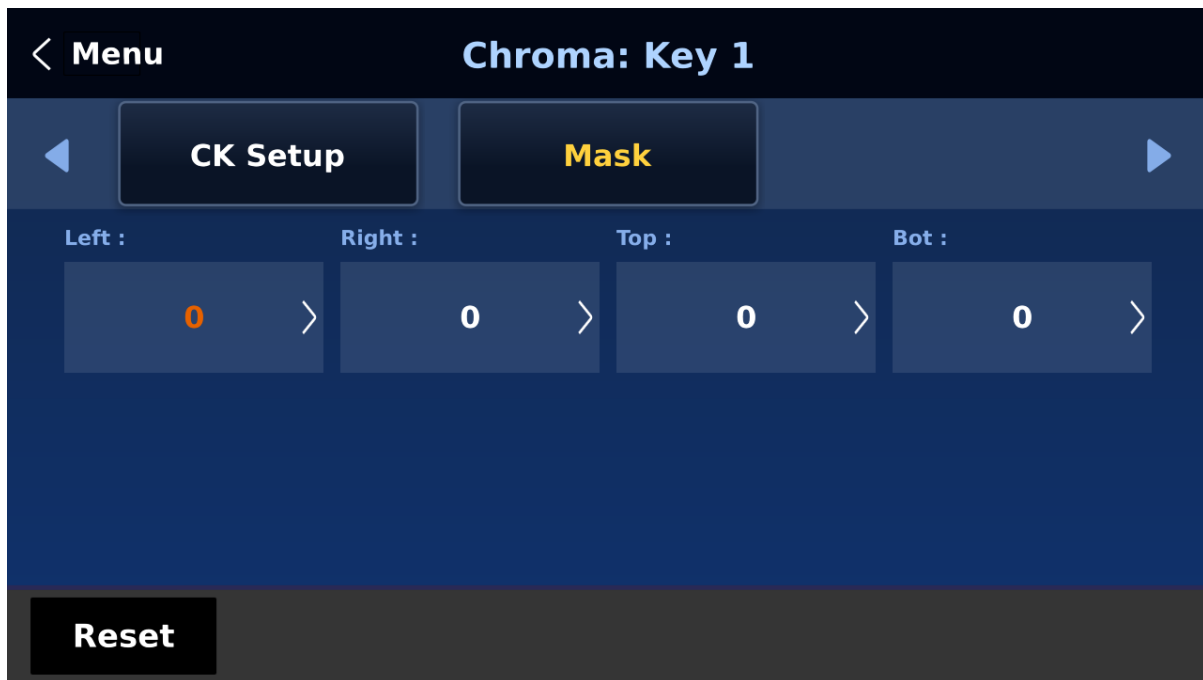
- **Left** – Left sets the left edge of the keyer mask.
- **Right** – Right sets the right edge of the keyer mask.
- **Top** – Top sets the top edge of the keyer mask.
- **Bottom** – Bottom sets the bottom edge of the keyer mask.

## 5.4 P-In-P

The **P-in-P** menu allows the user to adjust various parameters for the PIP window. Use this menu to configure your PIP window if **P-in-P** is selected in **Keyer Control** of the **Keyer** menu for a particular keyer.

**Note:** The keyer image source can only be selected in **Key Source** of the **Keyer** menu and the supported resolutions are 4K, 1080p and 1080i.

### *P-in-P*
In **P-in-P**, the user will be allowed to select a keyer that has been set to the PIP window. Please note that Keyers 1 – 4 are active for PIP configuration only if P-in-P is selected in the Keyer menu for the respective keyer.

- **Key 1**
- **Key 2**
- **Key 3**
- **Key 4**

You may set all four keyers to PIP but only two PIP windows can be activated at the same time.

In **Quality**, select **Fine** to fine tune the position of the P-in-P window by adjusting **X** and **Y** vales as well as the **Size** in **Position** sub menu. This feature allows you to move the P-in-P window more precisely to the desired location and adjust its size.

| ◀ | P-in-P | Position | Crop | ▶ |

**Source :**      **Quality :**

Key 1   >      Normal   >

Reset
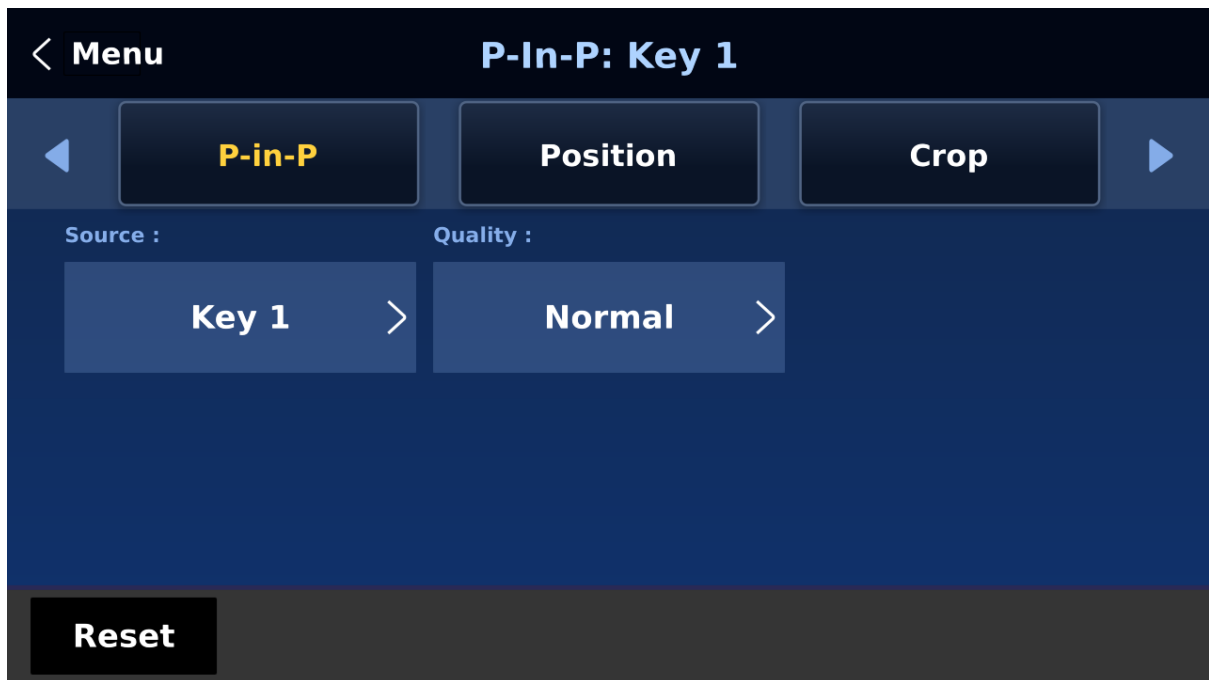
### Position

The user can adjust the P-in-P window position by adjusting values of **X**, **Y** and **SIZE** with the corresponding sliders, where X is the horizontal position, Y is the vertical position and Size is the PIP screen size.

< Menu
P-In-P: Key 1

| ◀ | P-in-P | Position | Crop | ▶ |

**X :**      **Y :**      **Size :**

0%   >      0%   >      0%   >

Reset

**X-Value**      Positive value: position the P-in-P window to the right.
Negative value: position the P-in-P window to the left.
Zero value: Position the P-in-P window at the center.

**Y-Value**      Positive value: move the P-in-P window up.
Negative value: move the P-in-P window down.
Zero value: Position the P-in-P window at the center.

| Size | Ranges from 0 to 50 with 1 being the smallest and 50 being the largest or 1920x1080. |
|---|---|
| | Regardless of the video resolution (4K, 1080p or 1080i), setting the size to 50 would mean a P-in-P window that is one quarter of the size of the background image or 1920 x 1080. |

*Crop*



The PIP image crop can be adjusted by modifying the following parameters:

- **Left** – Adjusts the position of the left edge of the PIP image.
- **Right** – Adjusts the position of the right edge of the PIP image.
- **Size** – Adjusts the PIP image crop size.
- **Top** – Adjusts the position of the top edge of the PIP image.
- **Bot** – Adjusts the position of the bottom edge of the PIP image.
- **Soft** – Adjusts the crop edge transparency.

### Border

The user is also allowed to add borders to the PIP window.



The HS-4000 offers various border styles listed as follows:

- Border Off
- Normal
- Shaded*
- 3D Bevel**
- Bevel Shaded*
- Dual Bevel**
- Bevel Flat**
- Flat Bevel**
- 3D Glass**
- Glass Shaded*
- Dual Glass**
- Glass Flat**
- Flat Glass**
- Circle**
- Circle Shaded*
- Rounded**
- Rounded Shaded*

**\*See _Shade Matte_ for dual color border setting**.

**\*\*See _Direction for border shadow setting._**

To turn the Border off, simply select the option "Border OFF."

In addition to assigning a style to the border, the user is also allowed to set border color by adjusting **Luma**, **Saturation** and **Hue** values. **Luma** and **Saturation** range from 0 to 100%. **Hue** value ranges from 0 to 355.

The borders can also be widened or narrowed by adjusting **Width**. Please note that a width of zero (0) will turn the PIP border off.

**Note: You will sometimes see black thin lines on your PIP image after setting the PIP border to Normal with a border width of zero. This is caused by using an image that differs from its original size. To remove these lines, turn the border off or use the crop function to shrink the image until the lines disappear.**

**Softness** defines the distinctiveness of the border edge. A low value results in a solid border edge and a high value gives a soft diffused border.
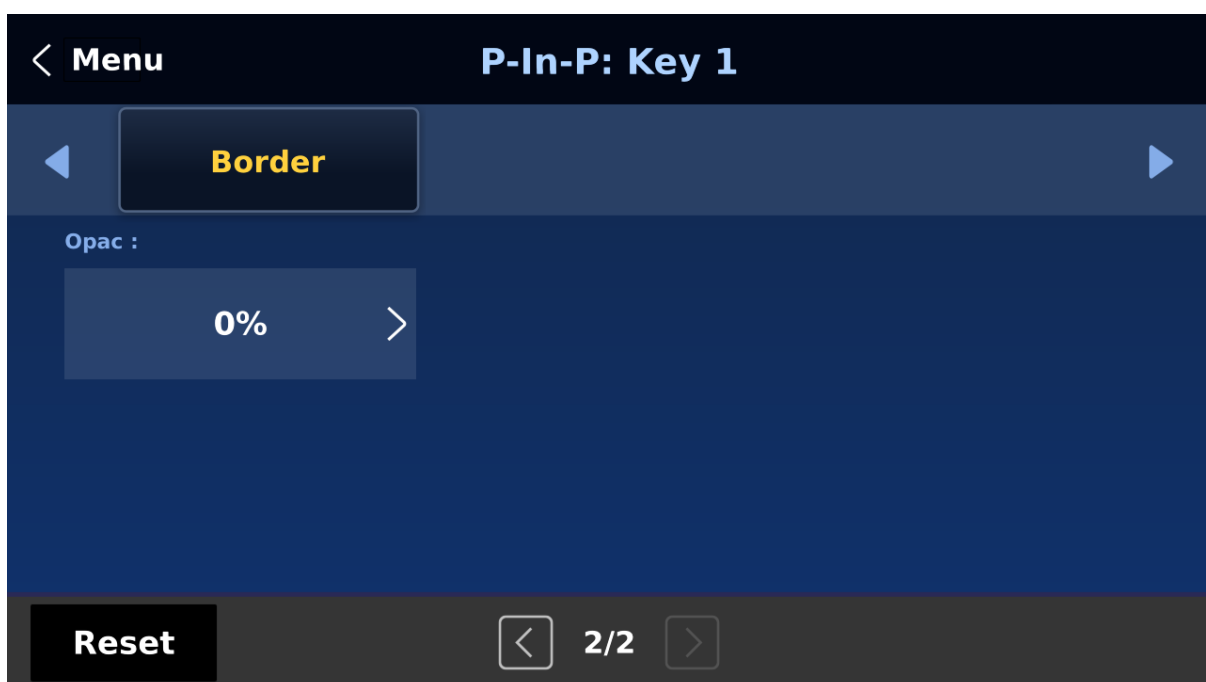


**Opac** adjusts the transparency of the border, ranging from 0% to 100%

**Direction** sets the direction of the light source with the value of parameter ranging from 0 to 355. The default is 35, which indicates a direction of North East.  You will see the border's color shadow changes as the Direction value is changed. The directions that specific parameter values correspond to are listed as follows:

- 0: North
- 90: East
- 180: South
- 270: West

### Shade Matte (Dual Color Border)

In order for the **Shade** effect to work, **Shaded Border (Dual Color)** must be first selected as the **Border such as "Shaded", "Bevel Shaded", etc.** For more information about border settings, see the previous section *Border*.

Shade Matte determines the inner border. The boundary between the normal border matte and the shade matte can be determined by adjusting the **Shade Position** parameter.
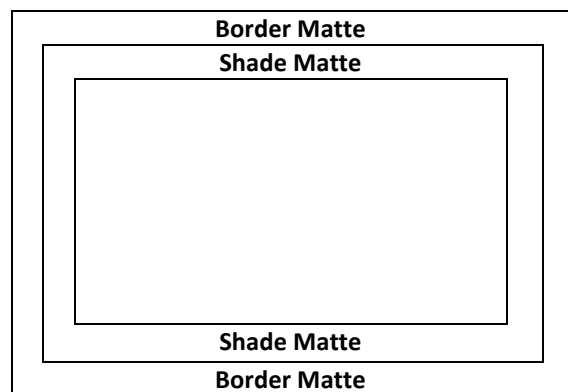


**Luma, Sat and Hue**

The color of the *Shade Matte* can also be controlled by adjusting the **Hue, Sat** and **Luma** values.

For **Hue** value, **Red** is 0, **Green** is approximately 120 and **Blue** is approximately 240. For secondary colors, **Yellow** is approximately 60, **Cyan** is approximately 180 and **Violet** is approximately 300.

The **Sat** or **Saturation value** refers to the intensity of the color selected in **Hue**. As the saturation increases, the color appears to be more pure. As the saturation decreases, the color appears to be more washed-out or pale.

**The Luma value** relates to how bright or dark the selected color or hue is. The higher the **Luma** value, the brighter the color selected in **Hue**.

**Shade Softness** and **Position**

The *Shade Matte* can be further configured by adjusting its **softness (Shade Soft)** and **width (Shade Pos)**.
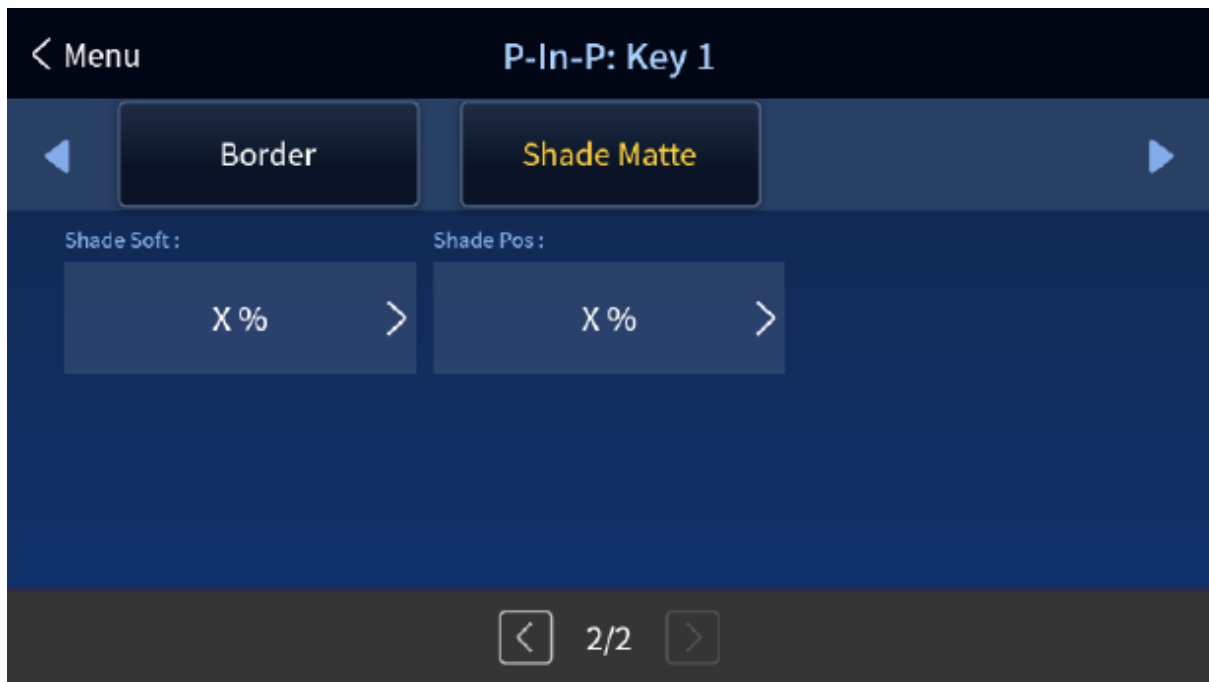
**Shade Soft**

This blurs or softens the *Shade Matte* area.

**Shade Position**

The position of the boundary line between *Shade Matte* and *Border Matte* is controlled by the **Shade Pos** value.

Increasing this value moves the boundary line such that the *Shade Matte* occupies less of the width of the border. Decreasing this value moves the boundary line such that the *Shade Matte* occupies more of the overall border width. When this value is 0, the *Shade Matte* occupies all of the border width.

## 5.5 Inputs

This feature allows the user to select mode of the selected input, configure the input color by adjusting its **Black Level**, **White Clip** and **Chroma Gain** parameters and adjust the audio volume and delay. In addition, the Crosspoint function allows the user to shuffle contents of Inputs 1-8 without changing physical connections at the back of the machine.

### *Input*

In this sub menu, you will be allowed to set the mode of display for the respective Input windows of the Multiview display. First select the input that you would like to configure and then for each selected input, set the mode of input by selecting one of the modes **from the first mode option**:

- Still – Displays the still picture loaded into Inputs 1-8 in the respective input window.
- Freeze – Freezes the current video played in the Input window.
- Live – Live view or video display in the Input window.

**Input Type**

Channels 3, 4, 7 and 8 are SDI/HDMI shared input channels, depending on the physical connections at the rear, specify the input interface accordingly.

**Color Space**

Select an option from the list below to provide details of the color primaries for interpretation of XYZ color space.

- Auto: System determined color space.
- REC709: REC709 is the standard camera encoding color space for HDTV established by International Telecommunication Union in 1990.
- BT2020: A 4K RGB color space that has a color gamut that is wider than all other RGB color spaces.

**Mode of Operation**

The second mode option allows you to select the mode of operation for inputs 3, 4, 7 and 8 when their input type is set to HDMI.

**OFF**: When input type is set to SDI.

**CG Mode:** HDMI ports of the switcher allow keying of CG text or graphics (1080p60/59.94/50) over live video (4K/60/59.94/50/30/29.97/25 and 1080p/60/59.94/50/30/29.97/25). Enable CG mode to use this feature. See *Character Generator* for more details.

## *Proc Amp*

Proc Amp allows the user to configure the input color by adjusting its Black Level (0 – 100%), White Clip (0 – 100%) and Chroma Gain (0 – 16) parameters.
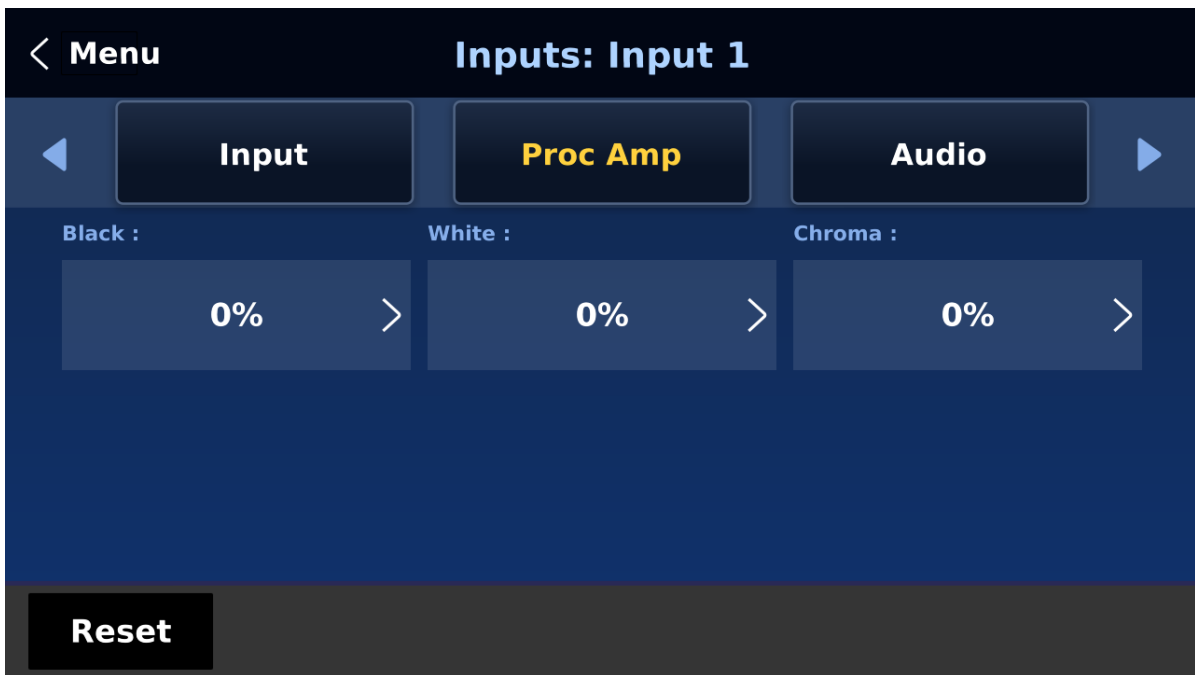
### Audio

**Gain (0 – 24 dB):** adjustment of the input audio volume for the selected video input.

**Delay (0 – 340 ms):** sets the delay of the audio component of the selected video input.
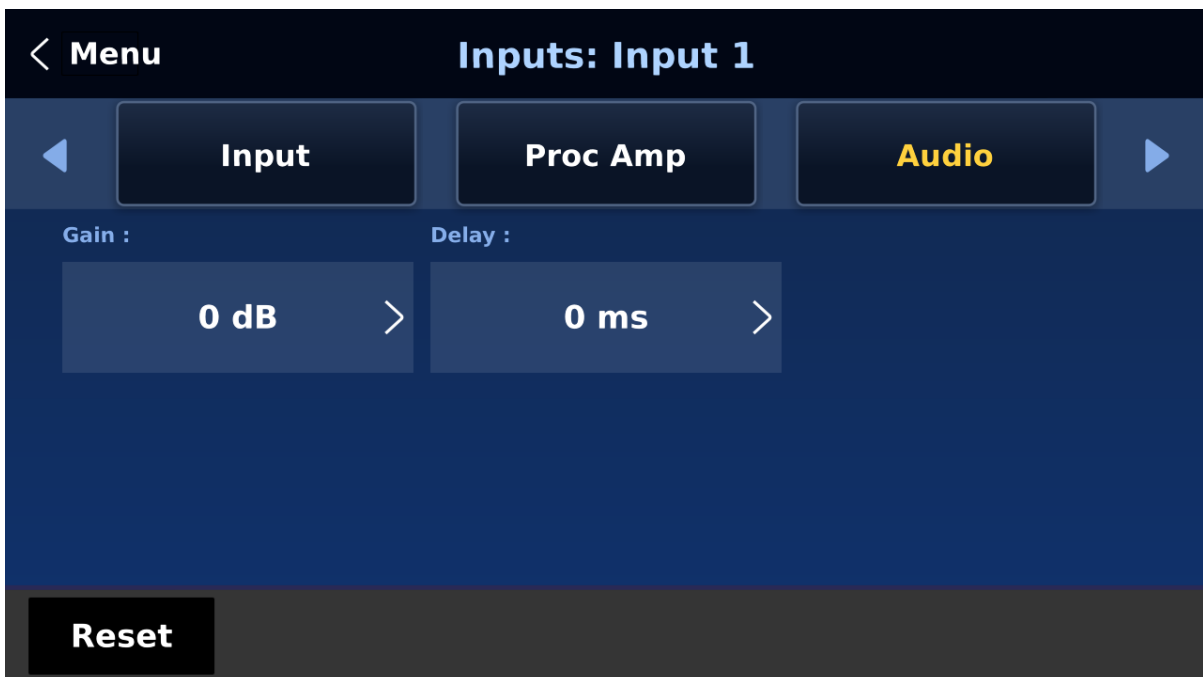


### Crosspoint

The crosspoint function allows the user to shuffle the contents of Inputs 1-8 without changing the physical connections at the back of the machine. In the example below, the input 1 video source is assigned to input 3, so the input 3 window should display the input 1 video. Select OFF if you would like to disable the crosspoint function. Available options are listed as follows:

- Input 1-8
- OFF

| Crosspoint | Audio XPT | |
|---|---|---|
| Input 1 | Input 2 | Input 3 |
| Input 4 | Input 5 | Input 6 |

Reset        〈 1/2 〉

### Audio XPT

The Audio XPT feature allows the user to associate the audio component of any input source to any of the input buttons (1 – 8), thus cross assigning audio input channels to program/preview row buttons.

〈 Menu                      Inputs: Input 1

| Crosspoint | Audio XPT | |
|---|---|---|
| Follow | External | Input 1 |
| Input 2 | Input 3 | Input 4 |

Reset        〈 1/2 〉

Available options are listed as follows:

- Input 1-8
- External
- Follow

"**External**" selects audio source from AUDIO IN ports.

Select "**Follow**" to set the audio to Audio-Follow-Video mode in which the PGM audio is played via **AUDIO OUT** port. Please note that there will be no audio delay.

## 5.6 Outputs

This menu allows the user to configure various output settings such as video output, tally mode and GPI connection.
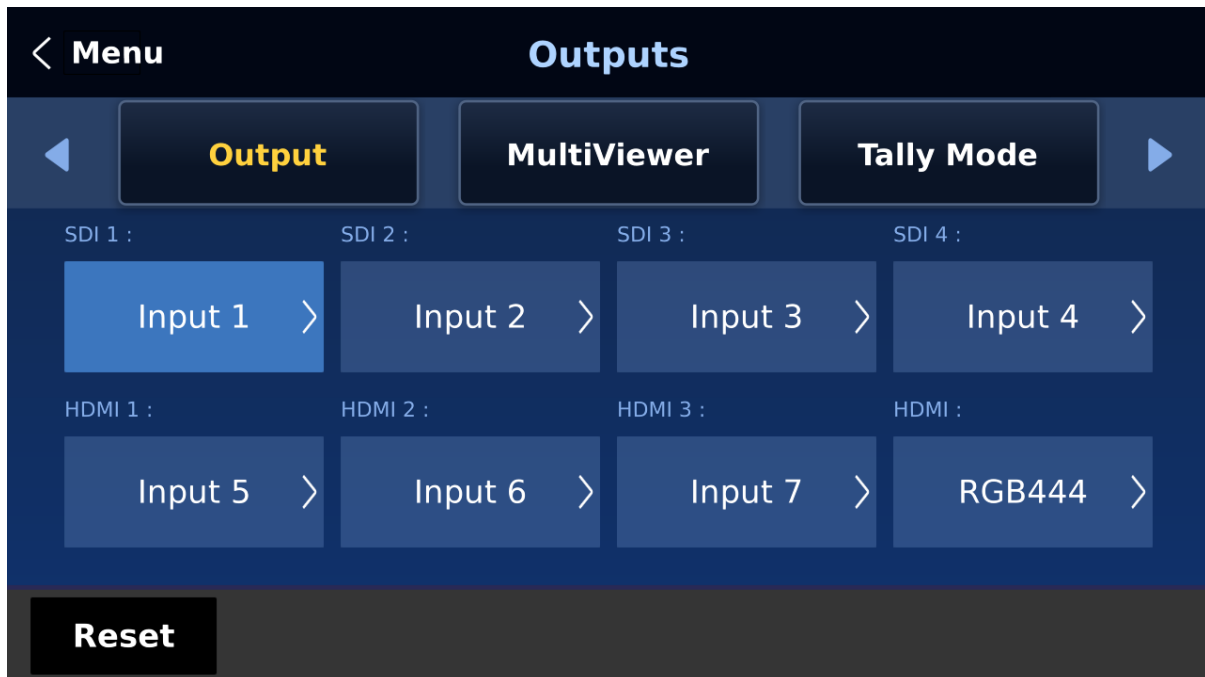


### *Outputs*

In general, the HS-4000 offers 5 output ports (**SDI 1 – 4 / HDMI AUX**) and all 5 ports can be configured to output one of the following:

- Input 1 – 8
- CLN PVW (Clean PVW)
- CLN PGM (Clean PGM)
- PG + DSK
- PVW
- PGM
- MultiV (Multi view)

Select the HDMI color space in **HDMI**. The available options are YUV444, YUV422 and RGB444.

### *Multiviewer*

The Multiviewer sets the Multiview display.
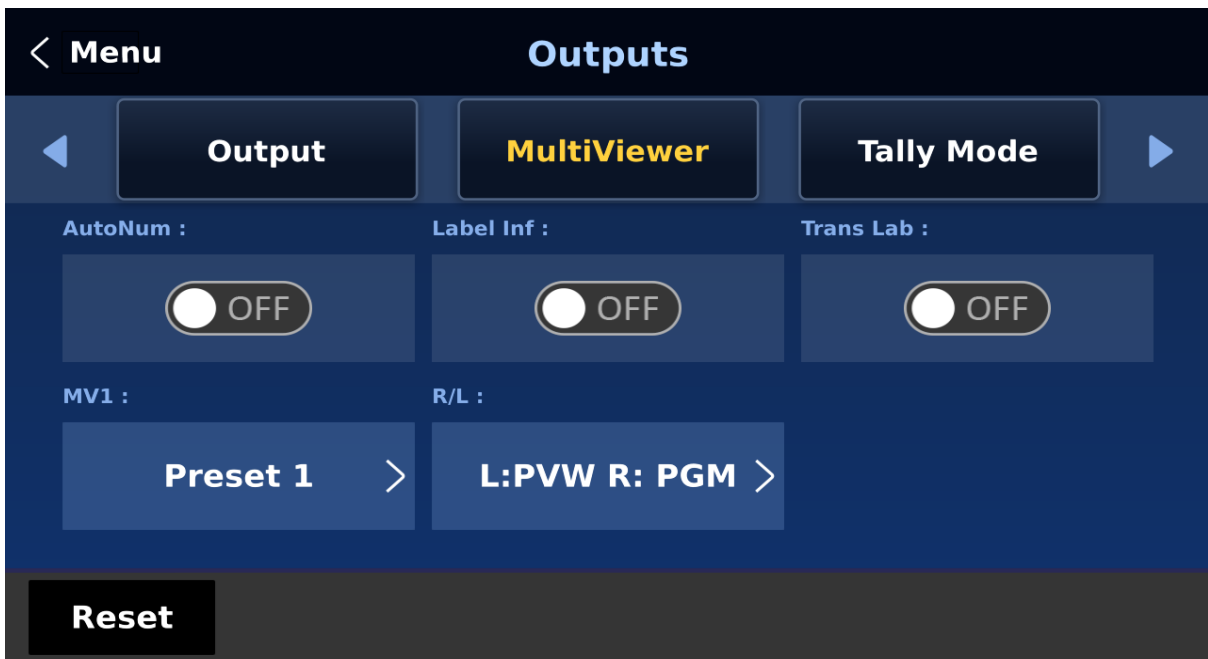
**AutoNum**: The Multiview's input windows can be automatically numbered, and this option turns ON/OFF automatic numbering.

**Label Inf** turns ON/OFF the label information of the input windows. The input label indicates whether the input is still (stl), live (*), or a frozen image (frz). **Please note that the label content cannot be modified.**

**Trans Lab** turns ON/OFF the Label Background Transparency. Once enabled, the background of the label should turn from an opaque black to a transparent one.

**MV1**

The HS-4000 Multi-view monitoring is available in different multi-image layouts. These outputs can be used to monitor video and audio in a number of different configurations. For each setup, embedded audio level indication is also available on all inputs as well as the Preview and Program windows.
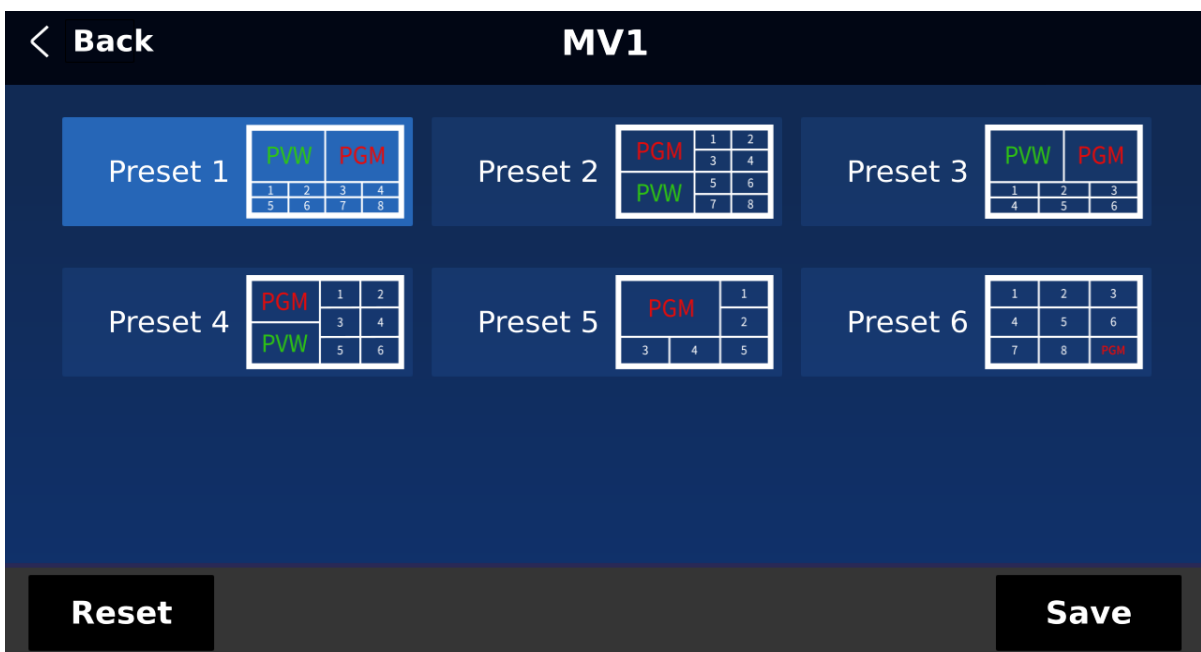
**R/L**

On the Multiview, by default, Preview window is positioned on the left and on the right is the Program window. This option allows you to switch their positions.

### *Tally Mode*

Tally output port generally sends two tally signals to each channel. In Datavideo products, **Red** indicates On-Air, and **Green** indicates next video source. On the Multiview screen, the tally light is indicated by rectangular borders around the input sub windows.
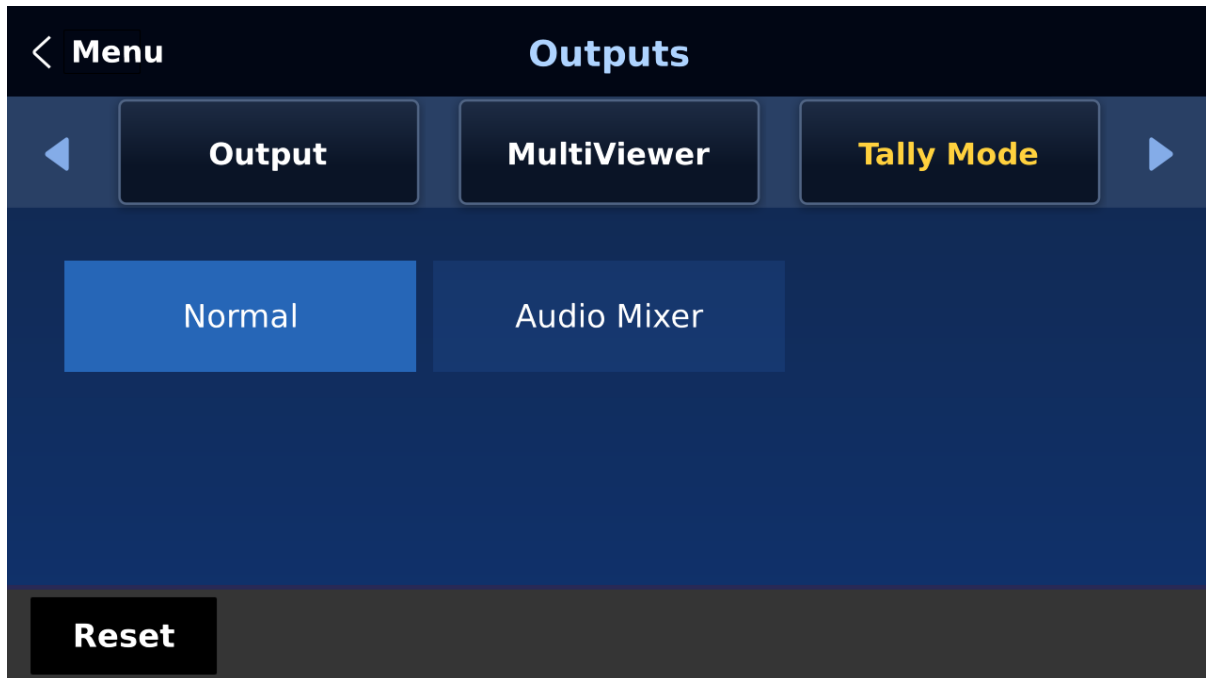


**The HS-4000 provides two tally modes:**

**Normal**: If in normal mode, tally lights of all video sources enabled on PGM view will be turned ON (**Red**). These sources include PGM, PIP and Key sources. While transition is in progress, tally lights of all video sources enabled on PGM view do not change color. The tally light will only change color (**Red → Green**) after transition of PGM and PVW views is complete. However, for video sources on the Preview window, the tally lights will be enabled **Green**, and the color is changed to **Red** as soon as the transition is triggered.

**Audio Mixer**: If Audio Mixer mode is selected, tally lights of all video sources enabled on PGM view will be turned ON (**Red**). While transition is in progress, tally lights of all video sources enabled on PGM view do not change color. The tally light will only change color (**Red → Green**) after transition of PGM and PVW views is complete. However, for video sources on the Preview window, the tally lights will be enabled **Green**, and the color is changed to **Red** as soon as the transition is triggered.

### *GPI Out*

GPI is designed to allow the user to trigger playback of an external playback device such as Datavideo's HDR-80/90. **GPI OUT** allows the user to configure your GPI connection.
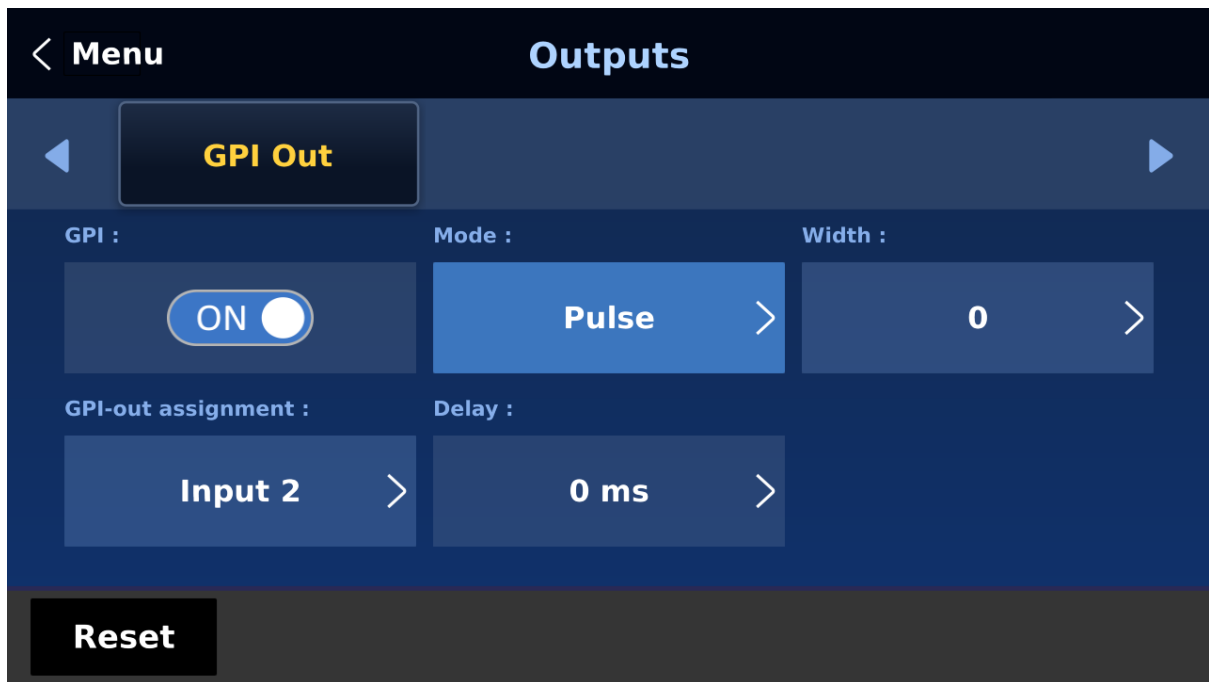
First enable the GPI port and then set the GPI **mode**, which is either level or pulse. The pulse width can be configured in **Width** sub-option (1-9).

Once the GPI function is enabled, you can assign it to one of **Inputs 1-8 which can later be used to trigger external devices** and the **delay** can be set to a value between 0 and 99.

## 5.7 Audio

In the **Audio** menu, you will be able to start and shut off the embedded audio of **SDI** and **HDMI** videos.

### *Audio*

External audio source can only enter the HS-4000 via the analog XLR input port found on the rear panel of the switcher. Ideally the user should use the HS-4000 with an audio mixer.

It is recommended to use AD-200 audio mixer designed and manufactured by Datavideo. All external audio sources can be connected to AD-200 before entering the HS-4000. The external audio can be embedded into SDI video out.
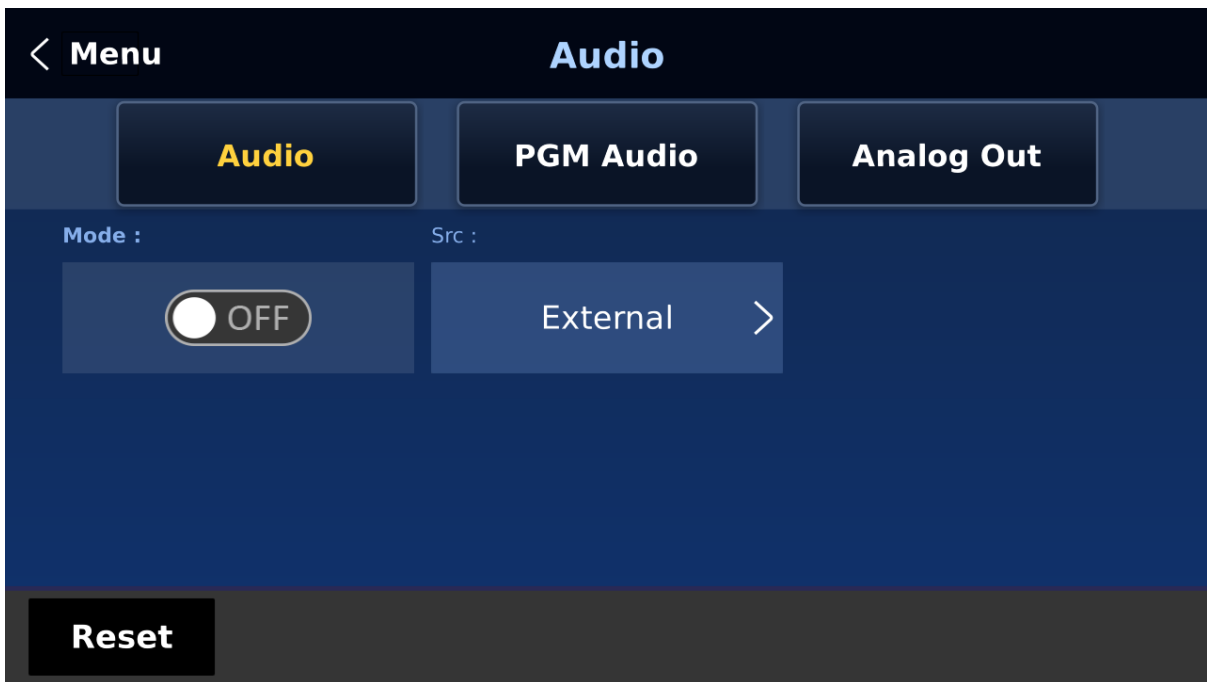
**Mode (ON/OFF)**: Setting Mode ON allows the HS-4000 to embed external audio component into SDI video out. Changing the **Mode** option from ON to OFF will mute the embedded audio.

**Audio Src**: This sub-option allows the user to select the audio source.

If "**External**" is selected, the external audio, i.e. audio from **AUDIO IN** port, will be played.

If "**Follow**" is selected, the audio will enter Audio follow Video mode, i.e. playback of the audio of the output video.

To play the audio of a particular input video channel, select an **input number** from Input 1-8.

## *PGM Audio*

In PGM Audio, you will be allowed to select the audio transition effect, and set the PGM audio volume and delay.
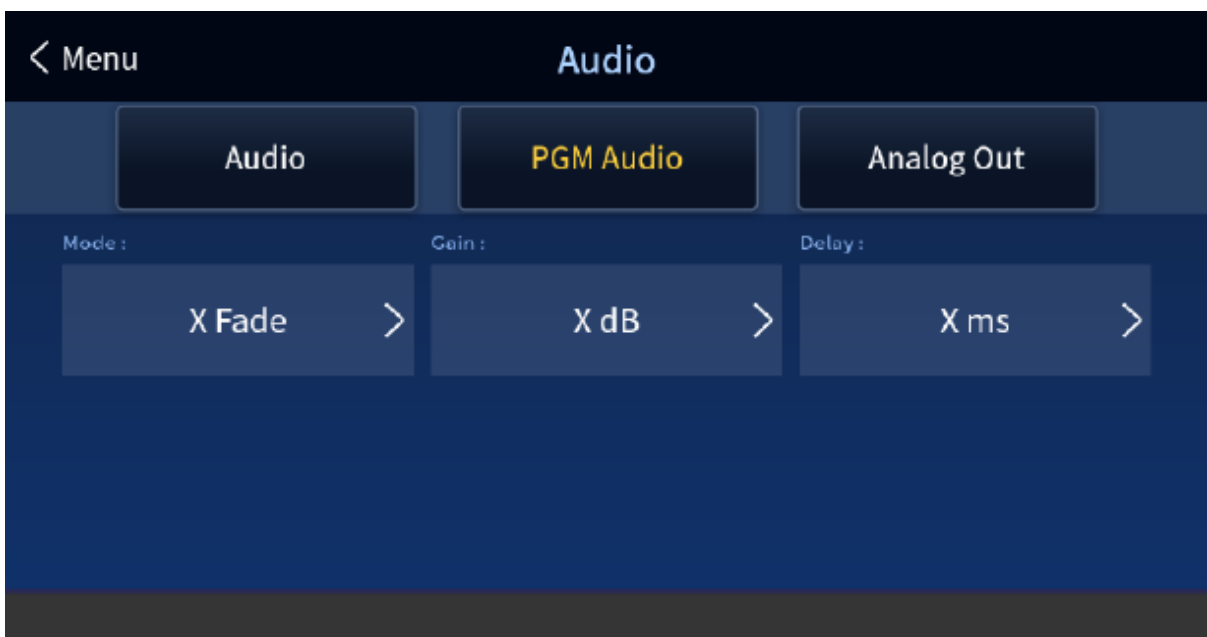
**Mode (V Fade/X Fade)**

While working in the Audio-F-Video mode, the audio sources will also change as the video sources are switched. We can choose how the audio changes sources, whether it be a clean cut (immediate switch) or some sort of transitioned change (cross fade or fade out & in). To do this we would need to set up with the following menu options.

- **X Fade:** PGM Audio / PVW Audio cross fade
- **V Fade:** Fade out PGM Audio then fade in PVW Audio

**Gain (-60 – 24 dB):** adjustment of the PGM audio volume.

**Delay (0 – 340 ms):** sets the PGM audio delay.

## *Analog Out*
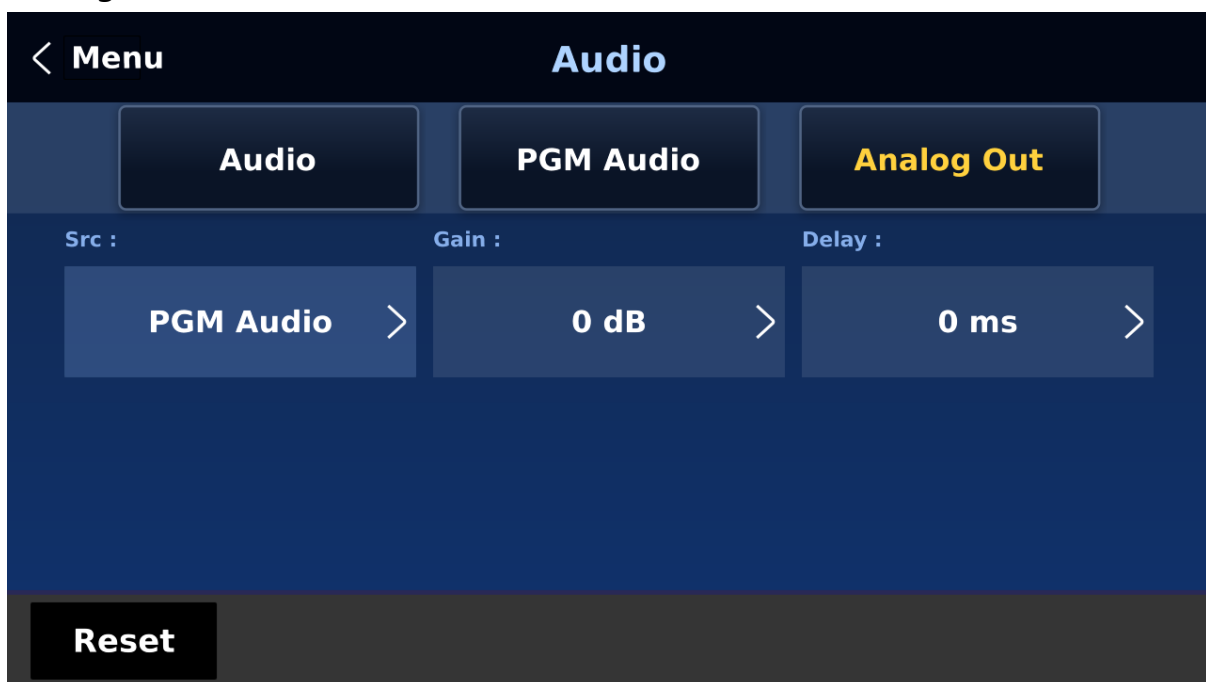


You are also allowed to select a source of audio of your preference and output the selected audio via Audio OUT. Open the GUI menu and select Audio → Analog Out → Src where you may select a source of audio from the following list.

- PGM Audio
- Follow
- Input 1-8

If "**Follow**" is selected, the audio will enter Audio follow Video mode, i.e. playback of the PGM audio via Audio OUT **without audio output delay**. If "**PGM Audio**" is selected, the HS-4000 will only play the PGM audio via Audio OUT **with audio output delay**.  You may also select to output one audio component of the 8 inputs via Audio OUT **without audio output delay**.

**Gain (-60 – 24 dB):** adjustment of the audio volume at the **AUDIO OUT**.

**Delay (0 – 340 ms):** sets the delay of the audio at the **AUDIO OUT**.

## 5.8 Files

In Files, you will be allowed to manipulate different files such as clips, still pictures, user memories and still and animated logos.

**Still** allows the user to load images from the memory, save images to the memory, and save the images captured. **User** allows you to **load** previously saved settings and **save** the currently configured settings.  In **Clip**, you will be able to browse through the clip files and load the clips directly on the switcher. As for logo and ani logo menus, they allow you to load still and animated logos directly on the switcher.

All five file types will be discussed in the following sub-sections.

### *User Mems*
In this option, the user is allowed to **load** previously saved settings and **save** the currently configured settings.
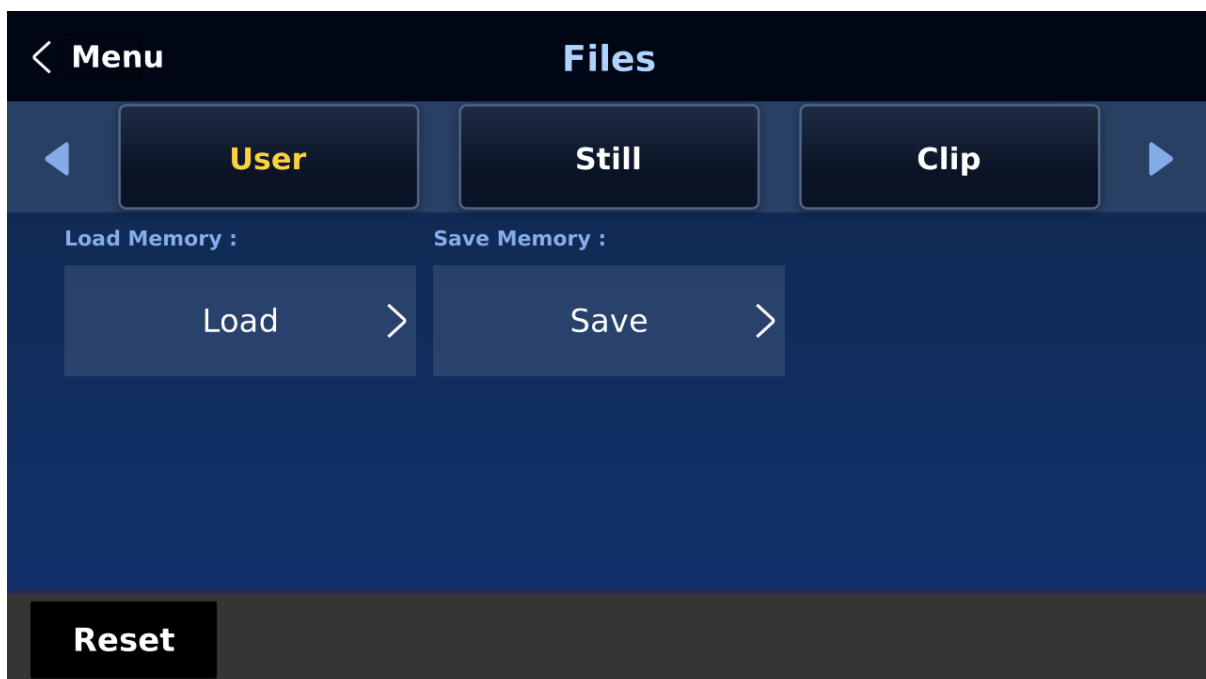


### *Load Memory*
Tap to open a numeric keypad and enter a memory location. Click **OK** to load the saved setting.

### *Save Memory*
Tap to open a numeric keypad and enter a memory location. Click **OK** to save the current setting.

### *Still*
**STILL image** is an image pre-loaded to the HS-4000's input buffers (Input 1-8). The **Still** menu allows users to load still pictures from the machine's internal memory to the input buffer, save still pictures to the machine's internal memory, view thumbnail pictures and grab program image to the specified still memory locations.
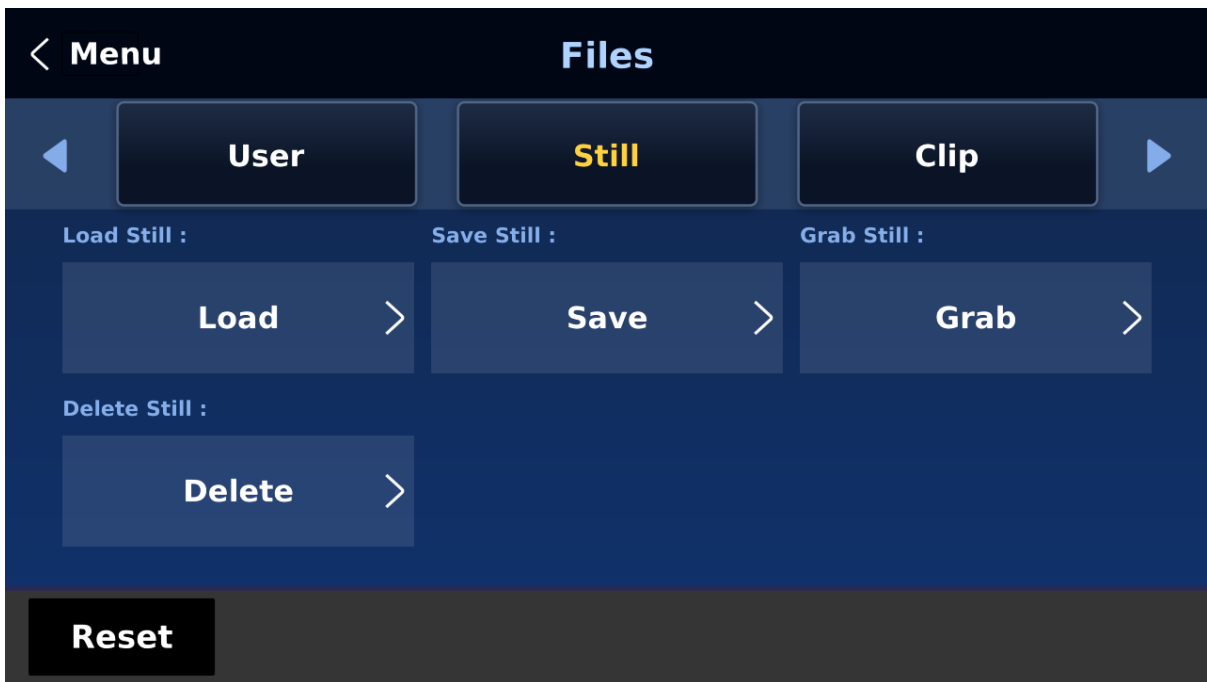
*Load Still*
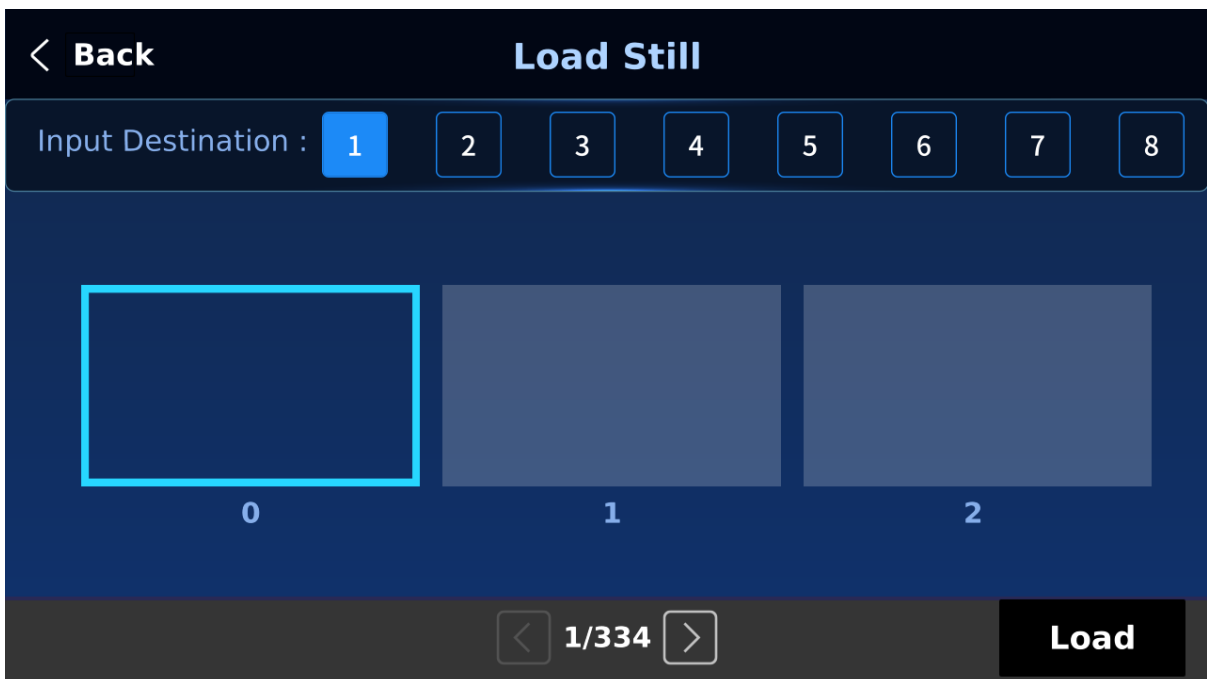


Upon selecting "**Load Still**", the user can then choose the memory location from which the still image is loaded. The system memory can store up to 250 still images. The following are destinations to which the still image can be loaded:

- Inputs 1 – 8

Tap "**Load**" to load the still image to the chosen destination.

**Image Preview** is available as t**humbnail pictures**.

**Note: The user is allowed to import still picture files. It is recommended to use 24-bit without Alpha bmp, png and jpg formats.**

*Save Still*
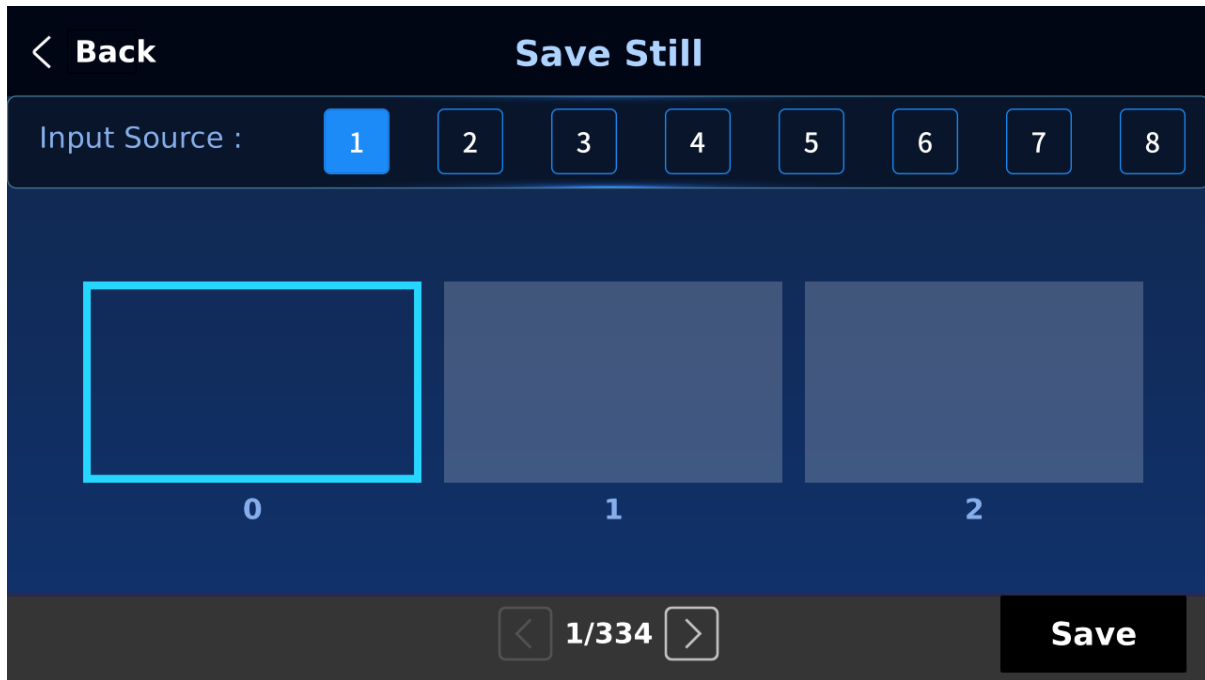


"**Save Still**" allows the user to save the still image to a specific memory location. The user should determine the source of the still image first. The available sources are listed below:

- Inputs 1 – 8

To complete the save, the user can simply tap "**Save**" after determining the memory location.

*Grab Still*
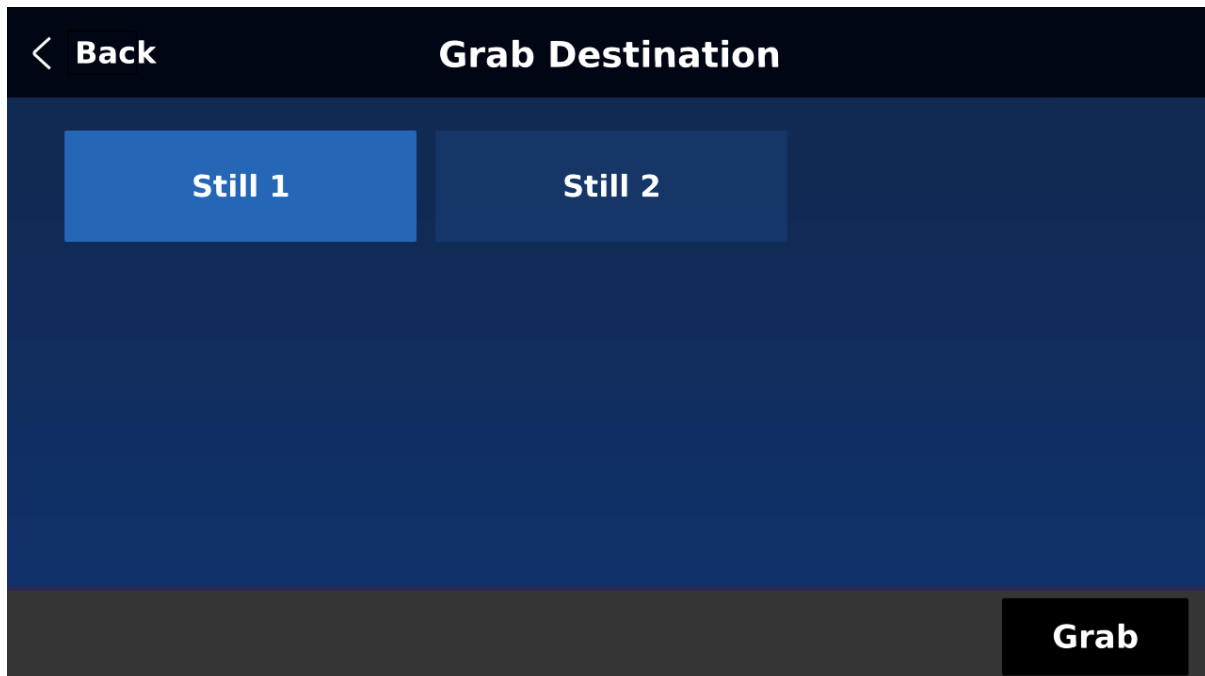


"**Grab Still**" function grabs an instant of the video image on the Program view to the destinations listed as follows:

- Still 1
- Still 2

After determining the destination to which an instant of the video image is captured, simply select "**Grab**" to trigger the image grab.

*Delete Still*

To remove a still from a memory location, simply select a memory location, and tap "**Delete**" then "**Yes**" to confirm the delete.
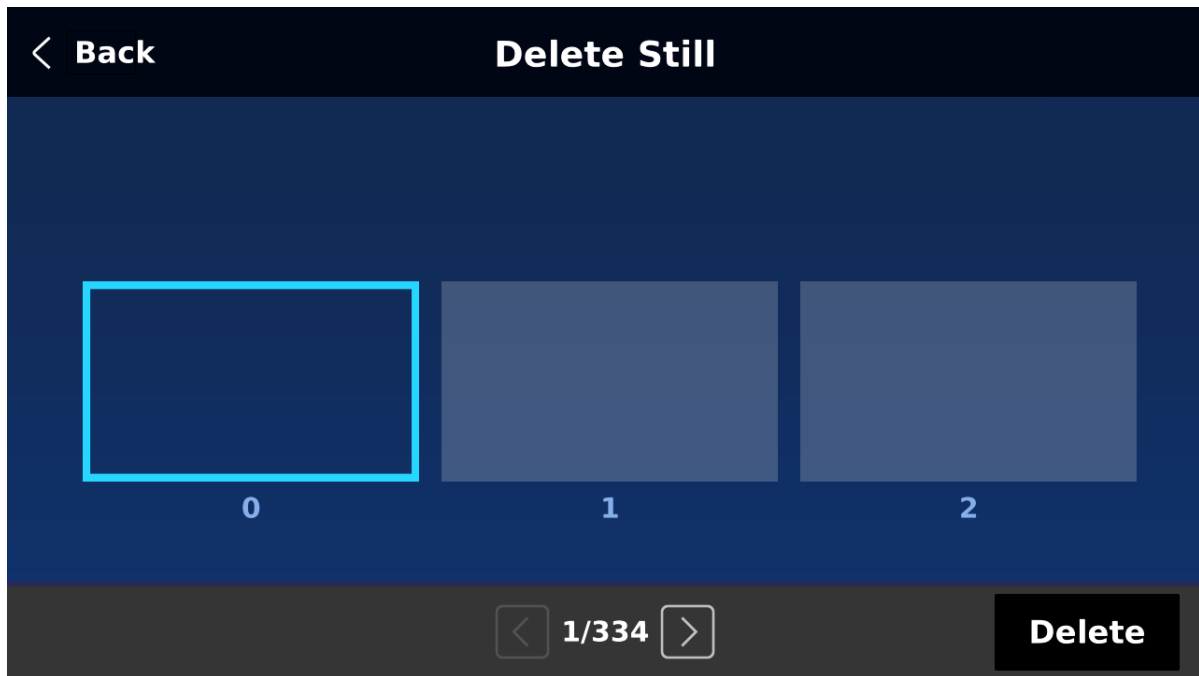


*Loading still images*

The HS-4000 allows the user to load still images saved on the machine to the Multiview screen. Please follow the steps outlined below to load the still picture.

1. Press the **FILES** button to open the menu on the 5 inch LCD screen.

2. Open the **Still** sub menu as shown below.
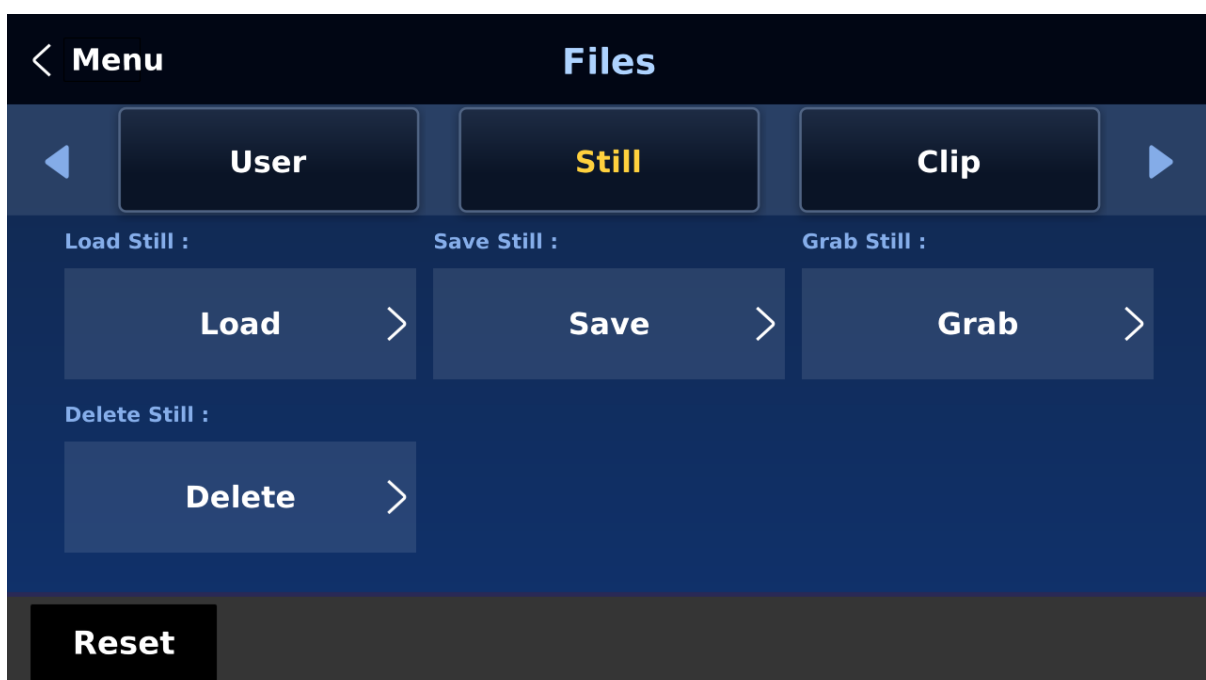
3. First select a destination to which the still picture will be loaded then the still picture. Lastly, tap **Load** to load the still picture to the selected destination.
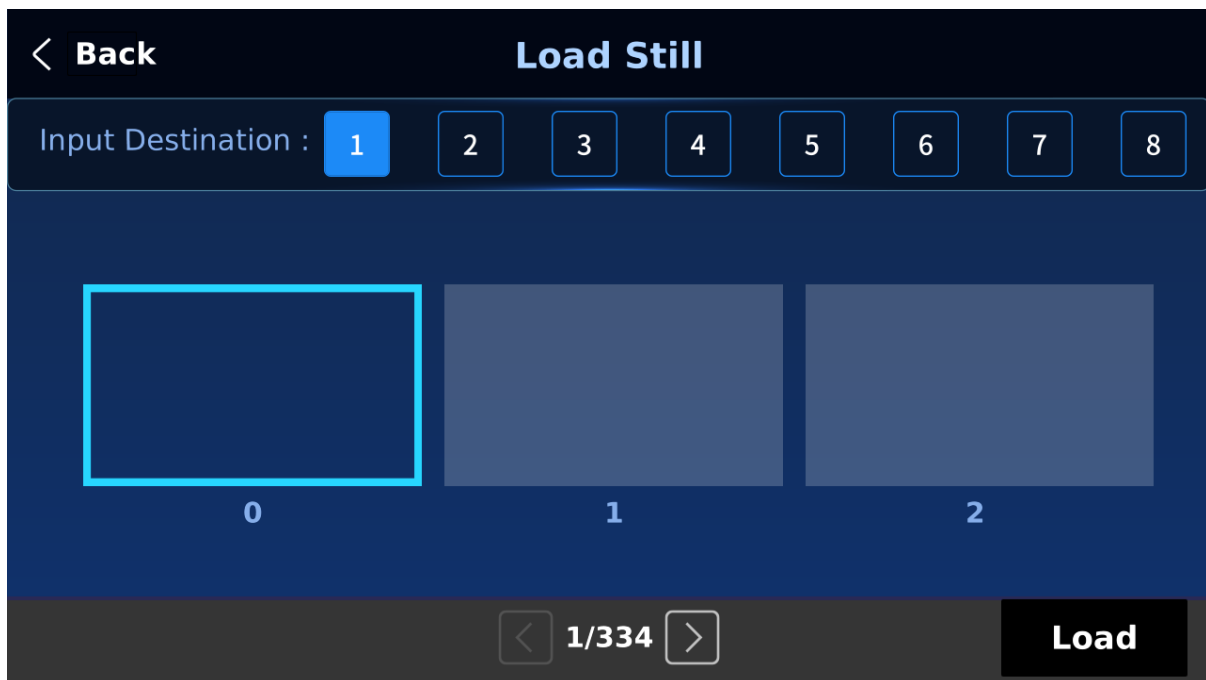


For more still functions such as file import from the PC or laptop, see _**Section 6.3 Managing Still Pictures**_.

### Stinger

The **Stinger** Transition Effect is currently under development and will be added in future firmware upgrades.
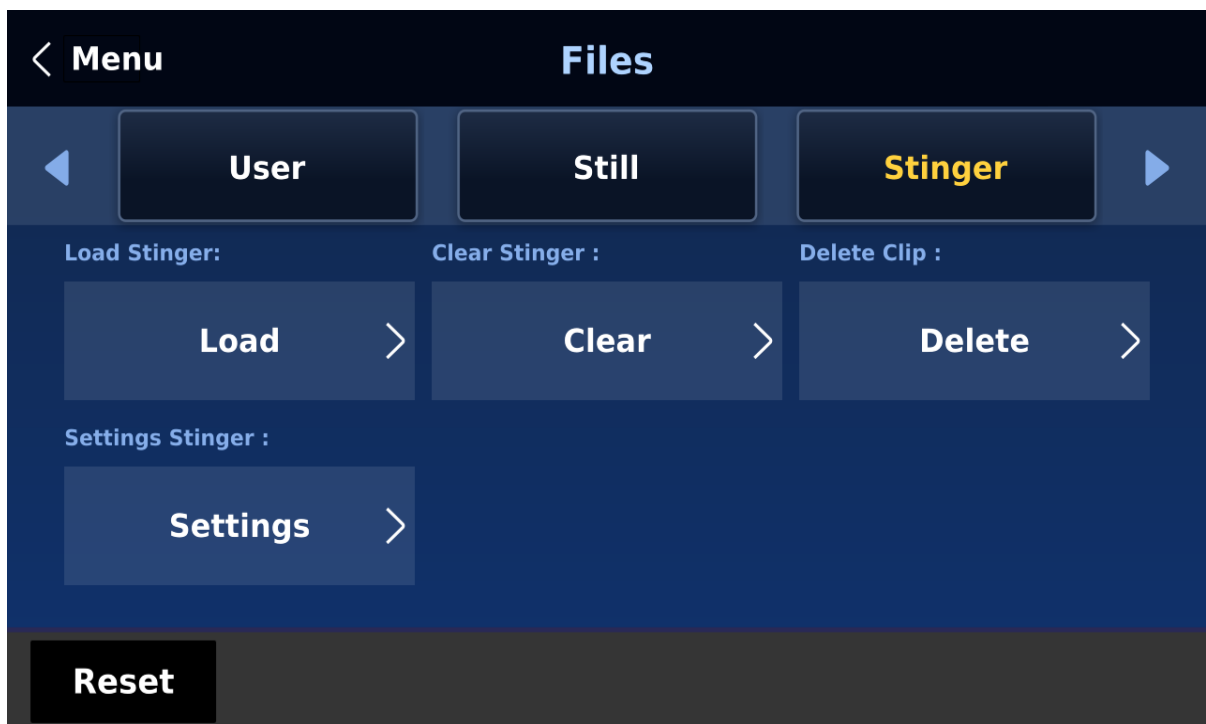
### Logo

Logo is a still image pre-loaded to the logo buffer (Logo 1/2). The **Logo** menu allows users to load logo pictures from the machine's internal memory to the logo buffer, save logo pictures to the machine's internal memory, view thumbnail logo pictures and adjust the logo positions.
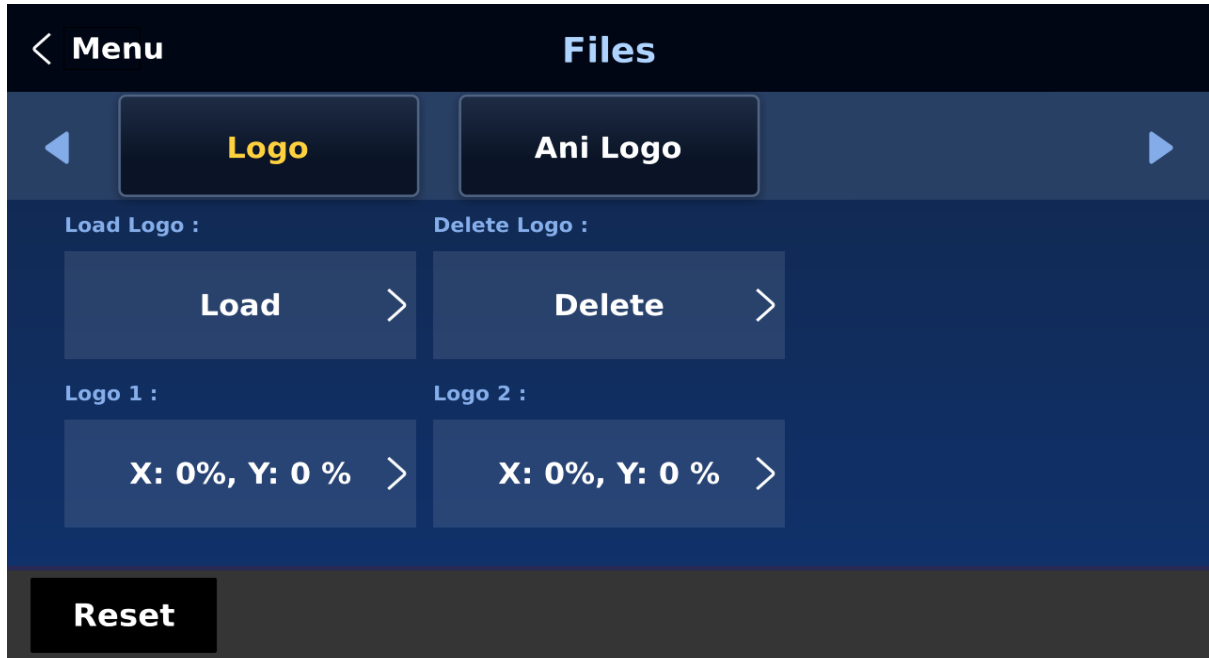


### Load Logo

Upon selecting "**Load Logo**", the user can then choose the memory location from which the still logo image is loaded. The system memory can store up to 1000 still logo images.

Select "**Load**" to load the logo to the chosen destination (Logo 1/Logo 2).
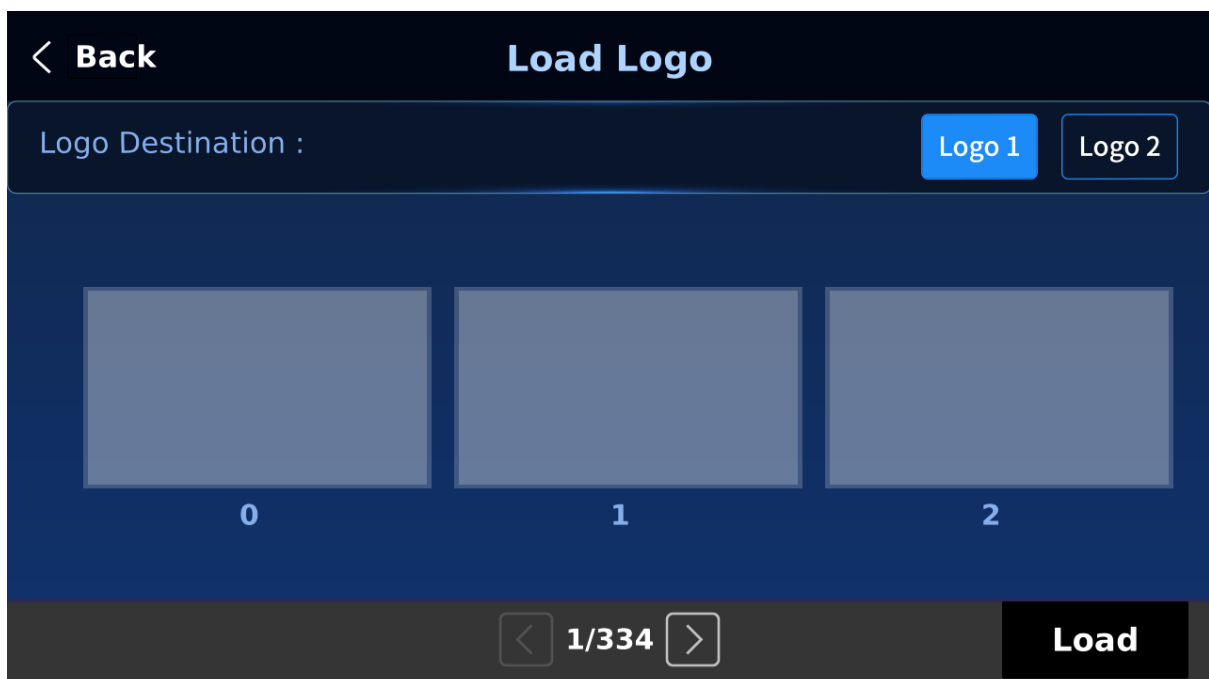


**Note: To import custom logos from your computer, see *Section 6.4 Enabling Still Logo* for instructions.**

### Clear Logo

To clear the loaded logo from the buffer (Logo 1/2), simply select "**Clear Logo**."

### Delete Logo

First move to a memory location, then select "**Delete**" to remove the still logo from the selected memory location.



### Positioning

The logo can be manually positioned by adjusting its XY coordinates. Note that the origin of the coordinate system is at the center of the screen.

**X**: A positive value indicates that the logo is in the right half of the screen and a negative value indicates that the logo is in the left half of the screen.

**Y**: A positive value indicates that the logo is in the top half of the screen and a negative value indicates that the logo is in the bottom half of the screen.

## Ani Logo

Ani Logo is an animated logo pre-loaded to the logo buffer (Logo 1/2). The **Ani Logo** menu allows users to load animated logo from the machine's internal memory to the logo buffer, save animated logo to the machine's internal memory, view thumbnail images and adjust logo position.
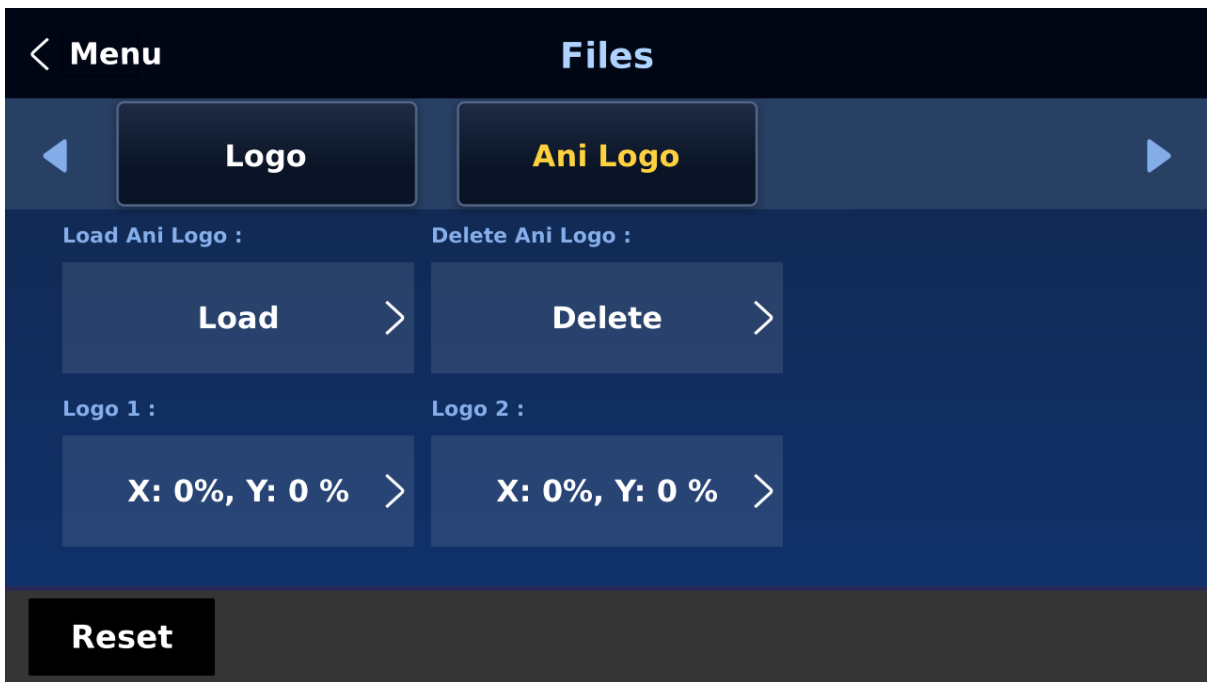
*Load Ani Logo*

Upon selecting "**Load Ani Logo**", the user can then choose the memory location from which the animated logo is loaded. The system memory can store up to 1000 logo animations.

Select "**Load**" to load the animated logo to the chosen destination (Logo 1/Logo 2).



Note: To import custom logo animations from your computer, see *chapter 6.6 Enabling Logo Animation* for instructions.

*Clear Ani Logo*

To clear the loaded logo animation from the buffer (Logo 1/2), simply select "**Clear Ani Logo**."

### Delete Ani Logo

First move to a memory location, then select "**Delete**" to remove the animated logo from the selected memory location.



### Positioning

The animated logo can be manually positioned by adjusting its XY coordinates. Note that the origin of the coordinate system is at the center of the screen.

**X**: A positive value indicates that the animated logo is in the right half of the screen and a negative value indicates that the animated logo is in the left half of the screen.

**Y**: A positive value indicates that the animated logo is in the top half of the screen and a negative value indicates that the animated logo is in the bottom half of the screen.

## 5.9 Setup

In the "**Setup**" menu, the user can change the **resolution**, reset the HS-4000 to its **Factory Default** values, enable/disable **Auto Save**, choose the preferred menu **language**, **upgrade firmware** and view the **current firmware versions** (Interface, Mainboard and Keyboard).

### Standard

This option allows the user to choose the appropriate output resolution. Once done, simply select "Save" to confirm the selected output resolution. The available resolutions are 4K/60/59.94/50/30/29.97/25 and 1080p/60/59.94/50/30/29.97/25.

**Note: If you've selected 1080p for the output resolution, all inputs should have a resolution of 1080p as well.**
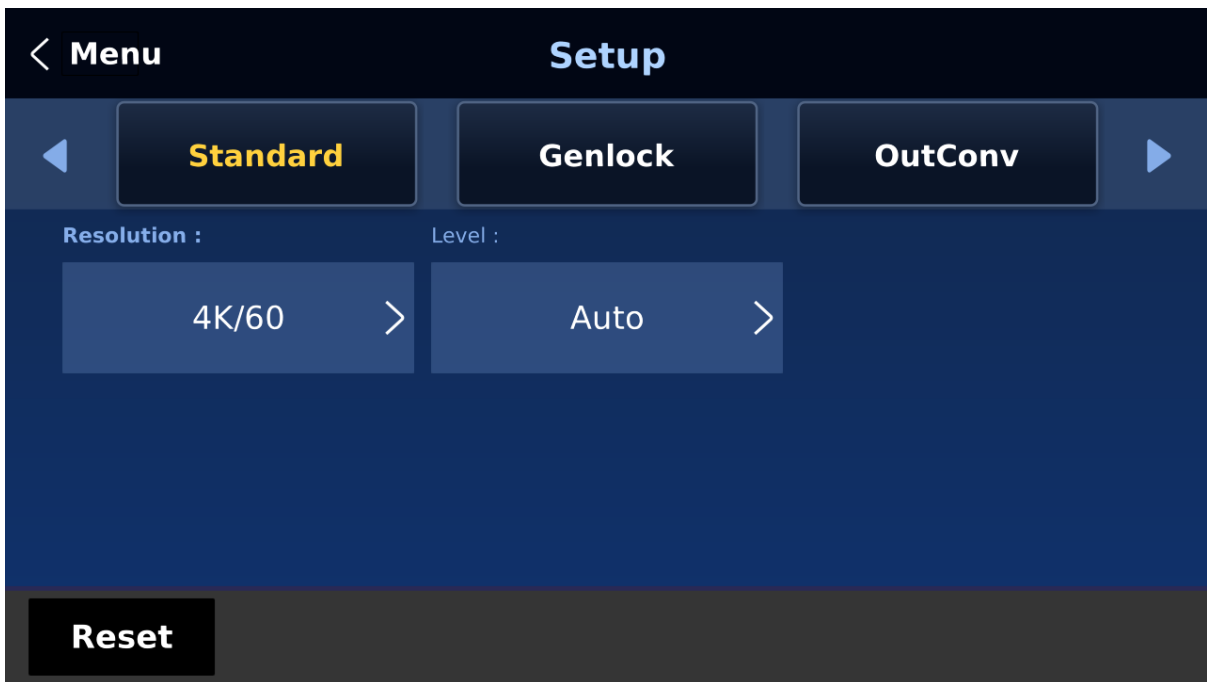
**Level**

There are two different audio standards available for selection. The user can either select the EBU or SMPTE standard. By selecting AUTO allows the device to automatically detect the audio standard.

**Note:** When the image is 50 Hz, the audio follows EBU standard and when the image is 59.94/60 Hz, the audio follows SMPTE standard.

## *Genlock*

**Genlock** is an external sync setting. **Ref IN/OUT** port receives external sync which can either be **Tri-Level** or **Black Burst** signal. **Please note that resolutions of 1080i and 720p are not appropriate for Black Burst Sync.**
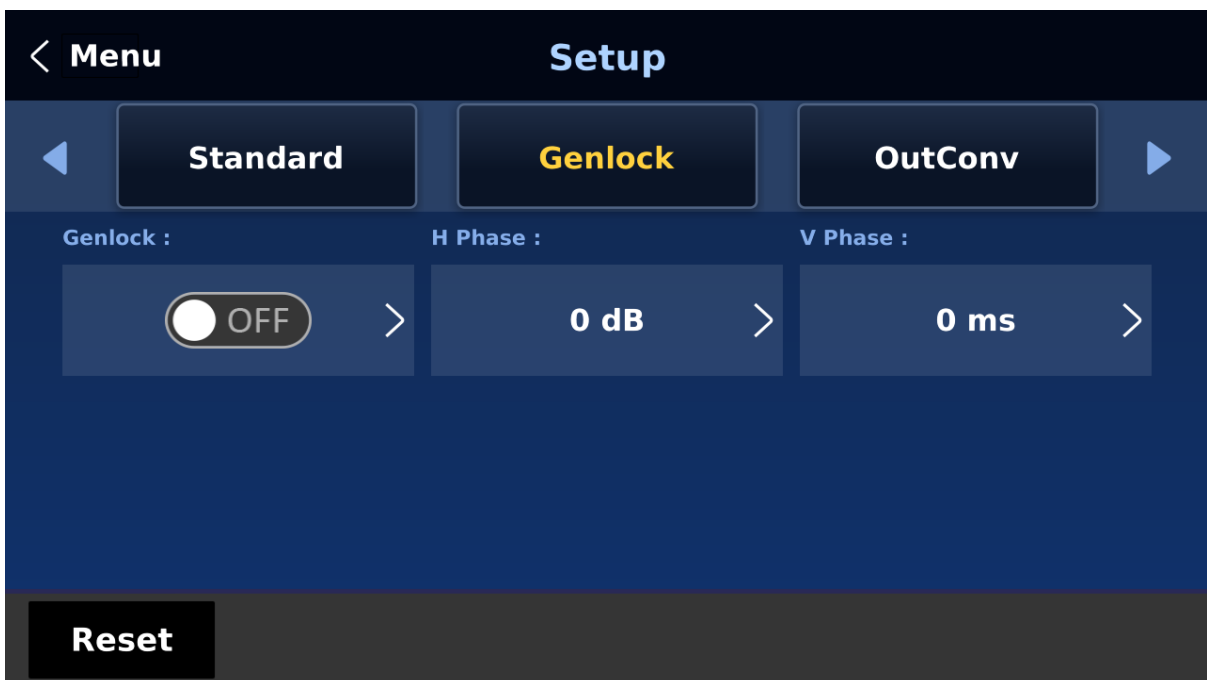
Enable genlock to allow the switcher to receive external sync, then adjust its H and V phases accordingly. H phase ranges from -2190 to +2190 ms and V phase ranges between -1124 and +1124. A positive value sets sync signal leading and a negative value sets sync signal lagging.

## *OutConv*

When the video output resolution is set to 4K, OutConv allows you to downconvert the resolution of SDI video output port 4 to 1080i or 1080p.



## *Keyboard*

In **Keyboard**, you will be allowed to adjust the keyboard brightness with 7 being the brightest and 1 being the dimmest.
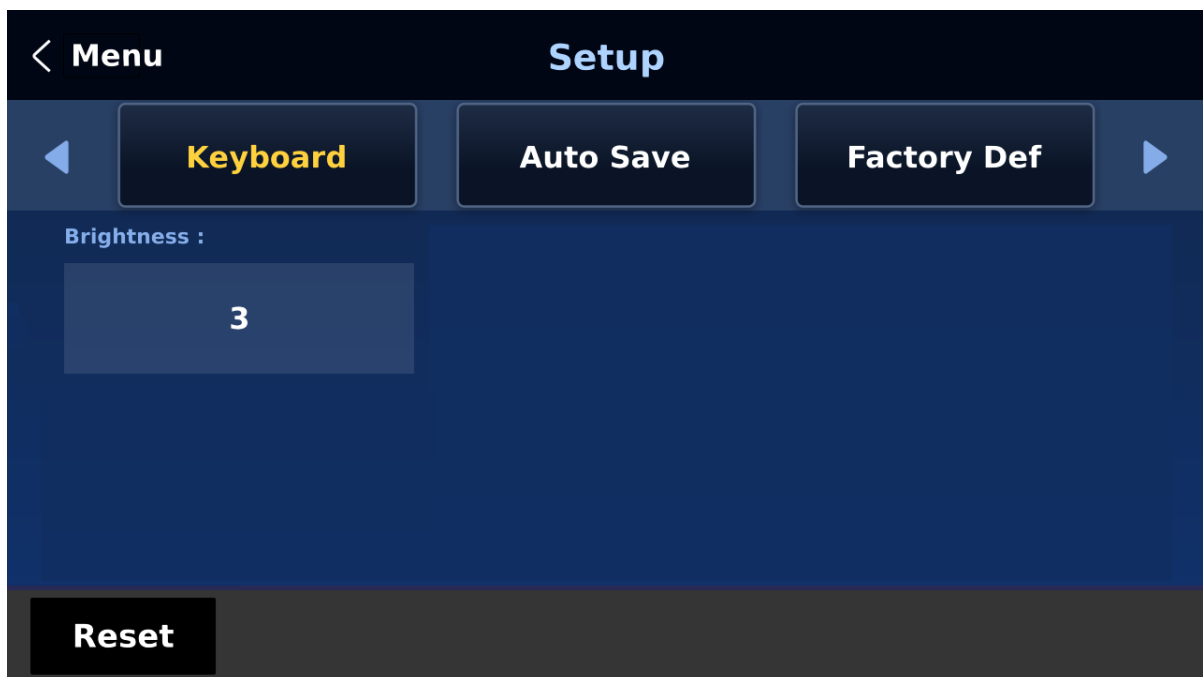
## Auto Save

When enabled, your last settings will be automatically saved within 5-10 seconds after exiting the GUI menu. Do not shut down your machine during this time. At the next boot, the machine will automatically load the last saved settings. Note that **Still Load** also triggers auto save.
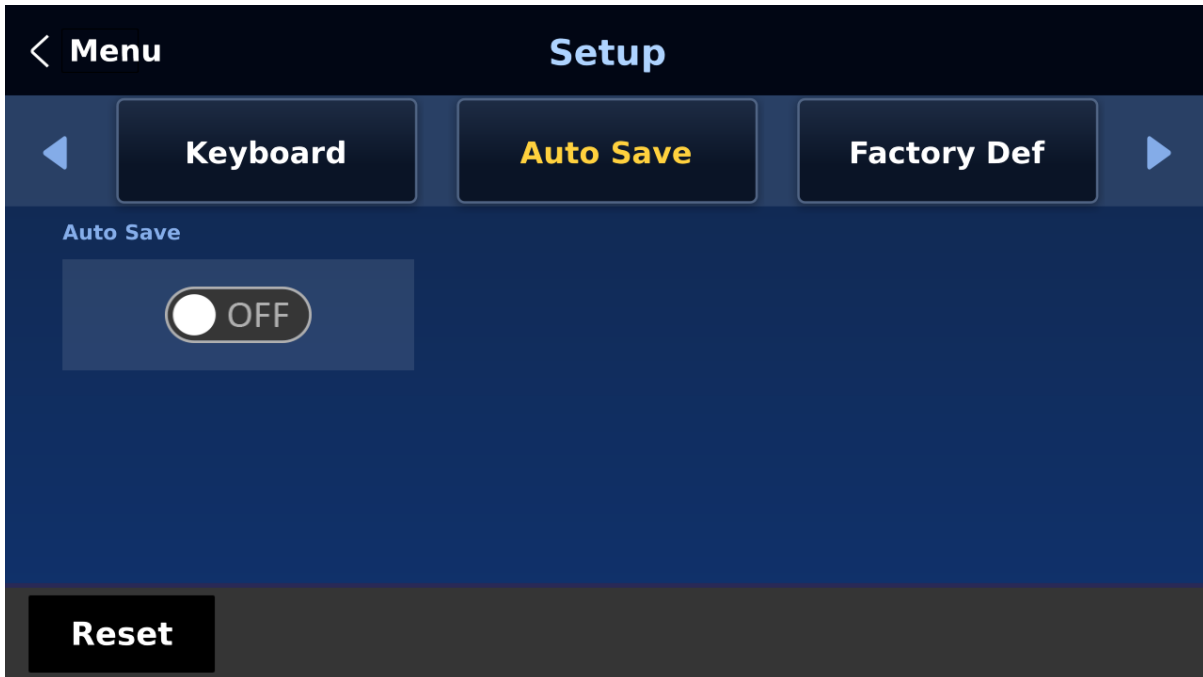


Note: The **Auto Save** function does not instantly save new settings; it is only activated 5 to 10 seconds after exiting the GUI menu. This is to avoid adverse effects on the smoothness of operation.

The **Auto Save** function does not apply to resolution setting. To change the HS-4000's resolution, go to "**GUI Menu/Setup/Standard**" then select "Save Setup" to save the new resolution setting.

## Factory Def
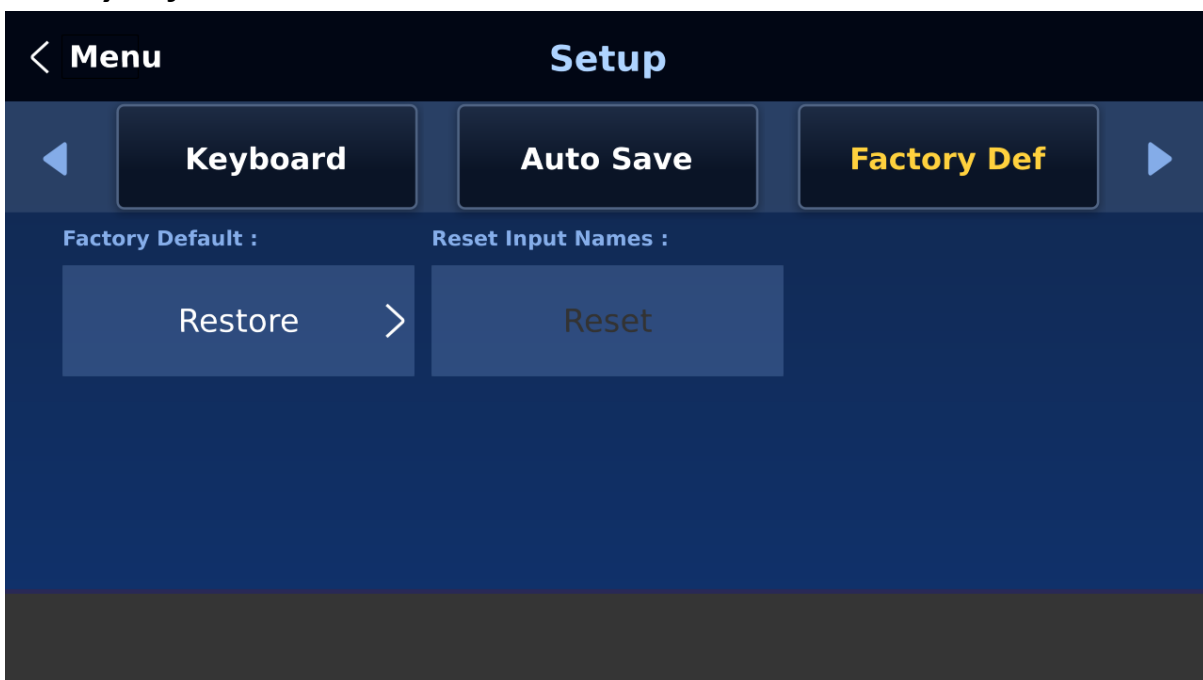
**Factory Default**: Tap Restore to reset the machine to factory default settings.

**Reset Input Names:** Tap Reset to reset the Multiviewer labels (Input 1-8).

### *Language*

The available GUI languages are English, Traditional Chinese and Simplified Chinese.



### *Network*

The Network sub menu allows you to view and set the switcher's IP address. See *Section 2.2* for network setup.



**DHCP:** The available network connection modes are **DHCP** and **Static.** The default connection mode is **Static** (DHCP turned off). The HS-4000's default IP address is **192.168.100.101**.

**IP Address:** Tap to open a numeric keypad then manually enter the IP address if **DHCP** is turned off (Static IP mode).

**Network Mask:** Tap to open a numeric keypad then manually enter the network mask if **DHCP** is turned off.

On the numeric keypad, select Cancel to close the keypad without saving the changes made and OK to save the IP address entered.

**Network Def: resets network settings to factory defaults.  Default settings are listed below.**
- DHCP: Off
- IP Address: 192.168.100.101
- Network Mask: 255.255.255.0

Once all settings are entered, tap Save to save all changes made and reboot the device to apply the new network settings.

Please note that you can also use a needle to push the reset hole next to the USB FW Upgrade port to restore the default IP address. Push the reset button then hold for about 5 to 10 seconds until the machine reboots itself to restore the IP address to 192.168.100.101.

## *Software*

This Software sub menu allows the user to perform a firmware upgrade when the USB storage device containing the latest firmware file is inserted. Tap **Upgrade** to start the firmware upgrade process. Refer to *Appendix 5* for more details. You can also view version numbers of various software.

# Chapter 6   Basic Operation

The switcher's control panel is the main control interface for the user to select video sources and take them to air during live production. On the control panel, the user will be allowed to select the transition style, enable/disable various keyers, and add logos to the program view.

The GUI allows the user to adjust transition settings, configure chroma keyers and PIP windows, assign inputs and outputs and modify audio parameters.

This chapter describes how you can switch video sources on the control panel using simple operations.

## 6.1 Video Switching

First let's learn the basics of video switching.

### *Program and Preview rows*

The Program row of buttons is typically used to select the switcher's main Program output image. The selected source sent to the Program outputs will be **backlit Red** on this row. Simple cuts between sources can be performed on this row by pressing the source number required for the next shot.
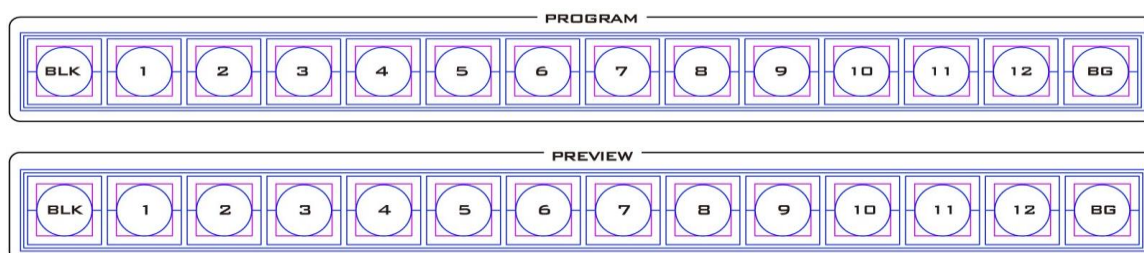


The Preview row of buttons is typically used to select the switcher's Preview or Next source output image. The selected source will be **backlit Green** on this row. You can transition between Preview and Program using the **T-Bar**, the **CUT** button or the **AUTO** button.

*Note: The keys on the Program and Preview rows will still be active while the T-Bar is moving.*

### *Source Row*

The HS-4000 allows you to simultaneously activate 8 live channels out of the available 12 input channels. As a result, channels 3/4/7/8 are designed to be shared channels, allowing you to switch between SDI and HDMI input ports (see the input video port labels at the rear of the switcher). In addition, you can also customize the output channels.

Use the Source row of buttons to switch between SDI and HDMI interfaces for shared input channels 3/4/7/8. You can also assign different video sources to the output channels by making a selection along the Source row of buttons.
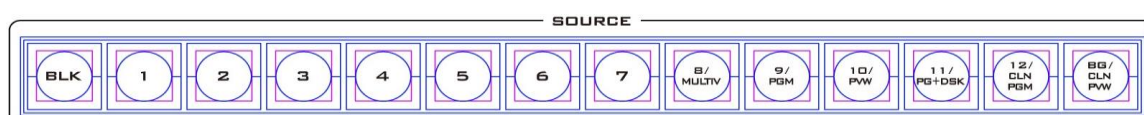
The Source row of buttons must be used with the SHIFT and AUX buttons. See the following for detailed descriptions.

Follow the steps below to switch the input interface for the shared channels (3/4/7/8):

1. Press the **SHIFT** button, buttons 3/4/7/8 along the Source row should illuminate.

2. Press one of the illuminated buttons (3/4/7/8) to switch between SDI and HDMI interfaces.

3. Press the **SHIFT** button again to exit.

Follow the steps below to customize the output channels:

1. Press the AUX button to start assigning your output videos.

2. Buttons 1-7 of the Preview row should turn green and they correspond to SDI outputs 1 – 4 and HDMI outputs 1 – 3. The selected channel should turn blinking green.

3. The blinking blue or green button along the Source row indicates the video source selected for the corresponding SDI or HDMI output. To change to another video source, simply press the corresponding button.

4. For composite buttons, press the BLK button to switch to another set of alternative video sources.

5. Push the AUX button again to exit.

### Black and Background MATTE View
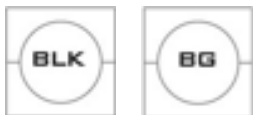
The **BLK/BG** button allows the user to switch between a black background, and a matte colour on Program and Preview screens.

The MATTE color can be configured in the GUI menu. Simply go to '**Start**' → '**Matte**' and then adjust **Luma**, **Saturation** and **Hue**.

For **Hue** value, **Red** is 0, **Green** is approximately 120 and **Blue** is approximately 240. For secondary colors, **Yellow** is approximately 60, **Cyan** is approximately 180 and **Violet** is approximately 300.

The **Sat** or **Saturation value** refers to the intensity of the color selected in **Hue**. As the saturation increases, the color appears to be more pure. As the saturation decreases, the color appears to be more washed-out or pale.

**The Luma value** relates to how bright or dark the selected color or hue is. The higher the **Luma** value, the brighter the color selected in **Hue**.

## 6.2 Transitions

The **Transitions** group of buttons allows the user to decide how to bring the selected Preview / Next source image to the Program output. The HS-4000 user can decide to use a **CUT, MIX, WIPE** or **Stinger (Animated Effect)** transition.

**Note: The Stinger transition is currently under development so the function cannot be used.**

## CUT Button

The **CUT** button is used to immediately switch between the currently selected Program and Preview sources.

## MIX Button

The **MIX** button is selected when a dissolve or fade transition between the selected Program and Preview sources is required. This **MIX** transition is produced by then moving the **T-Bar** manually or by pressing the **AUTO TRANS** button. To configure the mix transition time, open the GUI, then the **Start** menu, and modify the **M/E** value in the **Transition** sub menu accordingly.

| Program View Before Transition | Transition in Progress (MIX Effect) | Program View After Transition |
|---|---|---|
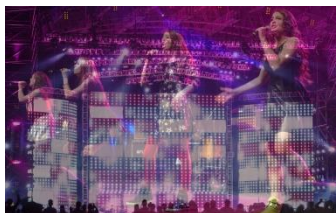


## WIPE Button

The **WIPE** button is selected when a 2D wipe transition between the selected Program and Preview sources is required. This WIPE transition effect is produced by then moving the **T-Bar** manually or by pressing the **AUTO** button. Follow the menu path **GUI menu → Start → WIPE Effects → WIPE** to select the 2D WIPE style.

| Program View Before Transition | Transition in Progress (WIPE Effect) | Program View After Transition |
|---|---|---|



## Stinger Button

Press the **Stinger** button to enable the Stinger transition mode.

The Stinger Transition Effect is basically an animated effect added during transition of two video sources. The animated effect is generated by a clip file which consists of a series of sequential files in **bmp/jpg/png/pic** formats. The Stinger transition is produced by then moving the **T-Bar** manually or by pressing the **AUTO** button.

**Note: The Stinger transition is currently under development so the button cannot be used.**

### FTB Button

The **FTB** button (Fade To Black) fades the current video program source to black. When pressed again it acts in reverse from complete black to the currently selected program video source. To set the transition time, open the GUI menu, then the **Start** menu, and modify the FTB value accordingly.

### T-Bar
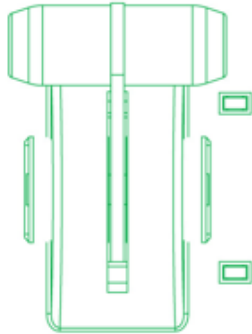
This performs a manually controlled transition from the current program source to the selected preview source. The selected transition wipe, dissolve or animation will be used. When the **T-Bar** has travelled as far as it can go, the transition between sources is complete.  Please note that the **T-Bar** can be operated bi-directionally.

The **T-Bar** has indicators next to it, which light when the transition is in progress indicating the direction of operation and is off after the transition is complete.

You may want to re-calibrate the T-Bar if you find it working incorrectly. See the section on **T-Bar Calibration** for instructions.

### AUTO Button

The **AUTO** button can sometimes be used instead of the manually operated **T-Bar** to automatically perform the complete selected transition between Program and Preview over a set period. The **M/E** value in the **START** menu is used here. See **Section 5.1** for setting the M/E value.

### Trans BG

Turning on the Trans BG button allows you to activate the MIX, WIPE or Stinger transition with the background image/video.

When on (backlit red), the background image/video will be included in any chosen transition from Preview to Program. When this button is toggled, or switched off, any Keyer transition chosen will not change the background Program image/video.

### Trans PVW

It is possible to see or test the effect of a chosen **MIX**, **WIPE** or **Stinger** transition on the Preview Monitor before using it on the Program output.

Once the **TRANS PVW** button is ON, select and use the transition that you want to test on the Preview monitor. You will also notice that the Preview Monitor switches to the currently selected Program source when the **TRANS PVW** button is turned on. Do not worry, the chosen Preview source has not changed. Press the **AUTO** button or move the **T-Bar** manually to preview the chosen transition.

**NOTE: Remember to turn off the TRANS PVW button** before attempting to use the chosen transition on the Program output.

## *WIPE Selection MENU*

There are 32 different 2D WIPE effects to choose from when using the HS-4000 switcher. To select a different WIPE transition select a WIPE style in the **Start** Item of the GUI Menu (see the table below).  Before you make the selection, make sure the **TRANS BG** and **WIPE** buttons are enabled.
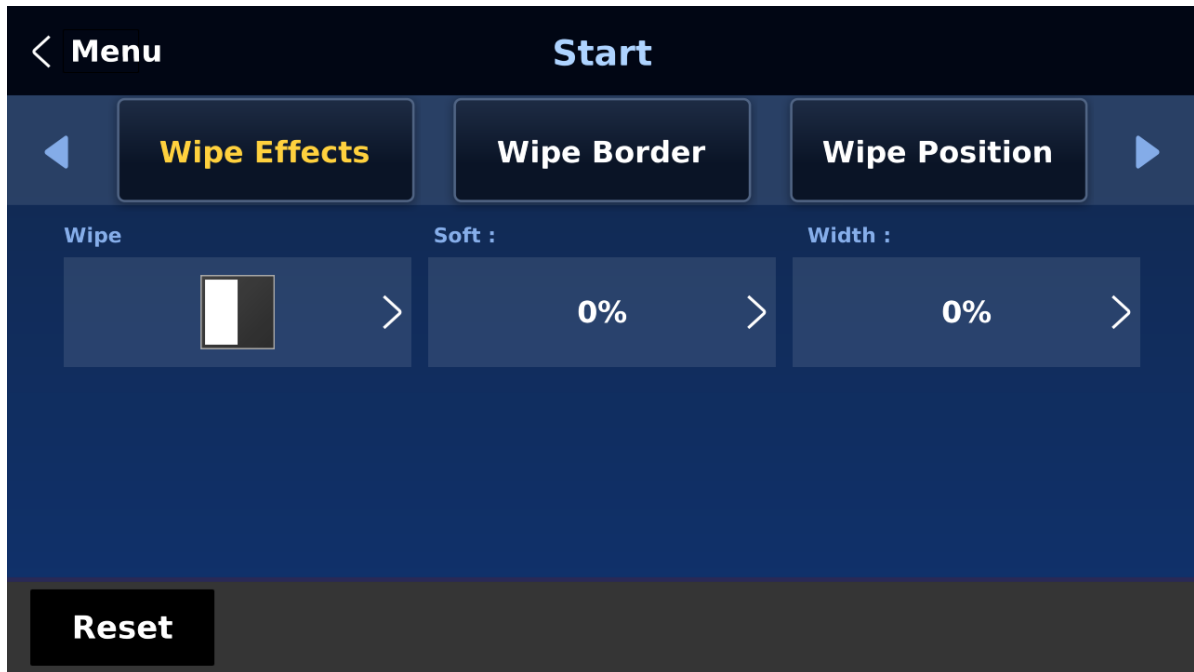


**Note:** Open the **GUI menu** by pressing the **HOME** button in the **MENU** area of the control panel.

To select a **WIPE** on the **GUI menu**, navigate to the **WIPE** option under **WIPE EFFECTS** and then select a **WIPE number**. Each WIPE transition also has flexible user options to tailor the look of the transition. All wipes have an optional colour border applied. The wipe border **width** and **colour** are also chosen within the menu system.

**Soft Value**
This value allows the 'inside' and 'outside' edge softness of the Wipe Border to be controlled. A low value makes a sharp or hard wipe edge. A large value results in a softer or diffused wipe edge.

**Width Value**
This value determines how wide the actual wipe effect is. A low value makes a narrow wipe. A large value makes a wider wipe.

**Hue, Sat and Luma values**
The colour of the Wipe Border Matte can also be controlled by adjusting the **Hue, Sat** and **Luma** values.

**Wipe Position**
Certain Wipes, such as the **Circle** and the **Oval Wipes**, allow the Wipe position to be controlled.
The **X value** allows the selected wipe to be offset to the left or right of the screen.
The **Y value** allows the selected wipe to be offset to the top or bottom of the screen.

## 6.3 Managing Still Pictures

On the HS-4000 Switcher, the user will be allowed to manipulate uncompressed still pictures with Grab and Frame Store functions. In this section, you will also be guided to load the stills saved on the switcher and display them on the monitor.

Each video channel of the HS-4000 has one frame store to which a still can be loaded, and the unit has enough storage space for up to 250 uncompressed stills.

### Grabbing & Saving a Still to Memory

The function is currently under development.

### Loading an existing Still from Memory

The function is currently under development.

### Deleting a saved Still from Memory

The function is currently under development.

### FS – Frame Store Button

 The HS-4000 has eight video channels and each of these channels has its own Frame Store, making a total of eight Frame Stores. Each of these Frame Stores can hold one still image. The FS button allows the user to call the still image into the production and toggle between that still image of the Frame Store and the live video input connected to that same video channel.

**How to choose live video input or Frame Store**
1. First press and hold down the FS button. The Preview row of input sources will flash green.
2. While still holding down the FS button, press the required input on the Preview row. For example, pressing button 1 switches the video channel to the still picture mode.
3. To return to the live video mode, simply press the channel button again.

This selection will also be confirmed on the Multi-view output, with the selected channel showing the live input or frame store image.

**Note: Before using the FS function, first make sure the still picture has been loaded to the input video channel. Refer to *Section 5.8* for instructions on loading still pictures.**

## 6.4 Enabling Still Logo

The HS-4000's logo function places a logo layer on your video. In this section, we will show you how to import still logo image to the switcher, load still logo image on the switcher as well as enabling the loaded still logo on Preview and Program Out.

The HS-4000 has enough storage space for up to 1000 uncompressed still logo pictures.

### *Loading an existing Logo from Memory*

The HS-4000 allows the user to load still logo from the machine's memory to the logo buffer (Logo 1 or 2), then press either Logo 1 or Logo 2 button to enable the loaded logo on both the Preview and Program Out. Follow the steps outlined below to load the desired still logo from memory.

1. Open the still logo sub menu in the Files menu.
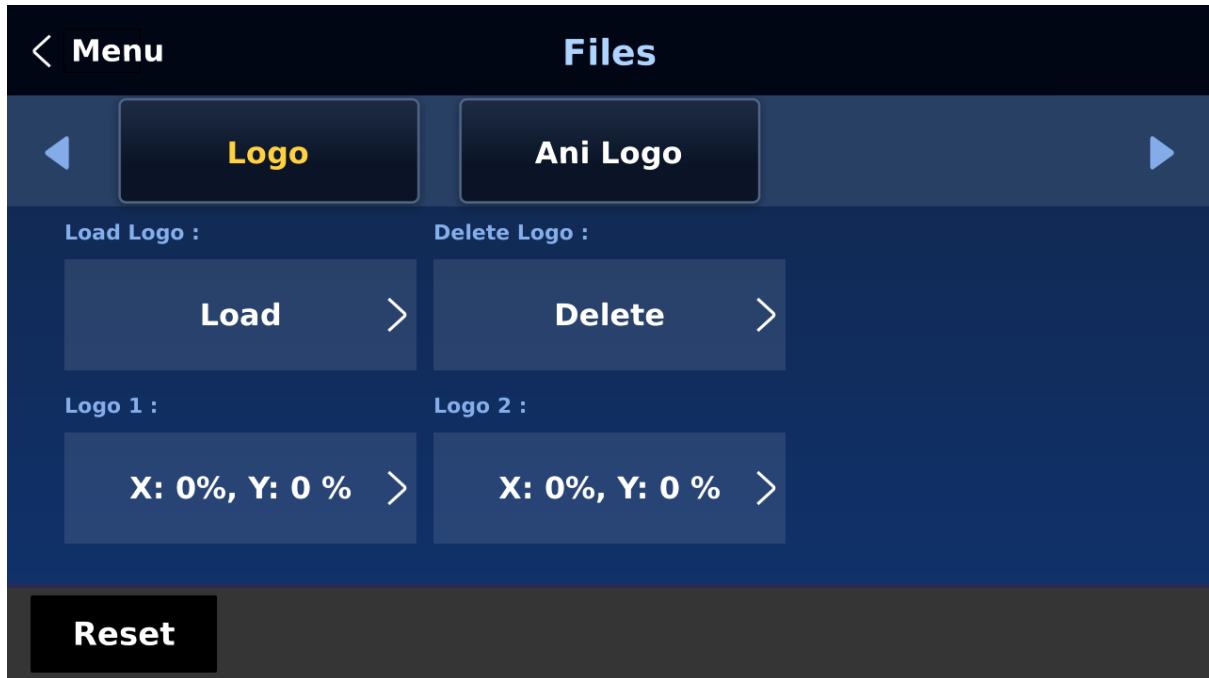


2. Tap **Load Logo**.



On the page shown above, you should find a thumbnail view of three logos. Use the right/left arrow buttons at the bottom of the page to browse all other logos which are shown in numerical order. Blank thumbnails are unused memory slots.

To load a still logo, simply select a logo buffer first then browse to a still logo number and lastly select **'Load'**. The selected still logo should be loaded into the selected buffer.

To adjust the logo position, simply change the **X** and **Y** values of the respective logo buffer which can be found at the bottom of the **Logo** menu.

Selecting "**Clear Logo**" clears the logo buffer. Selection of "**Delete Logo**" removes the logo from the selected memory slot.

### Importing Still Logo from the PC

The Switcher Image Import/Export software (**SwitcherImageImEx_vx.x.x.msi**) allows the user to import still logos from the PC to a designated memory slot of the switcher. **The software installation package can be downloaded from the product page.**

**Note: A standard still logo is basically a still picture with an aspect ratio limited to 480x1080.**

See for installation instructions and network configuration.

### How to use

1. Open the Switcher Image Import/Export Program and make sure the **Connect Status** shows "**Connected**" (shows **Not Connected** if disconnected).
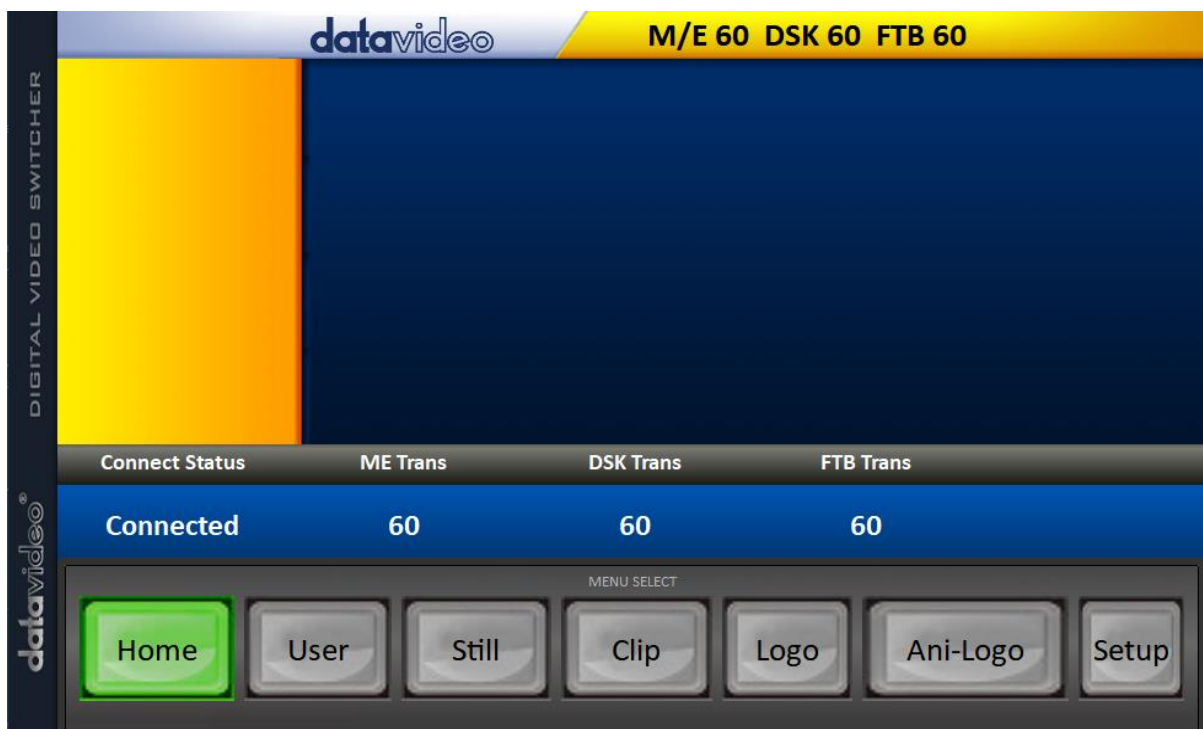
2. Clicking the **Logo** button to view logo thumbnails and import logos from your PC to the switcher.



3. Click "**Logo**" number then enter a memory slot number. Click **"Import Logo"** to open the file browser window and browse to the file that you would like to import.

4. Select the logo file that you would like to import. **Note that the aspect ratio is limited to 480x1080**.

5. Check on the program's Logo page to make sure that the logo has been imported successfully.

6. After successfully importing the logo into the switcher, you will then be able to start loading the new logo to the buffer. To enable the logo on Preview and Program Out, press the respective Logo buttons.

## 6.5 Enabling Logo Animation

The HS-4000's logo animation function places an animated logo layer on your video. Each animated logo consists of a series of 120 sequential files in bmp, jpg, png or pic format. Every image file is limited to an aspect ratio of 480x270.

In this section, we will show you how to import animated logo to the switcher, load animated logo on the switcher as well as enabling the loaded animated logo on Preview and Program Out.

**Note: The HS-4000 has enough storage space for up to 1000 uncompressed animated logo.**

### *Loading an existing Ani-Logo from Memory*

The HS-4000 allows the user to load ani logo from the machine's memory to the logo buffer (Logo 1 or 2), then press either Logo 1 or Logo 2 button to enable the loaded ani logo on both the Preview and Program Out. Follow the steps outlined below to load the desired ani logo from memory.

1. Open the ani logo sub menu in the Files menu.
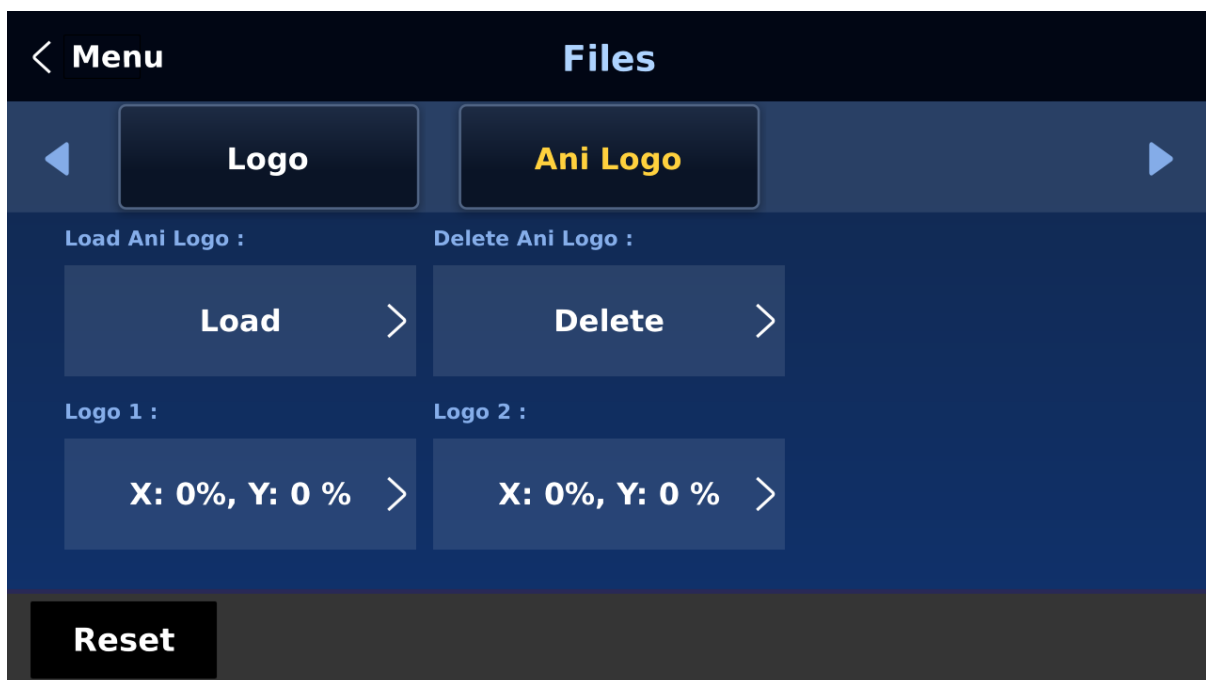
2. Tap **Load Ani Logo**.



On the page shown above, you should find a thumbnail view of three animated logos. Use the right/left arrow buttons at the bottom of the page to browse all other animated logos which are shown in numerical order. Blank thumbnails are unused memory slots.

To load an animated logo, simply select a logo buffer first then browse to an ani logo number and lastly select **'Load'**. The selected animated logo will be loaded into the selected buffer.

To adjust the animated logo position, simply change the **X** and **Y** values of the respective logo buffer which can be found at the bottom of the **Ani Logo** menu.

Selecting "**Clear Logo**" clears the logo buffer. Selection of "**Delete Logo**" removes the animated logo from the selected memory slot.

## *Importing Animated Logo from the PC*

The Switcher Image Import/Export software (**SwitcherImageImEx_vx.x.x.msi**) allows the user to import animated logos from the PC to a designated memory slot of the switcher. **The software installation package can be downloaded from the product page.**

**Note: Each animated logo consists of a series of 120 sequential files in bmp, jpg, png or pic format. Every image file is limited to an aspect ratio of 480x270.**

See *Chapter 4* for installation instructions and network configuration.

***How to use***

1. Open the Switcher Image Import/Export Program and make sure the **Connect Status** shows "**Connected**" (shows **Not Connected** if disconnected).
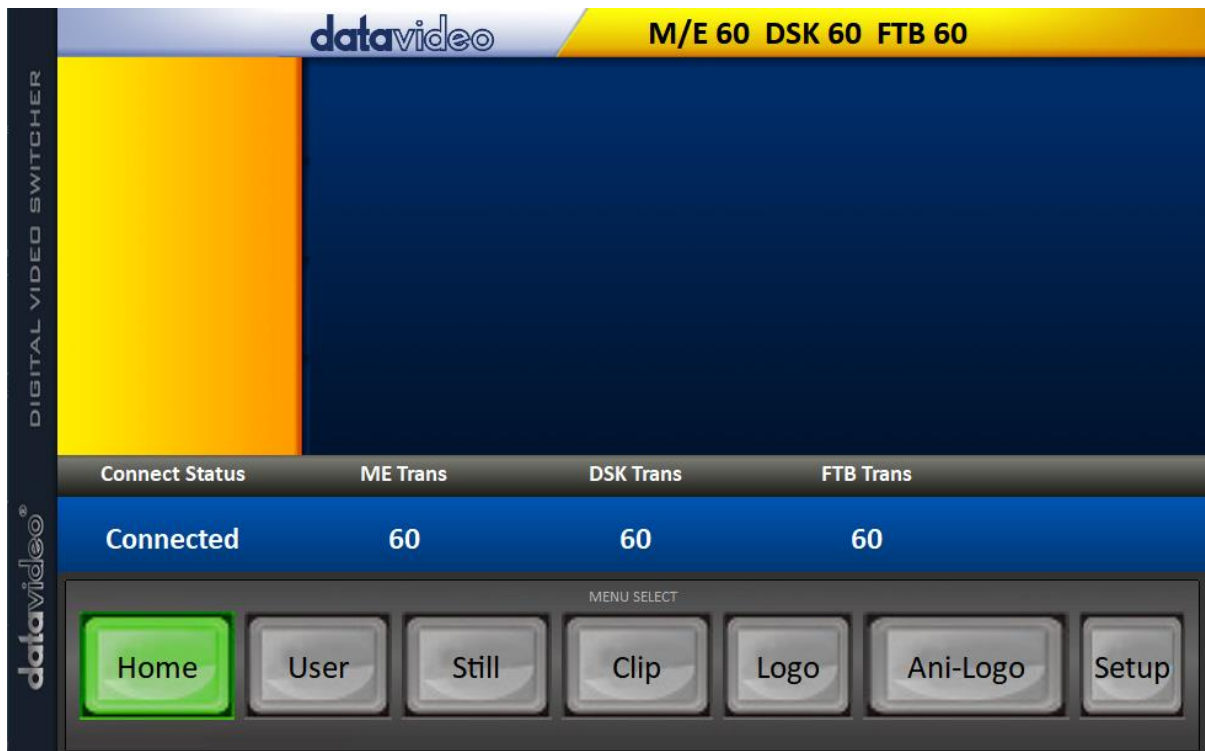


2. Clicking the **Ani-Logo** button to view animated logo thumbnails and import animated logos from your PC to the switcher.



3. Click "**Ani Logo**" number then enter a memory slot number. Click **"Import Ani-Logo"** to open the file browser window and browse to the file that you would like to import.

4. Select the animated logo file at the zeroth location so upon file import, the program will then link all images up into a sequential animation file. If your files are not the .pic format, they will be automatically converted to .pic format by the program first.

5. Check on the program's Ani Logo page to make sure that the animated logo has been imported successfully.
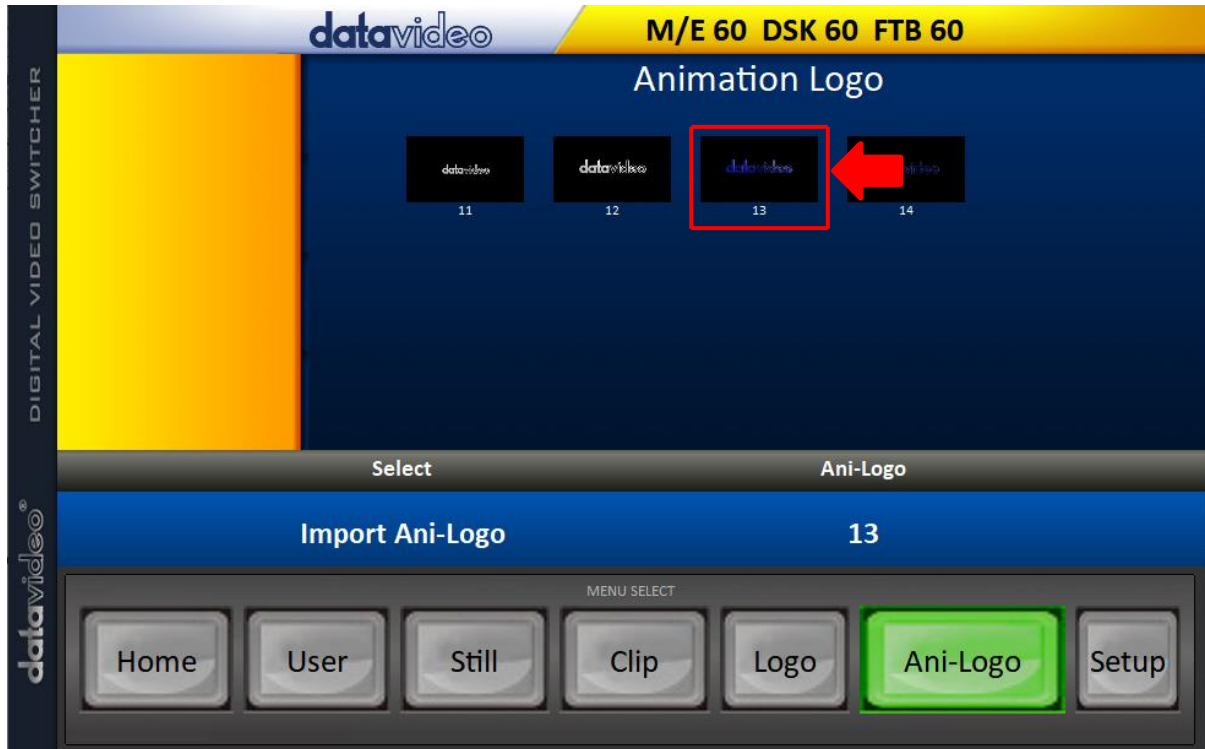


6. After successfully importing the animated logo into the switcher, you will then be able to start loading the new animated logo to the buffer. To enable the animated logo on Preview and Program Out, press the Logo button.

# Chapter 7    Advanced Operation

The HS-4000 is a High Definition Portable Video Studio. As well as mixing video and audio sources, it has additional functions such as Picture In Picture (PIP), DSK, LUMA KEY, Chroma Key and Logos.

Before attempting to use the HS-4000's PIP, DSK LUMA KEY and LOGO functions it may help to first understand the order of the video layers at the HS-4000 Program (PGM) outputs.
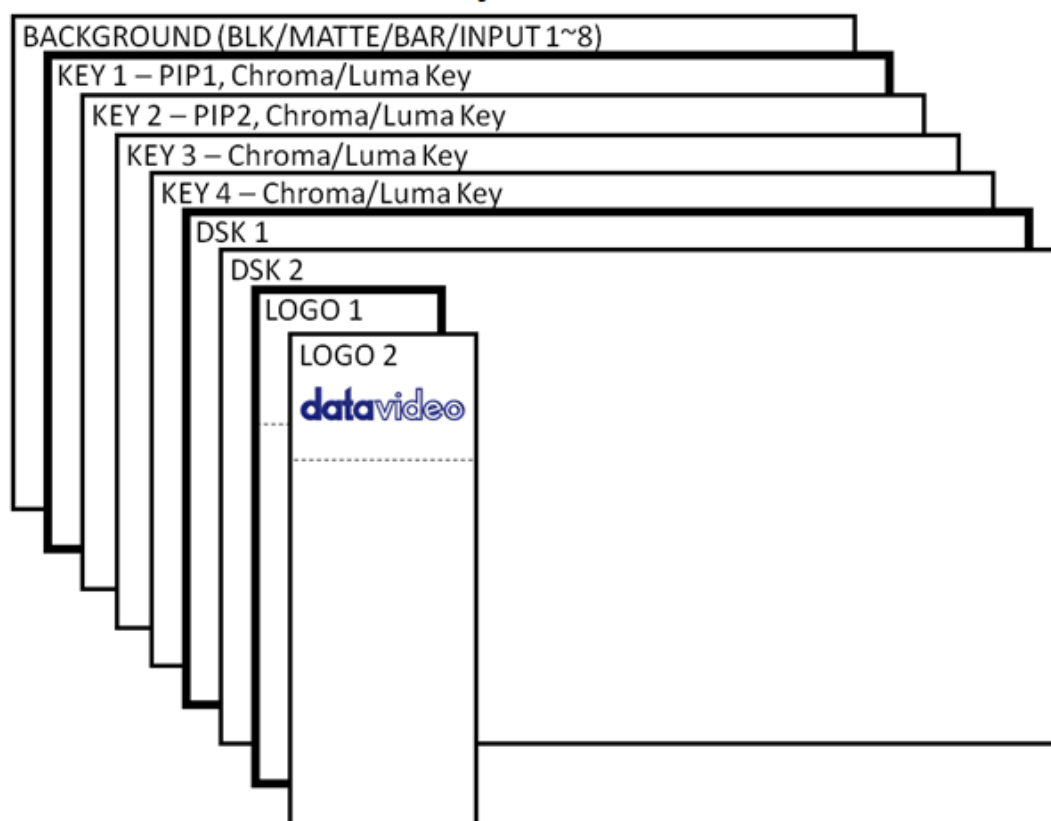


When logos 1 and 2 are enabled on PROGRAM and PREVIEW windows at the same time, you will be allowed to select two types of logos.

- Standard logo: max size of 480 x 1080 (1 still frame)
- Animated logo: max size of 480 x 270 (dynamic made up of 120 frames)

The **Background video layer** is the normal video layer **(black screen, color matte, color bars, inputs 1-8)** when mixing and switching with the HS-4000. It occupies the whole screen area of the Program output. This layer can be hidden or partly hidden by the PIP, DSK and LOGO layers in front of it.

The **Key 1 layer (PIP1, chroma key or luma key)** does not occupy the whole screen and is shown in front of the Background video layer when enabled.

The **Key 2 layer (PIP2, chroma key or luma key)** does not occupy the whole screen and is shown in front of the Background video and Key 1 layers when enabled.

The **Key 3 layer (chroma key or luma key)** does not occupy the whole screen and is shown in front of the Background video, Key 1 and Key 2 layers when enabled.

The **Key 4 layer (chroma key or luma key)** does not occupy the whole screen and is shown in front of the Background video, Key 1, Key 2 and Key 3 layers when enabled.

In some setups the Key image can be hidden behind other key images. This is not a fault. Change the position or size of the Key image if required.

The **DSK 1 layer** can occupy the whole screen. If set up incorrectly this layer can stop the video layers behind it from being seen properly. Re-adjust your DSK 1 settings or switch off the DSK1 function on the HS-4000 to restore the video behind it.

The **DSK 2 layer** can occupy the whole screen. If set up incorrectly this layer can stop the video layers behind it from being seen properly. Re-adjust your DSK 2 settings or switch off the DSK2 function on the HS-4000 to restore the video behind it.

The logo layer is the uppermost layer. If the standard logo (still) is chosen, the maximum logo size will be restricted to 480x1080. If the animated logo (dynamic) is chosen, the logo will be confined within 480x270.

*Note:* Where possible prepare and position the upper video layer elements in advance of the live production starting to avoid them appearing on the program output incorrectly.

Most broadcast networks have guidelines and advice on the use of video, images, music, logos and on screen text so it is best to check beforehand when planning a production. Do not use copyright protected content until you have the relevant permissions. Information on royalty free video, images and music is widely available, speak to your local dealer or search for advice on the internet.

## 7.1   Picture-in-Picture and Downstream Key

The **Picture in Picture (PIP)** feature of the **Key 1**, **Key 2, Key 3 and Key 4** layers can be used for displaying a smaller secondary image in front of the background video layer. This smaller PIP image can be resized, cropped, repositioned and even keyed by the user to avoid an important part of the background video layer being covered by it.

The **Down Stream Key layers** (**DSK 1** & **DSK 2**) are placed on top of all the previous layers. These layers are typically used with Character Generator inputs for displaying titles, graphics, lower thirds, clocks and logos. Datavideo offer several Character Generator products (additional purchase) such as CG-250, CG-10 and CG-500. If set up incorrectly these DSK layers can also stop the video layers behind them from being displayed properly.

The HS-4000 has six dedicated keyers, **Key1**, **Key2**, **Key3**, **Key4, DSK 1 and DSK 2**. All six keyers can be active simultaneously. In the following sub-sections, we will provide you with descriptions of different keyer settings and ways to access them.

## *Picture-In-Picture*

In this example, we are supplying the HS-4000 with an HD-SDI live video signal to input 2; this is selected on the Program row. We have also assigned a STILL image to input 6. This still image, selected on the **Keyer** sub menu, will be displayed in the PIP window.

**Note: See Still of Section 5.8 for assigning a STILL image to input 6.**
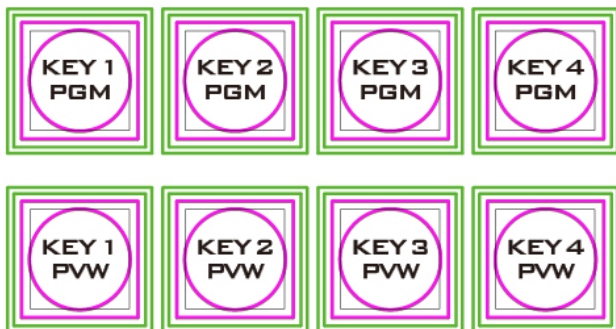
On the HS-4000's control panel, there are eight **KEYER** keys. These are labelled Program and Preview. The upper **KEYER** keys relate to activating Picture-In-Picture images on the Program outputs. The lower **KEYER** keys relate to activating Picture-In-Picture images on the Multi-view or Preview outputs. Before activating Picture-In-Picture images on the output image, you should first set these **KEYER** keys to PIP mode.

### *Assigning a video source to a PIP window*

On the **Keyer** menu you can assign a selected input to the chosen PIP video layer.

1. Open the **Keyer** menu to select **Keyer 1** and in the **Keyer Ctrl** sub menu, set **Key 1** to the desired key mode (**Luma**, **Chroma** and **Linear**) and PIP mode as shown below.

2.  In the **Key Source** sub menu, assign an input source, in this example, it's Input 6.
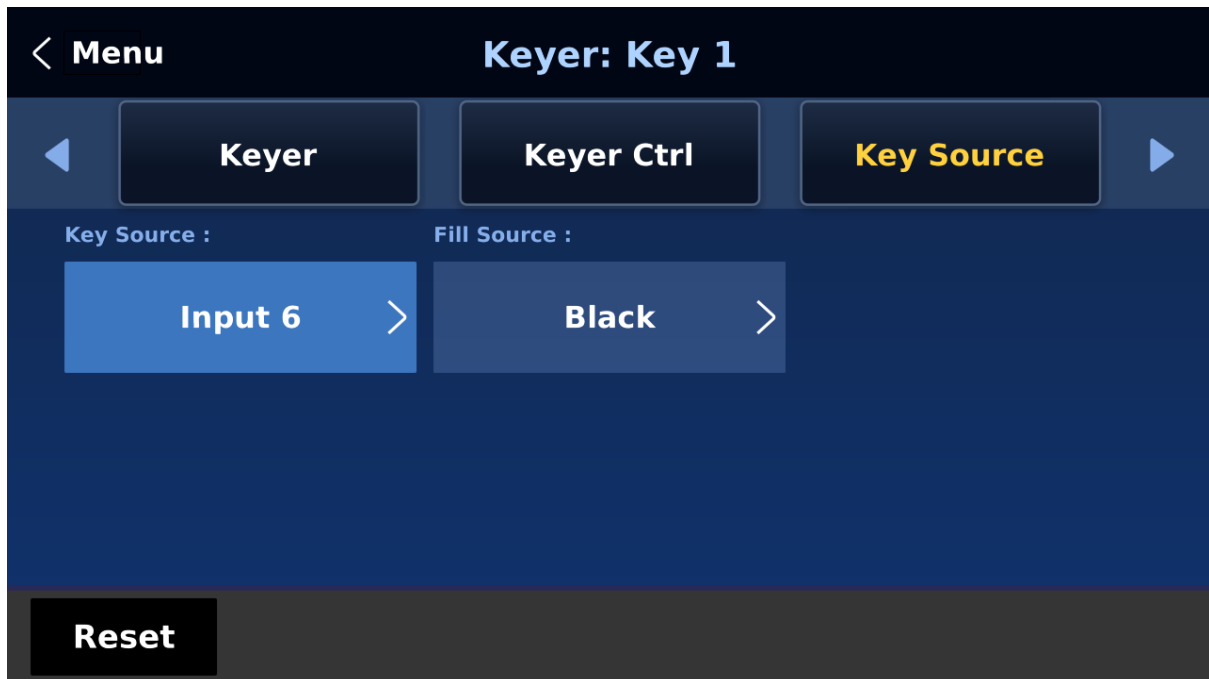


3.  Activate the PIP window on the Preview or Program output by pressing **Key 1 PVW** or **Key 1 PGM** button so that you can adjust the PIP window while viewing the changes made.

4.  Open the **P-in-P** menu and adjust the PIP window settings (**positions**, **border**, **shade matte** and **crop**). For descriptions of the parameters, refer to the section on **P-In-P** for more details.
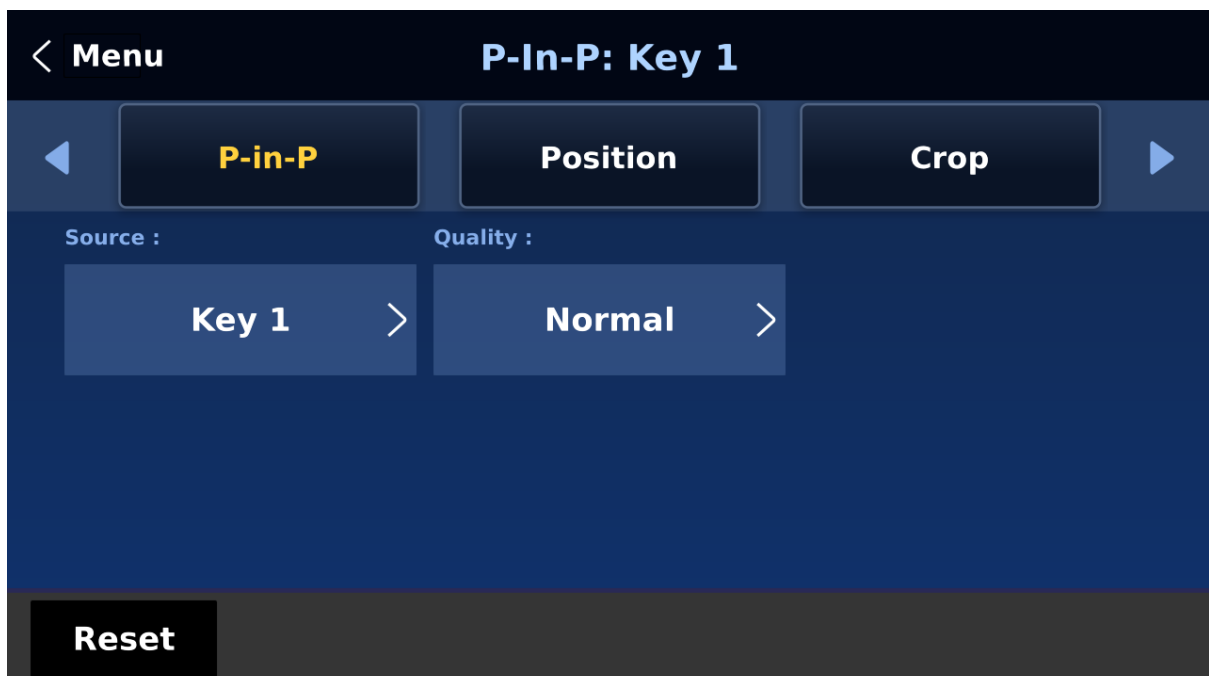


***Assigning a video source to a PIP window using shortcut keys***

In addition to assigning a video source to a PIP window on the **GUI MENU**, the user can also use shortcut keys to easily switch between different PIP image sources. Press and hold **KEY 1-**

**4 PGM** buttons, and the program and preview rows should start blinking. Press the program row buttons to select the PIP image source.

## *Character Generator*

The CG mode allows you to linear key the CG text or graphics over the live video. Simply connect the laptop, with CG-500 software installed, to one of the HDMI inputs (input ports 9 to 12 or input channels 3, 4, 7 and 8) of the switcher. Ensure that your input image or video resolution matches the switcher's resolution set in *GUI* → *Setup* → *Standard*.

**Then follow the steps below to set up the built-in TC-200**

1. Connect the laptop with CG-500 software installed to one of the HDMI ports of the HS-4000 switcher using an HDMI cable. In this example, we will be using HDMI port 9 for illustration purpose.

2. Open CG-500 on the laptop and create a CG image.

3. Switch ON the HS-4000's power button and after the boot up is complete, the Multiview should be displayed on the connected monitor.

4. On the Multiview, Input 3 window should display the CG image.

5. On GUI, tap **Inputs**.

6. Select **Input** 3 from **Source** and enable TC-200 mode by turning on CG Md in second mode of operation.

7. Open the "**Keyer**" sub menu.

8. Select "**DSK 1 or 2**" from the **Keyer** option and set Key and Fill Sources to Input 3.

9. Locate DSK buttons on the switcher's control panel then depending on the DSK keyer selected at Step 8, press DSK 1 or 2 button to open your CG graphics on either of the preview and program windows or both.
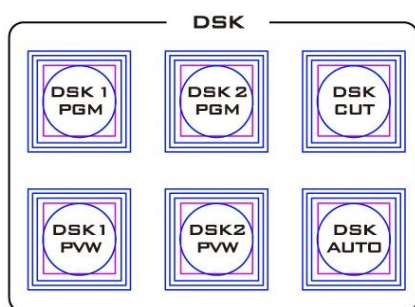


### *DSK Preview and DSK Program*

On the HS-4000 Control Panel / Keyboard there are four DSK keys. These are labelled Program and Preview. The upper DSK1 and DSK2 keys relate to activating Down Stream Keying on the Program outputs. The lower DSK1 and DSK2 keys relate to activating Down Stream Keying on the Multi-view or Preview outputs.

To display the CG subtitle configured previously, simply press the DSK 1/2 PGM or DSK 1/2 PVW button to enable the downstream key on the PGM or PVW screen.

## 7.2 Placing text on the video using luma key



The HS-4000 allows the user to place a logo or text image (ideally black and white) on the video using the luma key function. First of all, create a 1920x1080 (16:9) text image against a black or white background on a laptop. Once the text image is created, please follow the steps outlined as follows to insert the text image.

**Note: If the text image is dark, choose a white background; if the text image consists primarily of bright colors, choose a black background.**

1. Connect the laptop to the switcher's **HDMI Input Port 9 (Input Channel 3)**.

2. On the control panel, press the **Keyer** button to open the Keyer menu on the 5 inch LCD screen.

3. Select Key 1.
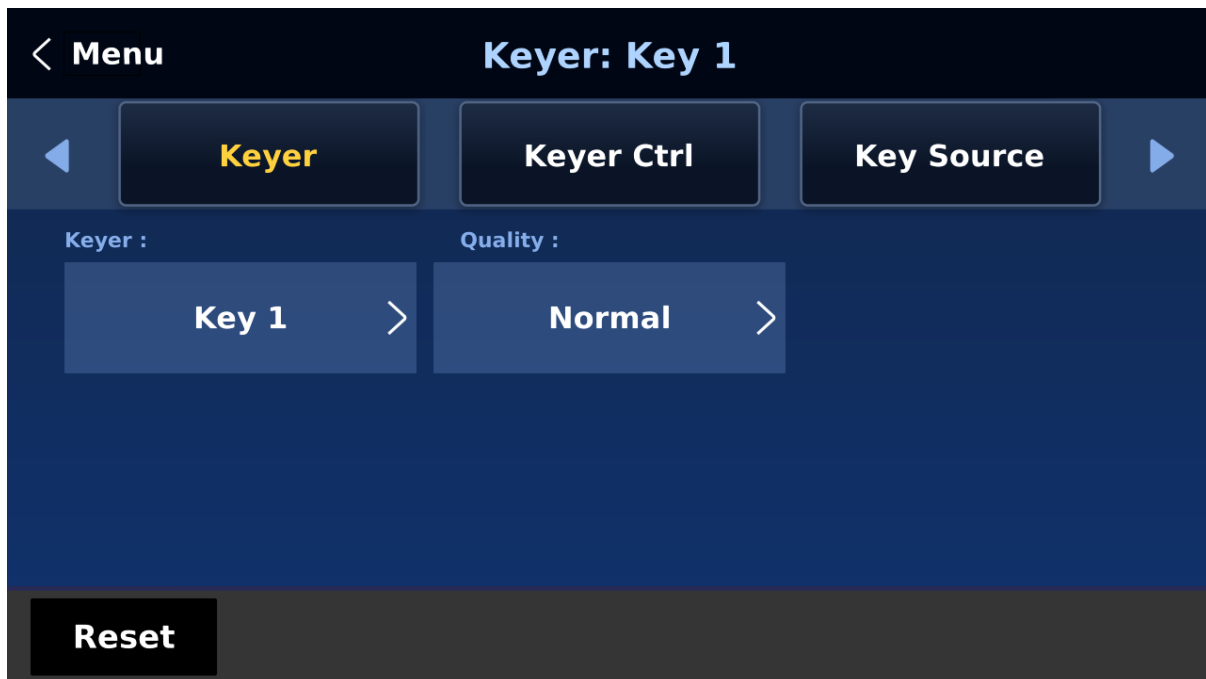


4. In the **Keyer Ctrl** sub menu, select "**Luma**" and "**Self**" to apply luma keying effect to the connected input. The luma key removes the background, in this case, the black component of the image.

**Keyer: Key 1**

< Menu

| Keyer | **Keyer Ctrl** | Key Source |

Mode :  **Luma**  >

Source Mode :  **Self**  >

Opac :  **0**  >

Lift :  **0**  >

Gain :  **0.0**  >

Invert :  OFF

**Reset**

5. In this example, the text image is against a black background so **reduce the Lift value to remove the black background**. Descriptions of the corresponding parameters are described below:

- **Lift** (0 – 100%) adjusts the dark/black areas of the key image. **Reducing the value of Lift** will make dark areas of the key image more transparent. The background image will be showing only through the transparent areas.
- **Gain** (0.0 – 16.0) adjusts the light/white areas of the key image. **Increasing the value of Gain** will make light areas of the key image more solid. The background image will be showing only through the transparent areas.
- **Opac** (0 – 100%) adjusts the transparency of the overall foreground image, which is the text in this example. **Increasing the value of Opacity** will make the overall key image less transparent.
- **Invert** (On/Off) sets the luma key color; luma key color is **white** if turned ON and **black** if turned OFF.

6. Set the "**Lift**" to 100% if the background is in total black.

7. **Opaque** logo can be created by setting the "**Opac**" parameter to 100%. Set "**Opac**" to 100% if an opaque logo is desired. **Semi-transparency** effect can be generated by setting the "**Opac**" parameter to a value between 0 and 100%.

8. In the **Key Source** sub menu, select an input source to which the luma key settings will be applied. In this example, select "**Input 3**" since this is the corresponding input channel of HDMI input port 9 to which the laptop is connected.
   **Note: Since "Self" is chosen, Fill Source can be ignored.**

9. After the luma key settings are properly configured, press the **Key 1 PGM** or **Key 1 PVW** button to place the text image on the Program screen or the Preview screen respectively.



Luma
Keying
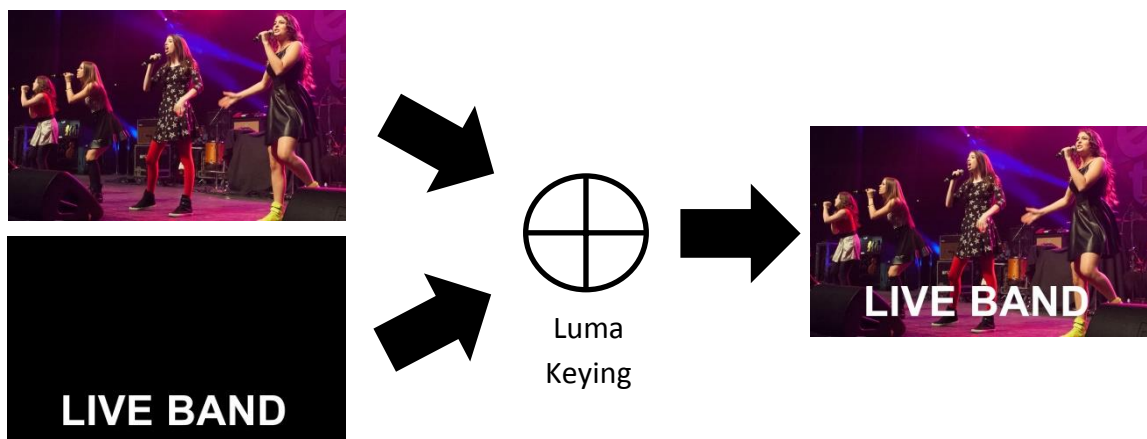
## 7.3   Insertion of People onto Backgrounds (Chroma Key)

The Chroma Key feature of the HS-4000 is easy to use. Typical Blue and Green screen studios can be quickly incorporated into an HS-4000 production.



The following is a quick overview of Chroma Key basics.

The **camera**, **backdrop** and **lighting** all play an important role in producing the optimal Chroma Key result. Although the HS-4000 is equipped with excellent keying controls, it is best to start with a good keyable image.

**A good foreground image helps produce a good key**

**Three chip/Three sensor camera**

We strongly recommend the use of a three chip or three sensor camera for Chroma Key shooting. If the camera has three chips or sensors then this usually means good colour separation within the camera. The optics on these cameras are usually better too. The extra image clarity and the good colour separation help improve the quality of the subsequent keying with the camera's output.

**White Balance the Camera**

White Balance is extremely important after setting up a chroma key studio. The camera must be correctly white balanced to minimize the subject picking up any colour cast (green or blue) from the background. Of course the white balance settings will vary according to the type of lighting you are using, but neutral whites and good skin tone colour are the all-important targets.

To set the white balance you will need a white reference card (or a sheet of white paper). Focus the camera on the reference card and light it evenly using the main light. Set the camera's iris / aperture so that the card is correctly exposed. Use the Auto White Balance (AWB) function, or set the white balance manually so that the card appears white. If you are in any doubt about how to white balance your camera, **please refer to your Camera's instruction manual for more details.**

**Lighting**

Lighting of your chosen green or blue backdrop is extremely important; the more even the lighting on the backdrop the better the finished result. Lighting setups for the foreground subject will vary according to the effect that you want. For chroma keying backdrops, balanced even lighting with no hotspots or shadow areas is the aim. The easiest way to achieve balanced Chroma key lighting is with a lighting setup that looks similar to this:
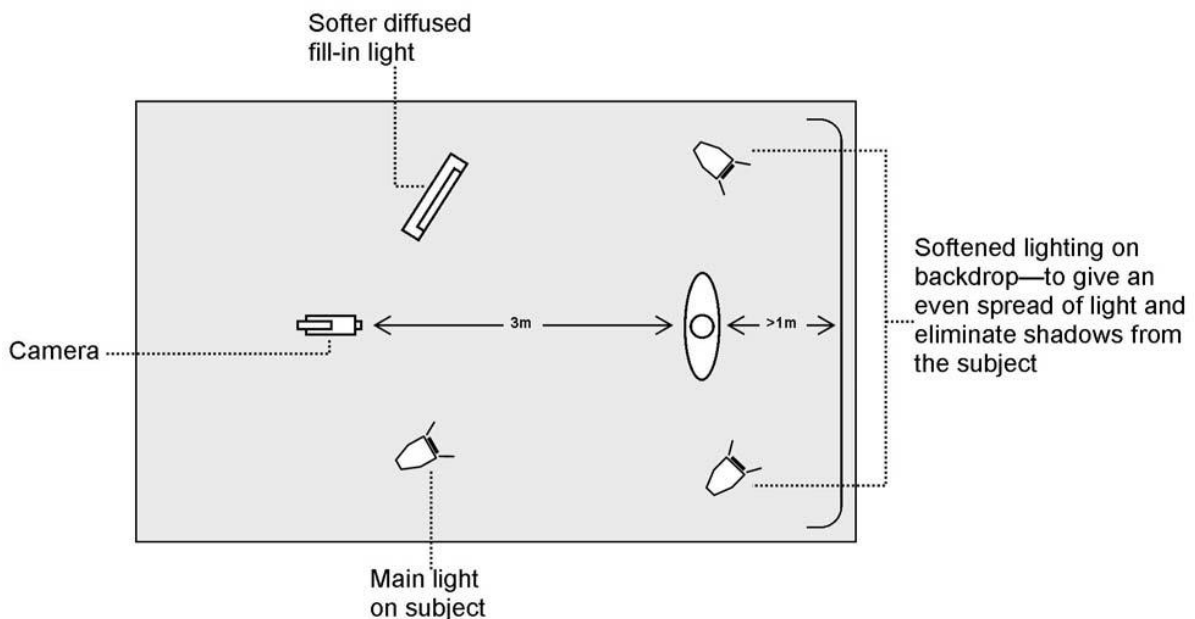


In the diagram, you will see that we recommend a **minimum** of four lights and we keep the subject **more than** 1m away from the backdrop. It is always easier to get more even lighting

if the subject is farther away from the backdrop (no shadows). The foreground lighting on the subject will also vary according to the effect that you are looking for.

After the studio set up is complete, connect the camera shooting the speaker on a green backdrop to the SDI Input 1 at the rear of the switcher. To configure the settings that will be used for chroma keying, press the **MENU** button on the control panel to open the GUI menu on the monitor. Follow the steps below to configure the chroma key settings.

1. Open the Keyer menu and select Key 1.
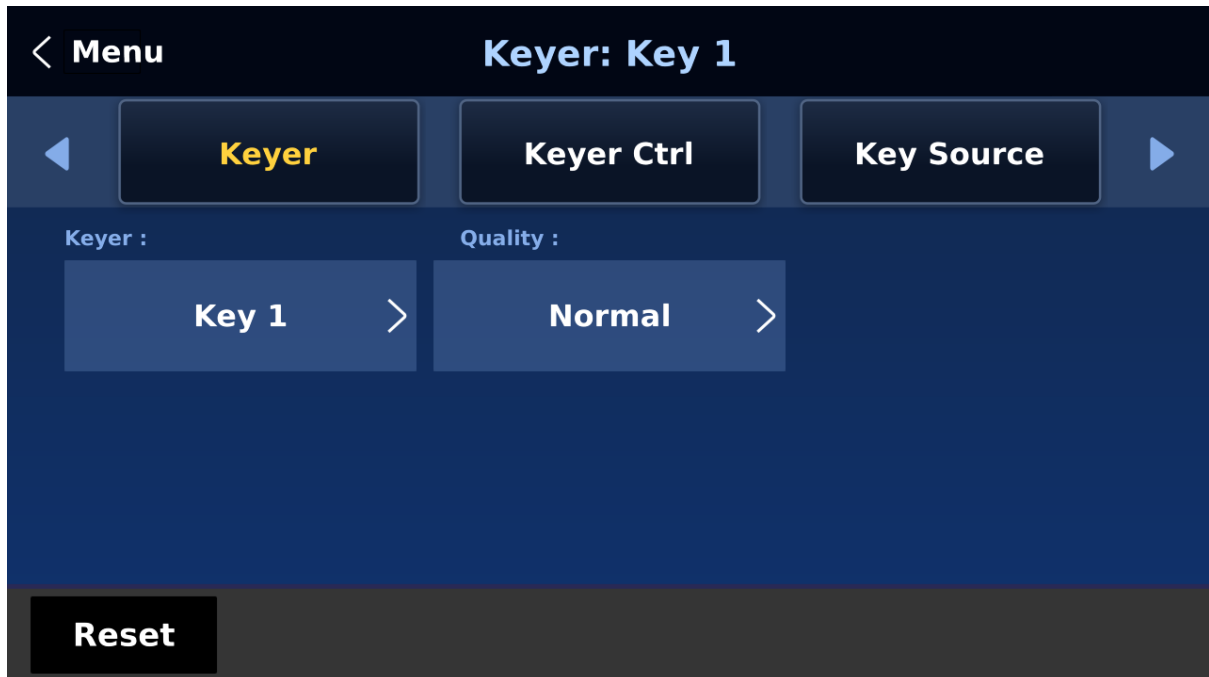


2. Select "**Chroma**" and "**Self**" in "**Keyer Ctrl**"

3. Select the camera source in "**Key Source**." In this example, we have selected Input 1, which corresponds to the SDI Input 1 at the rear of the switcher and therefore the port to which the camera is connected.



4. Adjust the left, right, top and bottom values of "**Mask**" to set the chroma key range according to the green or blue backdrop size.



5. Open the Chroma menu to adjust the corresponding chroma keyer parameters. Again in this example, we have selected Input 1, which corresponds to the SDI Input 1 at the rear of the switcher.

| Keyer | Keyer Source | Key Tie |
|---|---|---|
| Bars | Matte | Input 1 |
| Input 2 | Input 3 | Input 4 |

Reset     < 1/2 >

**Note**: Selection of **CK Auto** automatically calculates the best Hue & Luma values for the current Keyer source.

The chroma keyer parameters are described below:

< Menu      Chroma: Key 1

| CK Setup | Mask | |
|---|---|---|
| Krange : | K Fgnd : | K Bgnd : |
| 0 | 0 | 0 |
| Hi-Light : | Lo-Light : | Bg-Supp : |
| 0 | 0 | OFF |

Reset     < 2/3 >

- **Hue**: This parameter adjusts the color of the chroma key. A typical green screen value will be around 120. Blue screen value will be around 240.
- **Luma**: The **Luma** value relates to how bright or dark the selected key colour or hue is.
- **K Range** (Key Range): **Key Range** sets the range of hues or colors (0 – 360 degrees) that closely match the background color to be keyed. The user can start with a value of 120 degrees and this value can be fine-tuned up or down depending on the setup of the green or blue screen studio.

- **K Fgnd** (Key Foreground): **Key Foreground** adjusts the performance of the chroma key in light or white areas. Apply more **Key Foreground** if the light areas are becoming too transparent.
- **K Bgnd** (Key Background): **Key Background** adjusts the performance of the chroma key in dark or black areas. Apply more **Key Background** if the dark areas are becoming too transparent.
- **Hi-Light**: Hi-light boosts the foreground key in high luminance area.
- **Lo-Light**: Lo-light boosts the foreground key in low luminance area.
- **Bg-Supp:** Turn ON **Background Suppress** removes the Luma (Brightness) of the background from the final image. If the Chroma Key Output is showing Light Edges, then the **Bgnd suppress** can be used to suppress any background Luma that is showing through on these edges.

6. After configuring the chroma keyer, exit the menus and simply press **KEY 1 PGM** or **KEY 1 PVW** button on the switcher's control panel to place the speaker on **PGM** or **PVW** Screen as shown in the diagram below.



Chroma Keying
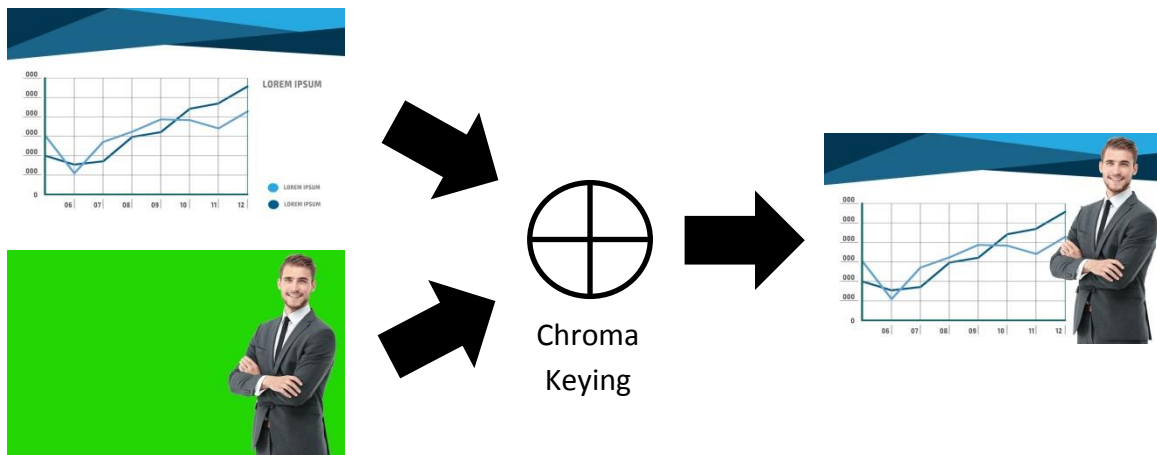
# Chapter 8     Monitor

The HS-4000's built-in monitor can be configured via an on screen menu. Press the **MENU** button to display the Main Menu list on the monitor.

This chapter covers the Menu options in the order that they appear on the monitor. These settings may also appear in more detail elsewhere in this instruction manual. Options may vary depending on the firmware version in use.

Use the **Up / Down** buttons to change the value and press the **ENTER** button to confirm. Once the chosen setting has been confirmed, it is stored within the switcher's non-volatile memory.

## 8.1     MENU Options

| Main Options | Sub Options | Values | | | Default |
|---|---|---|---|---|---|
| Picture | BRIGHTNESS | 0 – 100 | | | 50 |
| | CONTRAST | 0 – 100 | | | 50 |
| | SATURATION | 0 – 100 | | | 50 |
| | TINT | 0 – 100 | | | 50 |
| | SHARPNESS | 0 – 100 | | | 0 |
| | RGB Range | Full | | | Full |
| | | Limited | | | |
| | HDMI EDID | 2K | | | 4K |
| | | 4K | | | |
| | Color Space | Native | | | Native |
| | | REC709 | | | |
| | | DCI-P3 | | | |
| | Gamma | Off | | | 2.2 |
| | | 1.8 | | | |
| | | 2.0 | | | |
| | | 2.2 | | | |
| | | 2.35 | | | |
| | HDR | Off | | | Off |
| | | On | | | |
| | BACKLIGHT | 0 – 100 | | | 100 |
| | Color Temp. | 3200K | | | 6500K |
| | | 5500K | | | |
| | | 6500K | | | |
| | | 7500K | | | |
| | | 9300K | | | |
| | | User | Red Gain | 0 – 255 | 128 |
| | | | Green Gain | 0 – 255 | |
| | | | Blue Gain | 0 – 255 | |
| | | | Red Offset | 0 – 511 | 256 |

| Main Options | Sub Options | Values | | Default |
|---|---|---|---|---|
| | | Green Offset | 0 – 511 | |
| | | Blue Offset | 0 – 511 | |
| | **EXIT** | | | |
| **Marker** | **Center Marker** | Off | | Off |
| | | On | | |
| | **Center Marker Size** | Small | | Middle |
| | | Middle | | |
| | | Large | | |
| | **Aspect Marker** | Off | | Off |
| | | 16:9 | | |
| | | 1.85:1 | | |
| | | 2.35:1 | | |
| | | 4:3 | | |
| | | 3:2 | | |
| | **Safety Marker** | Off | | Off |
| | | 95% | | |
| | | 93% | | |
| | | 90% | | |
| | | 88% | | |
| | | 85% | | |
| | | 80% | | |
| | **Marker Color** | Red | | White |
| | | Green | | |
| | | Blue | | |
| | | White | | |
| | | Black | | |
| | **Thickness** | 1 – 15 | | 6 |
| | **Exit** | | | |
| **Function** | **Scan** | Aspect | | Aspect |
| | | Pixel to Pixel | | |
| | | Zoom | | |
| | **Aspect** | Full | | Full |
| | | 16:9 | | |
| | | 1.85:1 | | |
| | | 2.35:1 | | |
| | | 4:3 | | |
| | | 3:2 | | |
| | | 2.0X | | |
| | | 2.0X MAG | | |
| | **Overscan** | Off | | Off |
| | | On | | |
| | **Check Field** | Off | | Off |
| | | Red | | |
| | | Green | | |
| | | Blue | | |
| | | Mono | | |

| Main Options | Sub Options | Values | Default |
|---|---|---|---|
| | Zoom | 10% | |
| | | 20% | |
| | | 30% | |
| | | 40% | |
| | False Color | Off/On | Off |
| | False Color Table | Off/On | On |
| | Exit | | |
| Audio | Volume | 0 – 100 | 50 |
| | Audio Out | CH1&CH2 | CH1&CH2 |
| | | CH3&CH4 | |
| | | CH5&CH6 | |
| | | CH7&CH8 | |
| | Exit | | |
| System | Language | English | English |
| | | Traditional Chinese | |
| | | Simplified Chinese | |
| | Color Bar | Off/On | Off |
| | OSD Timer | 10s | 10s |
| | | 20s | |
| | | 30s | |
| | OSD Transparency | Off | Off |
| | | 25% | |
| | | 50% | |
| | OSD H Position | 0 – 100 | 50 |
| | OSD V Position | 0 – 100 | 50 |
| | Firmware Version | | |
| | Reset | Off/On | Off |
| | EXIT | | |

## Picture

You will be allowed to adjust basic image settings such as the **brightness**, **contrast**, **saturation**, **tint** and **sharpness**.

Advanced settings are **HDMI RGB range**, **color space**, **gamma correction**, **high dynamic range (HDR)**, **back light level**, and **color temperature**.

*Brightness*
Adjust the brightness of the screen from 0 – 100.

*Contrast*
Adjust the contrast of the screen from 0 – 100.

*Saturation*
Adjust the saturation of the screen from 0 – 100.

*Tint*
Adjust the tint of the screen from 0 – 100.

### Sharpness

Adjust the sharpness of the screen from 0 – 100.

### RGB Range

This set the RGB Range.

RGB Full (0-255): PC Monitor
RGB Limited (16-235): Standard or HD TVs

### HDMI EDID

The EDID learning function is only used when you experience any failures in playing audio and video correctly. You will be able to force the monitor's receiving resolution by setting the EDID to either 2K or 4K so that the connected HDMI source outputs the maximum resolution defined in EDID.

### Color Space

Select an option from the list below to provide details of the color primaries for interpretation of XYZ color space.

- Native
- REC709
  REC709 is the standard camera encoding color space for HDTV established by International Telecommunication Union in 1990.
- DCI-P3

### Gamma

This sets the gamma correction for the source of input; the smaller the gamma, the brighter the screen and vice versa.

- OFF
- 1.8 (MAC OS)
- 2.0
- 2.2 (Windows)
- 2.35

### HDR

HDR is a new TV video standard that generates higher contrast and wide-gamut images and therefore, an HDR monitor is capable of displaying more colors and details of an image than the regular ones.

### Back Light

Adjust the back light level from 0 – 100.

### Color Temperature

Select a color temperature for your scene. Available color temperatures are listed as follows:

- 3200°K
- 5500°K (Desktop publishing or printing)

- 6500°K (Usually for ordinary PC use)
- 7500°K
- 9300°K (TV pictures)
- User Color

**Note: Selection of the User Color mode allows you to manually set the color temperature by adjusting the Red Gain, Green Gain, Blue Gain, Red Offset, Green Offset and Blue Offset.**

## Marker

Aspect ratio is a crucial element in video shooting and it is defined as the proportion of the width and height of any image. You can use different aspect ratios in your video. Therefore, in order to know what will be in frame at different aspect ratios, during video production, you can turn on the monitor's aspect marker (a.k.a. guide frame) so that you can record the entire screen while still knowing where the cut-off will be by putting a mat over it.

### *Center Marker*
The Center Marker, if turned on, will place a crosshair in the middle of the screen.

### *Center Marker Size*
The Center Marker size can be set to small, medium or large.

### *Aspect Marker*
Sets the aspect marker display at the aspect ratio selected from the list below:

- OFF
- 16:9
- 1.85:1
- 2.35:1
- 4:3
- 3:2



### *Safety Marker*
This sets the safety zone display, which is the standard viewing range of the recorded video.
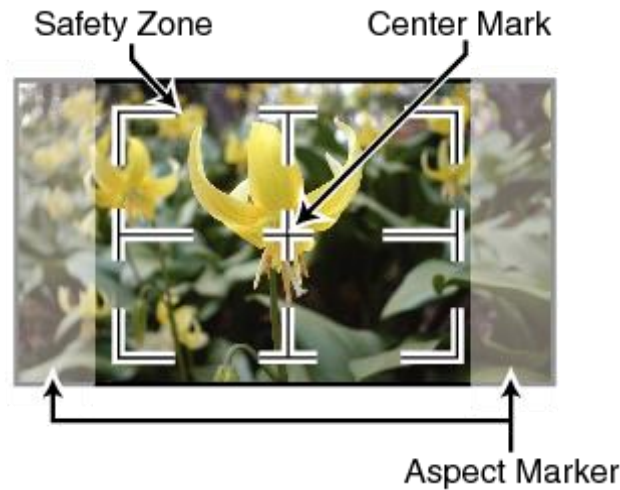
The options are listed as follows:

- OFF
- 95%
- 93%
- 90%
- 88%
- 85%
- 80%

*Marker Color*

The user is also allowed to apply different colors to the aspect marker. The five available marker colors are **Red**, **Green**, **Blue**, **White** and **Black**.

*Thickness*

This sets the aspect marker thickness ranging from 1 to 15.

## Function

This allows the user to set advanced settings for the monitor, such as the scan mode, the aspect ratio, overscan mode, check field, zoom, and etc. Details of how these functions can be configured are described as follows:

*Scan*

This sets the monitor's scan mode.

**Zoom**: Enlarge the original image according to the zoom ratio of the monitor.

**Aspect**: Display the image according to the aspect ratio of the monitor.

**Pixel to Pixel**: Display the original image resolution without scaling to match a certain resolution or an aspect ratio. For example, when the resolution of the input video is 1920x1080 but the monitor's resolution is only 1280x800, only area equivalent to 1280x800 out of 1920x1080 will be displayed.

*Aspect*

The aspect control allows you to manually set the aspect ratio of the monitor. You should choose the aspect ratio of your screen to match that of the input video in order to achieve the best viewing experience. Views of different aspect ratios are shown in the diagram below.

**Note: Aspect ratio control is disabled if the scan mode is set to pixel to pixel.**



full screen

2.35:1

1.85:1

16:9

4:3

3:2
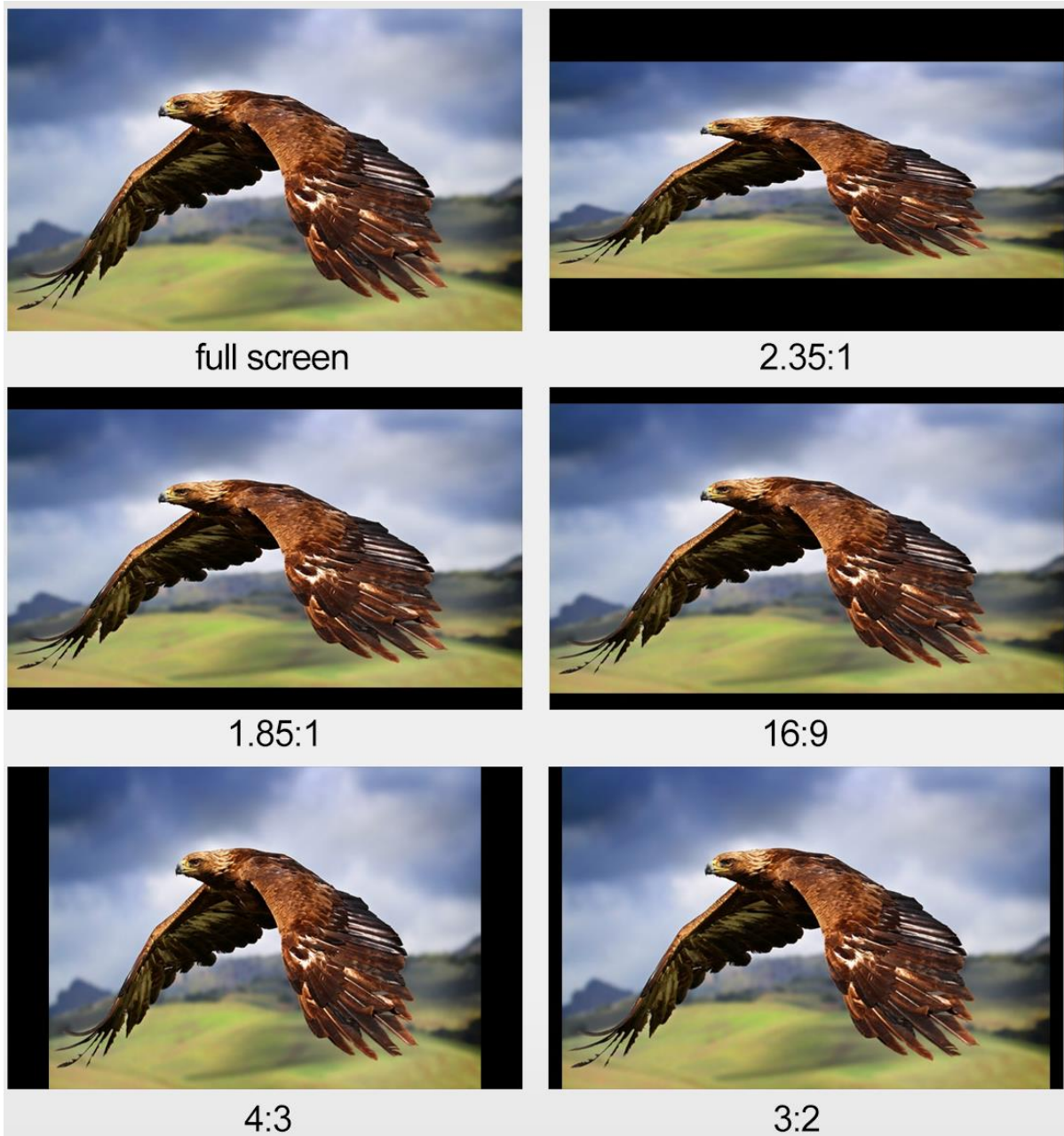
*Overscan*

If enabled, the image rendered on the display will be larger than the physical area of the screen, creating a cropped image on the monitor screen.

*Check Field*

The check field function offers the user Red-Only, Green-Only, Blue-Only and Mono modes for screen calibration should you require them.

First turn on the color bar, then turn on the single color mode in the check field as this allows you to do the screen calibration by adjusting the brightness, contrast, saturation, tint and sharpness.

*Zoom*

The zoom function allows you to enlarge the image by a certain percentage (10 – 40%).

**Note: Zoom control is disabled if the scan mode is set to pixel to pixel.**

*False Color*
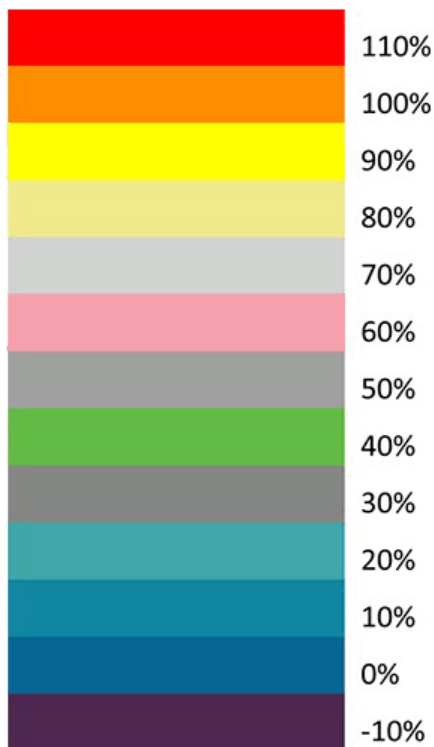


Also known as the exposure assist, once enabled, the false color feature will change colors of the elements of the image based on the brightness value. This allows the user to use the monitor's exposure function to achieve proper exposure without the use of costly external equipment.

To best utilize this feature, you must first understand the color chart below. The color chart is like a color scale. The exposure level is represented by different colors which correspond to the respective luminance of the pixels as displayed on the monitor. The correct exposure ranges from 10 – 100%. Anything below 10% is regarded as underexposed and if exposure exceeds 100%, it is deemed overexposed.

Underexposure and overexposure will lead to loss of details in an image.

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For example, areas with exposure level of 56IRE when applied the false color will be shown as pink color on the monitor. Therefore, as you increase the exposure, that area will change color to grey, then yellow and finally to red if overexposed. Blue indicates underexposure.

An example of an original image with the false color applied is shown on the left of the image below.
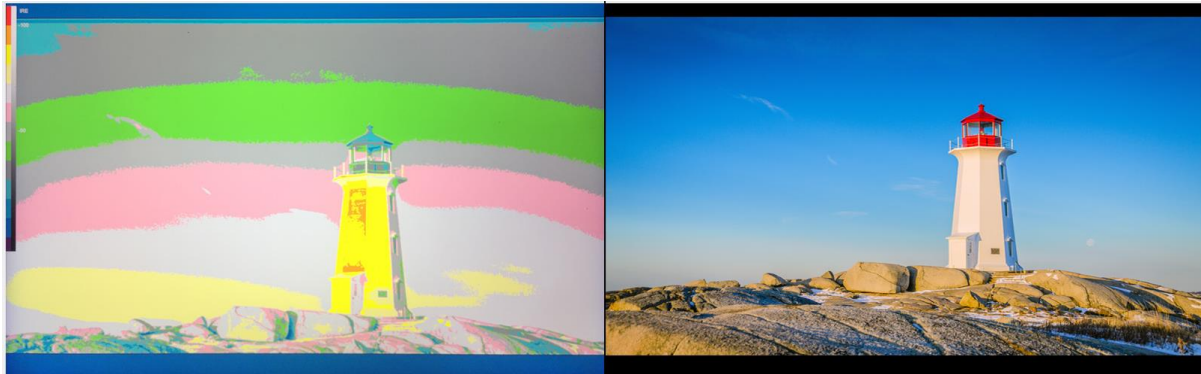


### False Color Table

This enables/disables false color chart on the screen. A sample of the chart is shown below.



| | |
|---|---|
| | 100 to 109 IRE |
| | 93 to 100 IRE |
| | 84 to 93 IRE |
| | 77 to 84 IRE |
| | 58 to 77 IRE |
| | 54 to 58 IRE |
| | 47 to 54 IRE |
| | 43 to 47 IRE |
| | 24 to 43 IRE |
| | 15 to 24 IRE |
| | 8 to 15 IRE |
| | 2 to 8 IRE |
| | -7 to 2 IRE |

## Audio

### Volume

The Volume option sets the audio level of the audio output.

### Audio Out

Select an embedded audio pair for the audio output.

- CH1&CH2
- CH3&CH4
- CH5&CH6
- CH7&CH8

## System

### *Language*
The available languages are **English**, **Traditional Chinese** and **Simplified Chinese**.

### *Color Bar*
Enable/Disable color bar.

### *OSD Timer*
This sets the OSD menu's ON time; the OSD menu will be automatically turned off after the timer times out.

- 10s
- 20s
- 30s

### *OSD Transparency*
This sets the OSD menu transparency. You can set the transparency level to either 25% or 50%. Disabling this option will yield an opaque OSD menu.

### *OSD H Position*
This adjusts the horizontal screen position of the OSD menu.

### *OSD V Position*
This adjusts the vertical screen position of the OSD menu.

### *Firmware Version*
This displays the monitor's firmware version number.

### *Reset*
Select **ON** to reset the monitor settings entirely.

# Chapter 9    Video Streaming and Recording

The HS-4000 4K 8-Channel Portable Video Studio includes a built-in Video Streaming Server (NVS-32) allowing the user to stream and record your program at the same time. From any SDI/HDMI input sources, the Datavideo's video streaming server generates an H.264/265 encoded stream that is compliant with RTMP(S) and SRT protocols. While encoding the video at bit rates appropriate for live streaming, the Datavideo NVS-32 concurrently records a high-quality MP4 file to an SD card.

*Note: The built-in video streaming server will be referred to as NVS-32 in the rest of this chapter.*

## 9.1 Streaming Network Connection and Device Search

This section details how to connect the NVS-32 to a network with or without a DHCP server, and describes how to acquire the NVS-32's IP address.

### DHCP

Follow the following procedure to scan your DHCP network for connected NVS-32 devices.

*Note: By default, the NVS-32 uses DHCP to connect and will be assigned an IP address upon connection to a DHCP server.*

1. Connect the NVS-32's LAN/DVIP port to a DHCP server via an Ethernet cable.
2. Turn on the HS-4000's power and the NVS-32 will also be turned ON in DHCP by default.
3. Connect the laptop to the same network that the NVS-32 is connected to.
4. Use *DVIP Configuration Tool* to search for NVS-32's IP address.
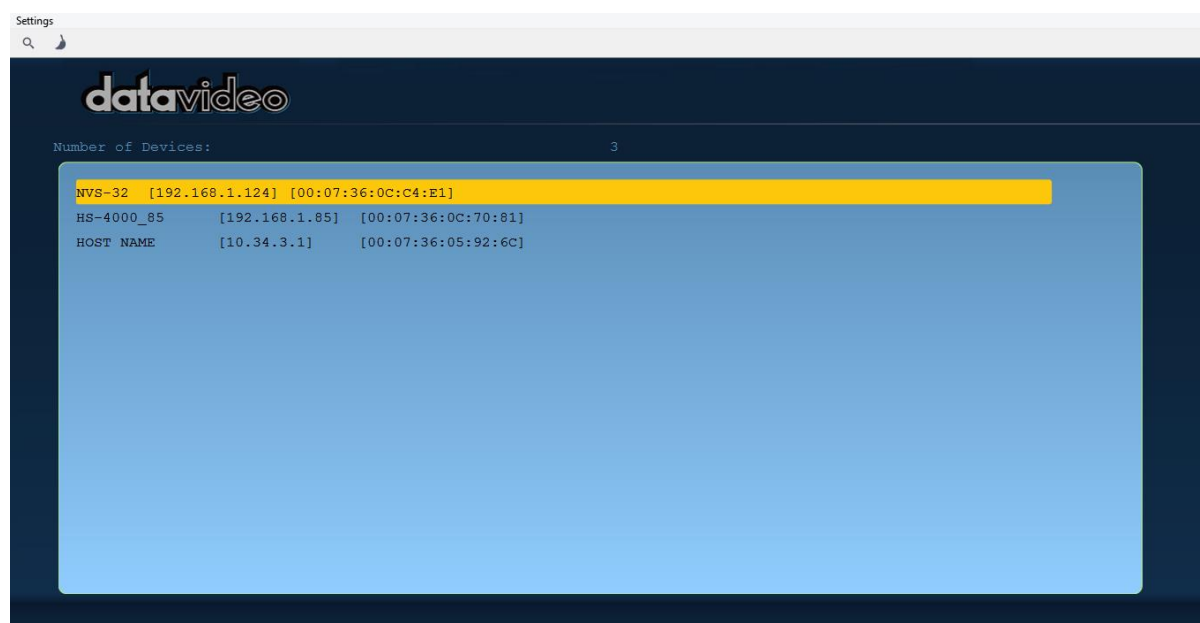
### Static IP

With DHCP disabled, the NVS-32 will not be assigned an IP address upon connection to a DHCP server. As such it is recommended that you manually assign a static IP address to the device.

### Static IP Address

Static IP is primarily used in point-to-point connection, allowing you to access the NVS-32 directly from the PC. To assign a static IP address to the NVS-32, please follow the steps outlined below:

1. Connect the NVS-32's LAN/DVIP port to a DHCP server via an Ethernet cable.
2. Turn on the HS-4000's power and the NVS-32 will also be turned ON in the DHCP mode by default.
3. Search for the NVS-32 device according to the method as detailed in the previous DHCP section. Once found, log in to the user interface on the web browser.
4. Open the Network page by clicking the "Network" tab.
5. Disable DHCP.
6. You will be allowed to manually enter a static IP address once DHCP is disabled. Depending on your network configuration, you will also need subnet mask, gateway IP as well as the DNS information.



## 9.2 Web User Interface

By now, we have obtained the NVS-32's IP address. Enter it into the address bar of a browser then hit **ENTER**. Log in with the user name and password provided below.

**User name: admin**

**Password: admin**
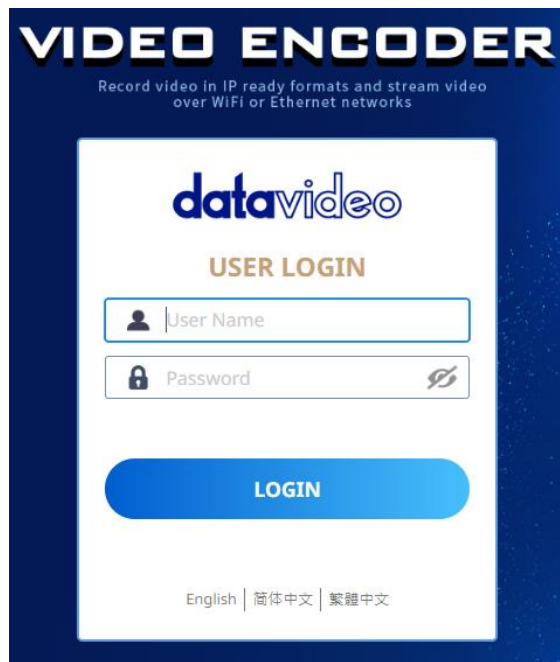
On the web user interface, the setting options are in the main area with device information on the left and device status at the top right corner.

Tabs to access different pages.

Click for a reduced view

Status Pane

Information Pane

Main configuration area

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## *Status Pane*

The status pane is described below.
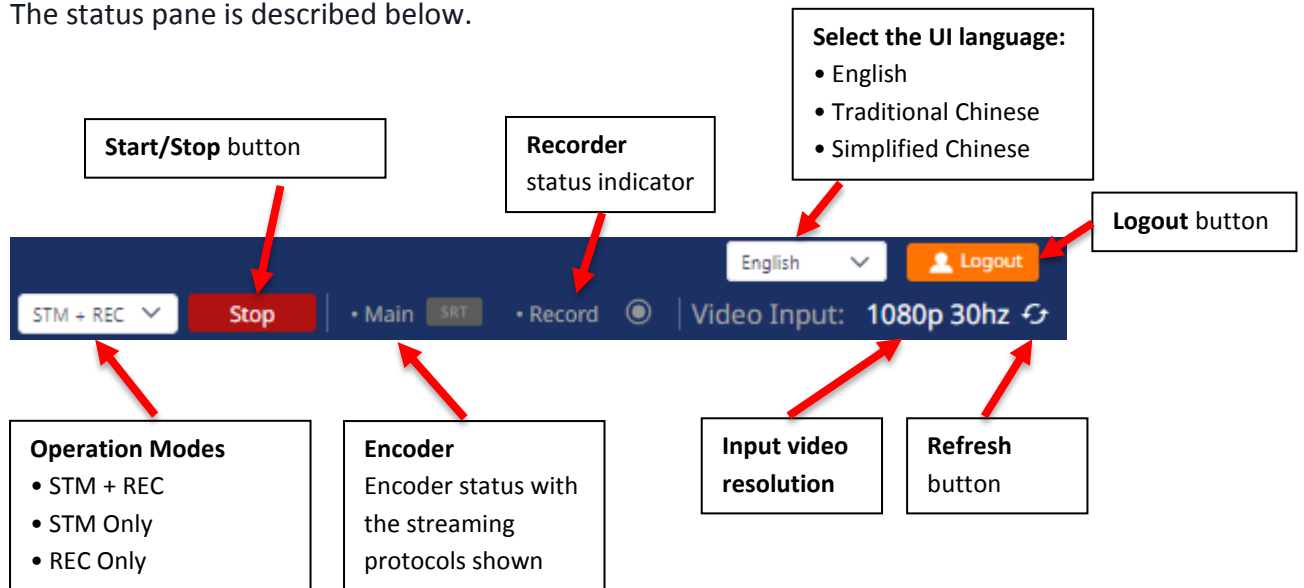


The NVS-32 offers the following operation modes:

- **STM + REC: Streaming encoder and recorder are enabled at the same time.**
- **STM Only: Only streaming encoder is enabled.**
- **REC Only: Only recorder is enabled.**

which can be selected from the drop-down list shown above. Regardless of the mode selected, you will be allowed to customize stream and record settings.

The streaming encoder settings consist of ***Encoding Format***, ***Resolution***, ***Video Bitrate (mbps)***, ***Bitrate Control***, ***Key Frame Interval*** and the ***Protocol***.

Two streaming protocols are offered and they are ***RTMP*** and ***SRT***. See ***Section 9.3*** for details.

The recorder settings are simply ***Encoding Format***, ***Resolution*** and ***Video Bitrate (mbps)***.

Click the **"Start"** button to start operating in the selected mode. Click the **"Stop"** button to end device operation.

**Note: The status indicators should be turned on after the device starts operating in the selected mode. A flashing indicator indicates that device is initializing. A solid color indicator means that the device is functioning well. You should check the device for errors if the indicator flashes three times then turned off. The error code and the suggested solution will be shown in the Message box on the *Information* pane.**

You can also select the UI language. The currently available languages are English, Traditional Chinese, and Simplified Chinese.

The input video resolution is also shown, however, the NVS-32 web UI does not update itself so to learn the latest device status, please refresh the page manually on a regular basis.

## Information Pane
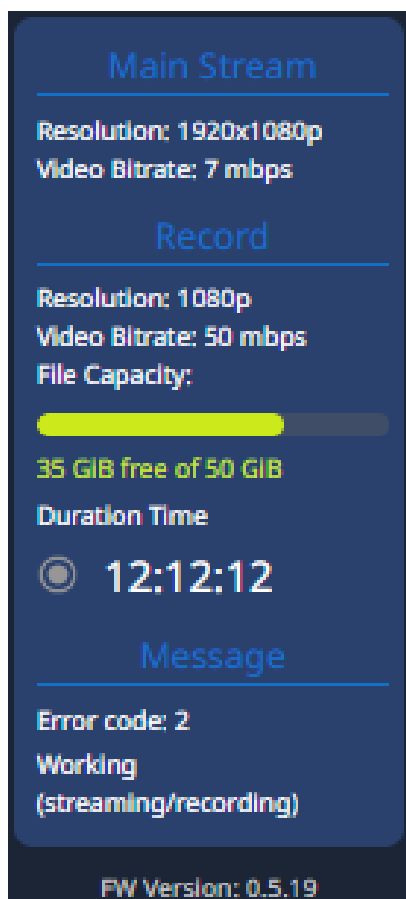
The information pane displays the video stream's resolution and video bitrate (encoder and recorder), SD card information (total disk size, remaining capacity and length of the video recorded), error messages (shown in orange) and device status (shown in white).

The firmware version is shown at the bottom.

**Main Stream**

Resolution: 1920x1080p
Video Bitrate: 7 mbps

**Record**

Resolution: 1080p
Video Bitrate: 50 mbps
File Capacity:

35 GIB free of 50 GIB
Duration Time

◉ 12:12:12

**Message**

Error code: 2
Working
(streaming/recording)

FW Version: 0.5.19

The error codes are listed in the table below.

| Error | Code | Descriptions | Impact |
|---|---|---|---|
| No Error | 000 | No error | |
| Parameter Error | 254 | Stream parameters error | Stream Only |
| Internet or Server Error | 253 | Internet disconnected, poor connection, server handshake error or disconnected from server | Stream Only |
| Write Packet Error | 251 | Unable to write packets to server; restore by reconnecting | Stream Only |
| HDMI Unplugged | 250 | HDMI input disconnected or no HDMI signal | Record/Stream |
| Incorrect Resolution or Low Frame Rate | 249 | Incorrect resolution/frame rate | Record/Stream |
| Used H.265 video encoding during RTMP(S) streaming | 248 | H.265 not supported on RTMP | Stream Only |
| Used H.264 video encoding during 4K streaming | 246 | H.264 not supported while streaming 4K 50/59/60 video | Stream Only |
| CODEC not supported | 245 | Unknown CODEC used | Record/Stream |
| No SD Card | 244 | SD card not detected | Record Only |
| CODEC Fatal Error | 243 | CODEC fatal error | Record/Stream |
| CODEC Timing Error | 242 | CODEC timing error | Record/Stream |

| Status | Code | Descriptions | Impact |
|---|---|---|---|
| CODEC Unknown Error | 241 | CODEC unknown error | Record/Stream |
| SD Card Write Error | 240 | SD card write error; compatibility issue | Record Only |
| SD Card Full | 238 | SD card full | Record Only |
| Firmware Update Failure | 237 | Firmware update failed | System |
| SD Card Format Failure | 236 | SD card cannot be formatted | System |

The status codes are listed in the table below.

| Status | Code | Descriptions | Impact |
|---|---|---|---|
| No Error | 000 | Record/Stream stopped without error. | |
| Initiating | 001 | Record/Stream is initializing. | Record/Stream |
| Working | 002 | Recording/Streaming in progress | Record/Stream |
| F/W Updating | 007 | Firmware is updating. | System |
| F/W Update Successful | 009 | Firmware update is successful. | System |
| SD Card Format Successful | 010 | SD card is formatted successfully. | System |

## Encoder

Click the *Encoder* tab to open the encoder configuration page.



First select an appropriate video bitrate mode from the **Encoder Mode** drop-down list for video streams and the recorder. The modes are high, mid and low which provide quick access to suggested video bitrate combinations across the encoder and the recorder.
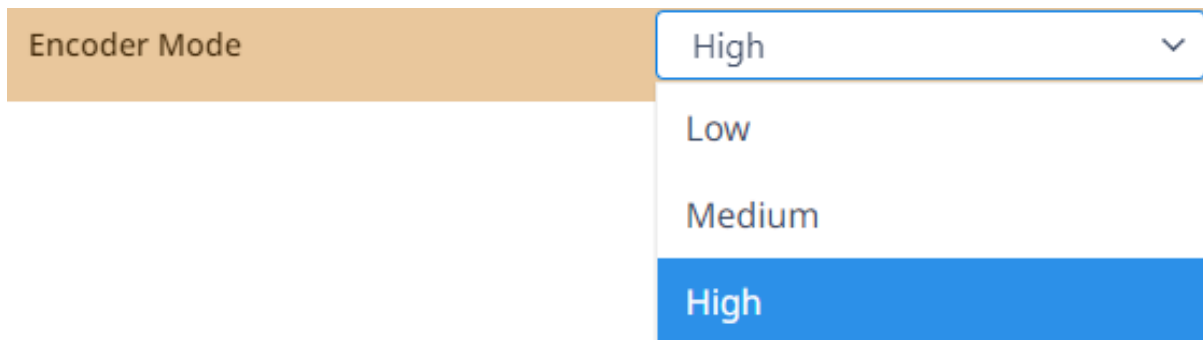
The correlated video bitrates of the encoder and the recorder in each mode are summarized in the table below:

| Modes | Encoder | Recorder |
|---|---|---|
| Low | 6 Mbps | 20 Mbps |
| Medium | 8 Mbps | 30 Mbps |
| High | 10 Mbps | 40 Mbps |

Please note that you can also use the **_Video Bitrate_** drop-down list to modify the video bitrate.

You can also use the Bitrate button on the front panel to switch between High, Medium and Low. See **_BITRATE Button_**.

### *Streaming Encoder Settings*
The stream settings will be described in detail below.

### Encoding Format
First select either the H.264 or H265 video codec after you've turned on the streaming server.

If you're working with high-resolution video formats such as 4K and 8K, H.265 is the better choice due to its improved compression efficiency. However, if you're working with older devices or platforms that may not support H.265, or if you're streaming video over a limited bandwidth connection, H.264 may be the better option.

### Resolution
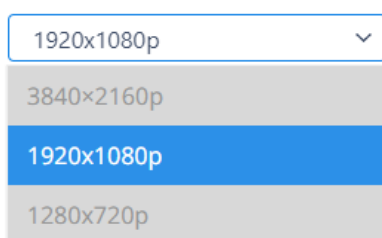


The first step of encoder setup is to adjust the image size. It is best to either match your original video source or scale it down. For example, capture at HD 720 and stream at HD 720. Or capture at 4K 2160 and stream at Full HD 1080.

You should never be scaling up and streaming at a higher resolution than your original video source. For example, it does not make sense to capture at 720 and stream at 1080. Note that you will also have no gain in quality and you are using more bandwidth than is necessary for your viewers.

You should also be aware that higher resolutions require greater processing power to encode the stream. Attempting too high of a resolution on too little processing power can result in degraded image quality and corrupted or interrupted streams or recordings.

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Please note that the NVS-32 does not support interlace video, so you should always avoid setting the resolution of your switcher's output video to 1080i/60/59.94/50.

**Video Bitrate**
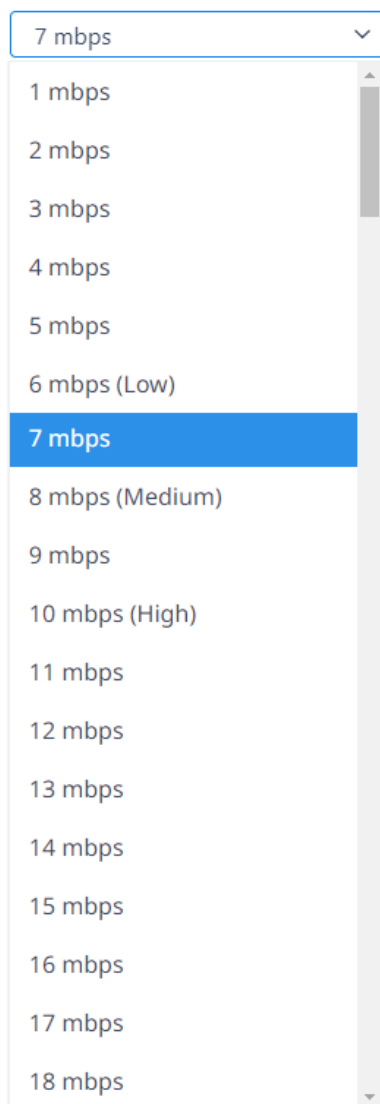
| 7 mbps | ∨ |
|---|---|
| 1 mbps | |
| 2 mbps | |
| 3 mbps | |
| 4 mbps | |
| 5 mbps | |
| 6 mbps (Low) | |
| **7 mbps** | |
| 8 mbps (Medium) | |
| 9 mbps | |
| 10 mbps (High) | |
| 11 mbps | |
| 12 mbps | |
| 13 mbps | |
| 14 mbps | |
| 15 mbps | |
| 16 mbps | |
| 17 mbps | |
| 18 mbps | |

The bitrate of the video specifies the amount of information stored in the video. The higher the bitrate, the clearer the video will be. However, when choosing your encoding settings for streaming, you should first check your available upload bandwidth. A good rule of thumb is for the bitrate of your stream to use no more than 50% of your available upload bandwidth capacity on a **DEDICATED** line. For example, if the result you get from a speed test shows that you have 20Mbps of upload speed available, your combined audio and video bitrate should not exceed 10Mbps.

**Keyframe Interval**

The keyframe interval in video encoding determines how often complete frames, called keyframes, are inserted into a video sequence. For live stream, a two-second keyframe interval is optimal, so if your frame rate is 30 fps, the keyframe interval would be every 60 frames or 2 seconds.

**Note: A short keyframe interval can result in stuttered playback.**

**Protocol**

The NVS-32 offers the user two streaming protocols which are **RTMP** and **SRT**.

Please note that when streaming, the NVS-32 converts video into data, which are sent across an IP network. High bitrates consume more bandwidth across the IP network. In a gigabit office LAN, high bitrate may not be a concern and Speed/Bandwidth is therefore not a limitation in an NVS-32 application environment.

If your available bandwidth is limited, you should reduce both your resolution and your bitrate accordingly. A good rule of thumb is for the bitrate of your stream to use no more than 50% of your available upload bandwidth capacity on a dedicated line. For example, if the result you get from a speed test shows that you have 20Mbps of upload speed available, your combined audio and video bitrate should not exceed 10Mbps.

### RTMP(S)

Real-Time Messaging Protocol (RTMP) is a communication protocol for streaming audio, video and data over the Internet. See the following for descriptions of the settings.

**RTMP(S) URL**: Enter the RTMP URL obtained from any live streaming platform.
**Note: The NVS-32 supports RTMP(S) Publish only and not RTMP(S) Local.**

**Stream Name**: Enter the stream name or key provided by the live streaming platform that you will be using.

Lastly, enter your RTMP server **account name** and **password**.

### SRT

Read this section to learn how to link between an SRT source and destination devices.

Caller and listener modes work together to establish the SRT link between source and destination devices. Simply set one device to listener mode and the other the caller mode which is entirely arbitrary.

If Caller is selected, enter the IP address of the destination device (decoder) in the **Caller IP/URL** field and a port number in **SRT Port**. The SRT port number ranges from 1024 to 65535; the default is 10001. Please note that if your SRT stream destination is a CDN or media server, the IP address and the port number should be provided by the service provider. Lastly, enter a name for your video stream in **Stream ID**.

If Listener is selected, simply enter an SRT port number that you intend to use on this device for the SRT stream.

**Latency** sets the maximum buffer size for managing SRT packets; the value ranges from 20 to 8,000 ms. The default is 1000 ms.
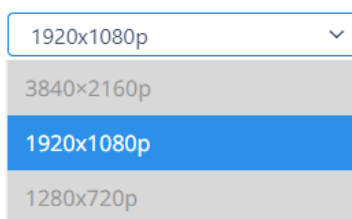
### Recorder Settings

The record settings will be described in detail below.

### Encoding Format

See **_descriptions_** in the encoder section.
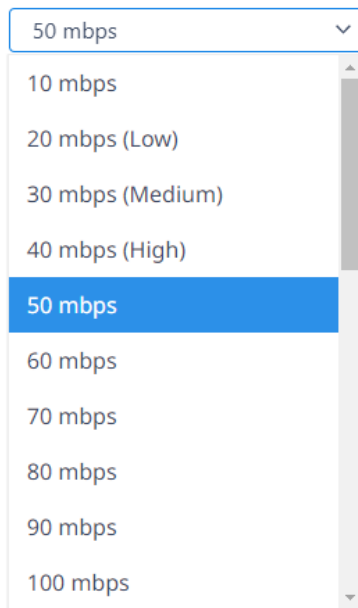
### Resolution

Recording resolution is the number of pixels (dots) used to create an image. Higher resolutions use more pixels to create an image. This means that greater amounts of detail can be expressed in the image, but larger file sizes and a greater amount of storage (i.e. hard drive space) are required to save the images or video.

1920x1080p
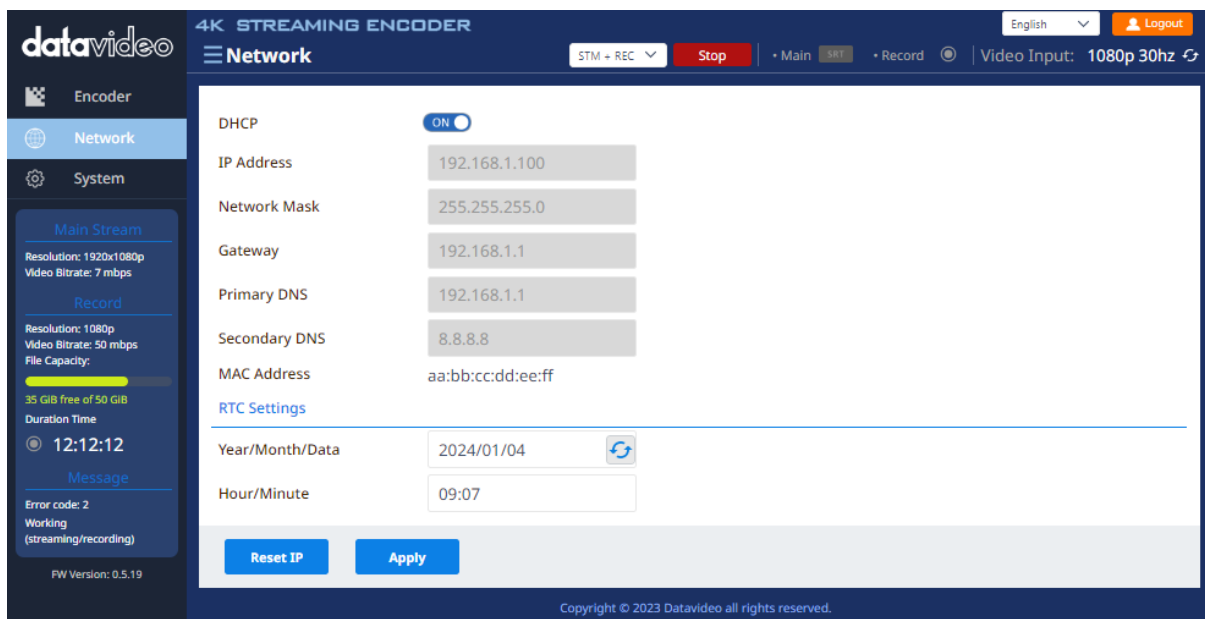3840×2160p
1920x1080p
1280x720p

**Video Bitrate**



The bitrate of the video specifies the amount of information stored in the video. The higher the bitrate is, the clearer the video is.

## *Network*

The network page allows the user to choose to use DHCP or Static IP to connect. You can also view the current time retrieved from an RTC server on this page.



### *DHCP Enable/Disable*

Enable DHCP to connect to a DHCP server which should assign an IP address to your device. To use a static IP address, simply disable DHCP then enter your network connection settings which include the IP address, network mask, gateway IP and DNS information.

The device's MAC address is shown but cannot be modified.

Please note that the NVS-32 uses DHCP to connect by default. Click the **Reset IP** button to restore default network settings and the **Apply** button to save.

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### RTC Settings

Date and time are retrieved from the RTC server. Click the **Refresh** button ⟳ to update the current time.

## System

On the system page, you will be allowed to modify the **device name**, perform a **firmware upgrade**, change the **login information** and **format the SD card**.

The system page is shown in the diagram below.
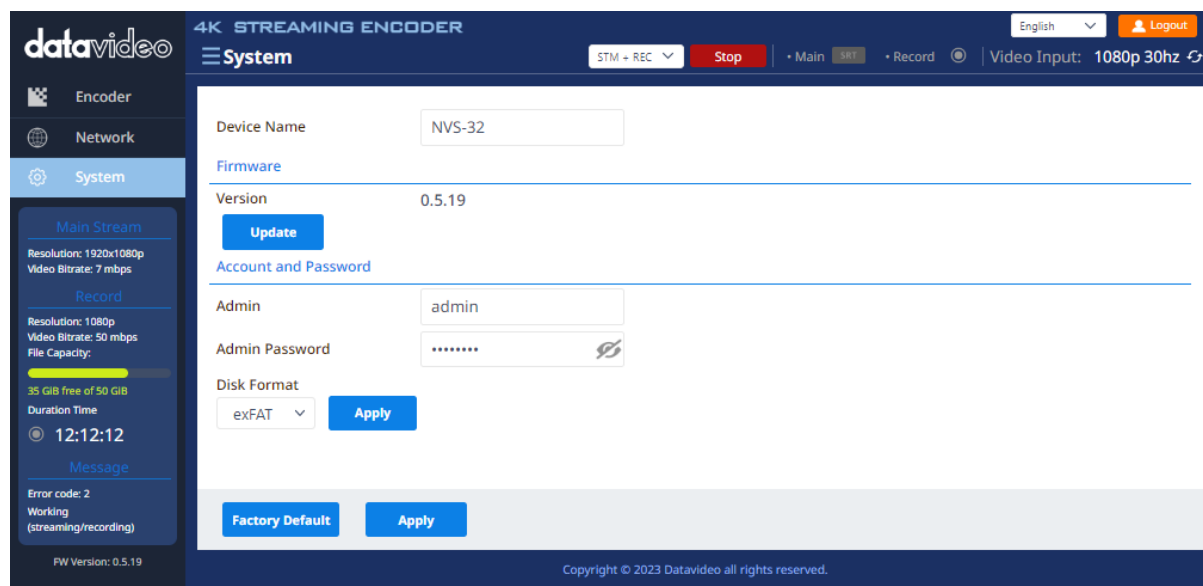


### Device Name

Enter a preferred name in the textbox then click the **Apply** button to save the change.

### Account and Password

Enter preferred username and password in the admin and admin password textboxes respectively. Click the **Apply** button to save the change.

To reset the login credentials to default username (admin) and password (admin), simply click the **Factory Default** button.

Alternatively, see *9.5 Resetting Login Credentials* to reset using the stream control buttons.

### Disk Format

Before you start recording, you should format the SD card to either FAT32 or exFAT. Comparison between exFAT and FAT32 is provided in the table below.

| FAT32 | exFAT |
|---|---|
| Best suited for small drives. | Works well on large drives. |
| Maximum file size 4GB and partition size 8 TB. | No limit on file size, and partition size. |
| FAT32 is an older type of file system introduced in Windows 95. | exFAT replaces FAT32, and supports cross-platform scenarios. |
| Better compatibility | Not used often. |

**Note that you should only use Class 10 SD card or above. See *Appendix 4 Recommended SD Cards* for a list of SD cards recommended by Datavideo.**

# 9.3 Video Streaming Guides

Use the guides in this section to learn about publishing streams to various media.

## *RTMP(S)*

Real-Time Messaging Protocol (RTMP) is a communication protocol for streaming audio, and video over the Internet. **Please note that the NVS-32 does not support RTMP(S) local.**

In this section, we will show you how to set up an **RTMP(S)** stream to **Facebook** and **Youtube**. The step-by-step setup is outlined as follows:
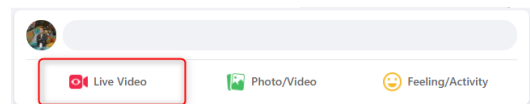
### *Facebook*

1. Open Facebook Live by clicking the link below then click "Go Live Now".

https://www.facebook.com/formedia/solutions/facebook-live
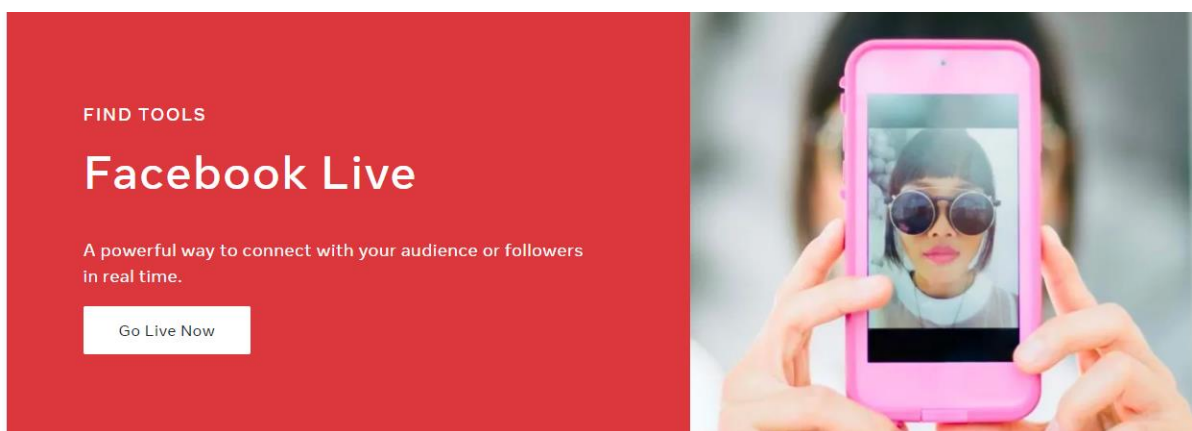


Please note that you can also link to Facebook Live from your Facebook Personal Page or Facebook Fan Page by clicking "Live Video" as depicted below.



2. Select "Go live".
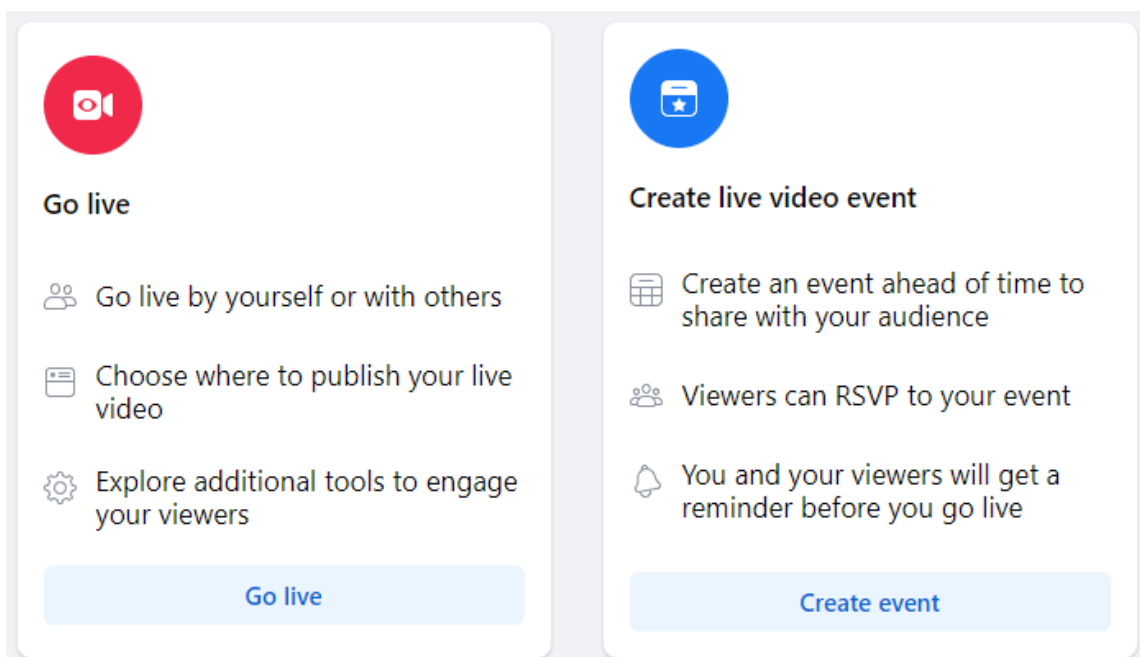
3. Select "Streaming software" where you will be able to find the server URL and the stream key. If you'd like, you can also enter the title and descriptions about this live stream.



4. Enter "Server URL" and "Stream key" in the RTMP(S) URL and Stream Name textboxes respectively. In this example, the server URL is **rtmps://live-api-s.facebook.com:443/rtmp/** and the stream key is **FB-370758482040289-0-AbwT_NpvFKtprYPK**. Also remember to enter your Facebook account information.

5. Click the **Apply** button to save the RTMP(S) stream settings. At the top right corner of the web UI, the stream channel should be updated to show RTMP(S) mode.
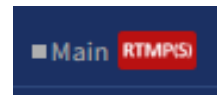


6. As shown in the diagram below, you can also preview the live camera video on Facebook Live.



7. Before you activate the live stream on Facebook, on the left pane of Facebook Live, choose where and when you want to post your live video as well as the audience. Lastly, click the "Go live" button to start livestreaming of your camera video on Facebook.
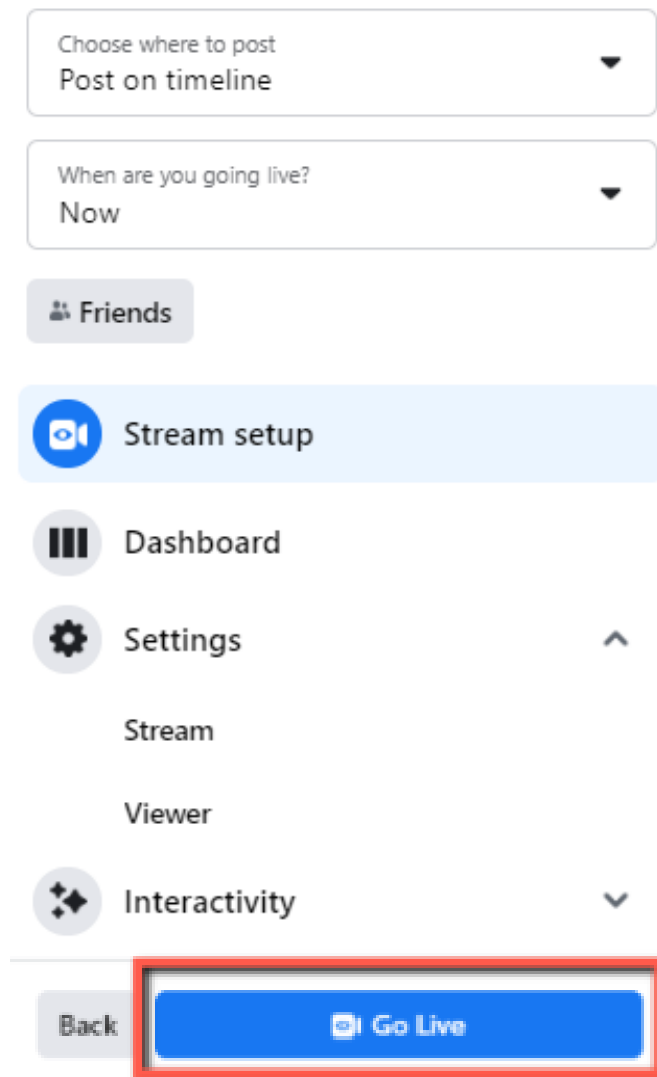
8. To end the live stream, simply click "End Live Video".
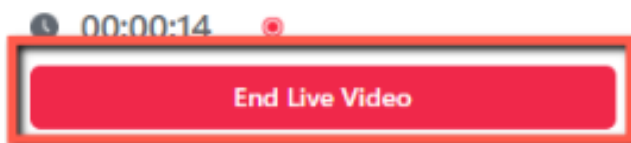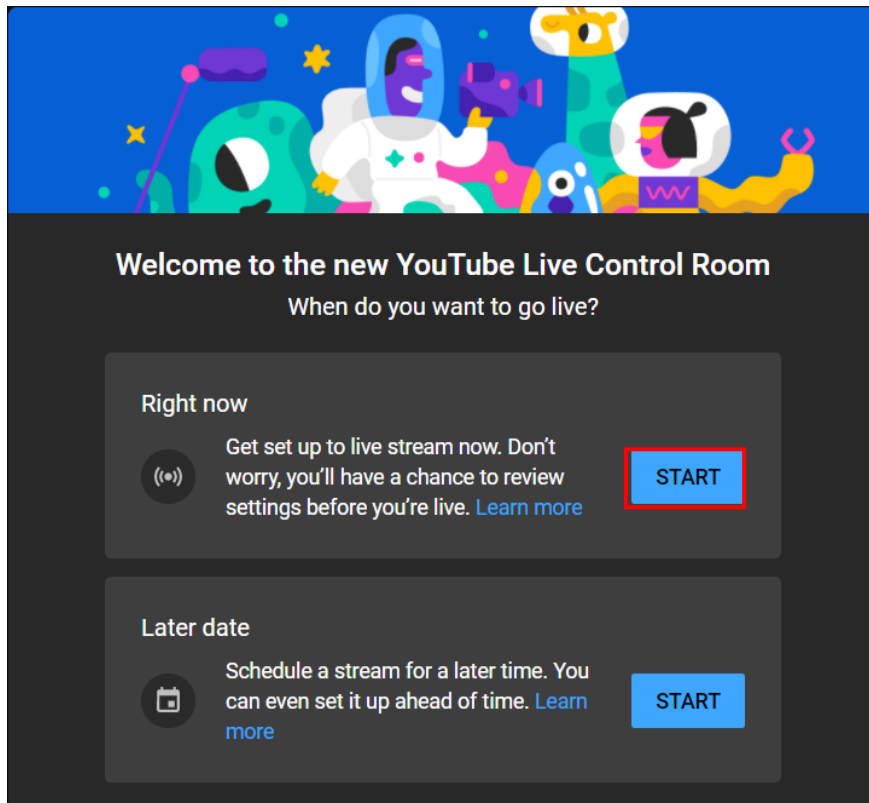


*Youtube*

1. Open the Youtube Live Control Room by clicking the link below:
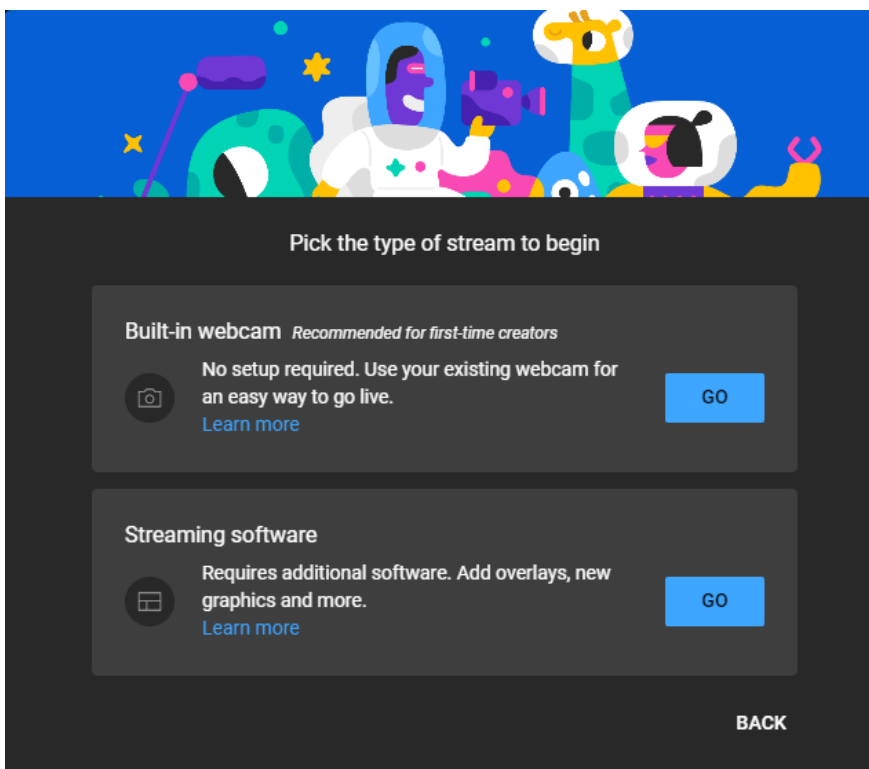   https://www.youtube.com/live_dashboard

   Alternatively, log in to your Youtube account, locate and click the camera icon at the top right corner, then select "Go live".
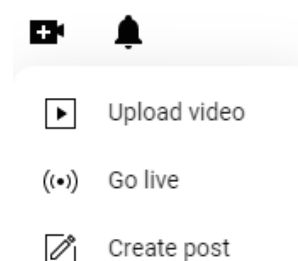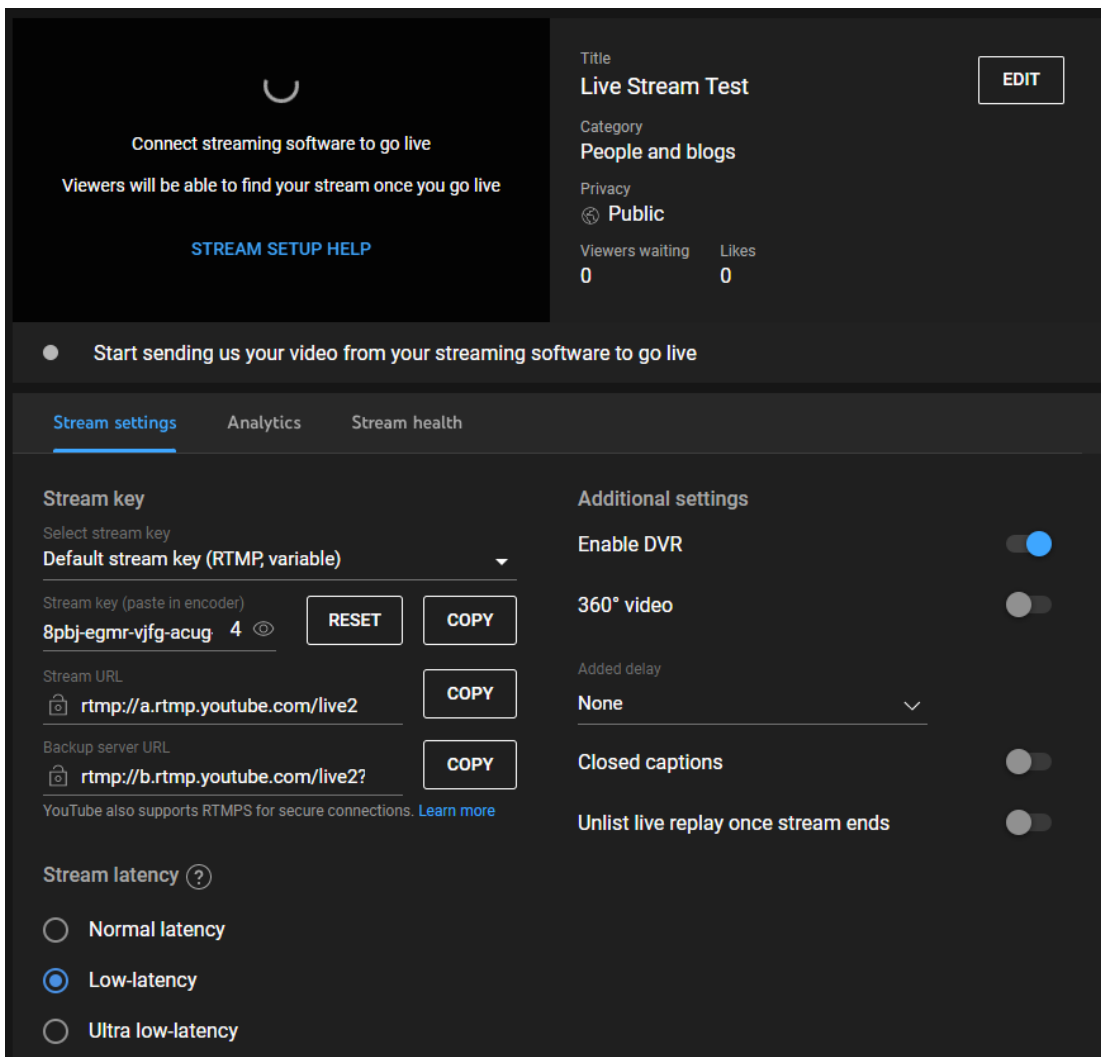
2. As soon as the "**Youtube Live Control Room**" opens, select "**Right Now**".



3. Select **Streaming Software**.



4. You will be able to find the server URL and the stream key in **Stream settings** pane of the Youtube Live Control Room. If you'd like, you can also click **Edit** to modify the stream information such as title and descriptions.

5. Enter "Server URL" and "Stream key" in the RTMP(S) URL and Stream Name textboxes respectively. In this example, the server URL is **rtmp://a.rtmp.youtube.com/live2/** and the stream key is **8pbj-egmr-vjfg-acug-6vsc**. Also remember to enter your Youtube account information.
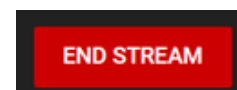


6. Click the **Apply** button to save the RTMP(S) stream settings.  At the top right corner of the web UI, the corresponding stream channel should be updated to show RTMP(S) mode.



7. To end the live stream, simply click "**END STREAM**" which can be found at the top right corner of the Youtube Live Control Room.

## SRT



Unlike RTMP(S), we will use vMIX to playback an SRT stream on a PC. If your PC or laptop does not have vMIX installed, please visit https://www.vmix.com/ and download the installation file then install the program.

Please note that the NVS-32/vMIX connection is bidirectional. Regardless of the caller-listener setup, either end can be the camera video source.

### Listener

Open the web UI and on the **Encoder** page, select **SRT Listener** from the **Protocols** drop-down list of the encoder. Then enter the **SRT port number 9000** in the **SRT URL** textbox. Lastly click the **Apply** button to save the SRT settings and the **Start** button to activate the stream.
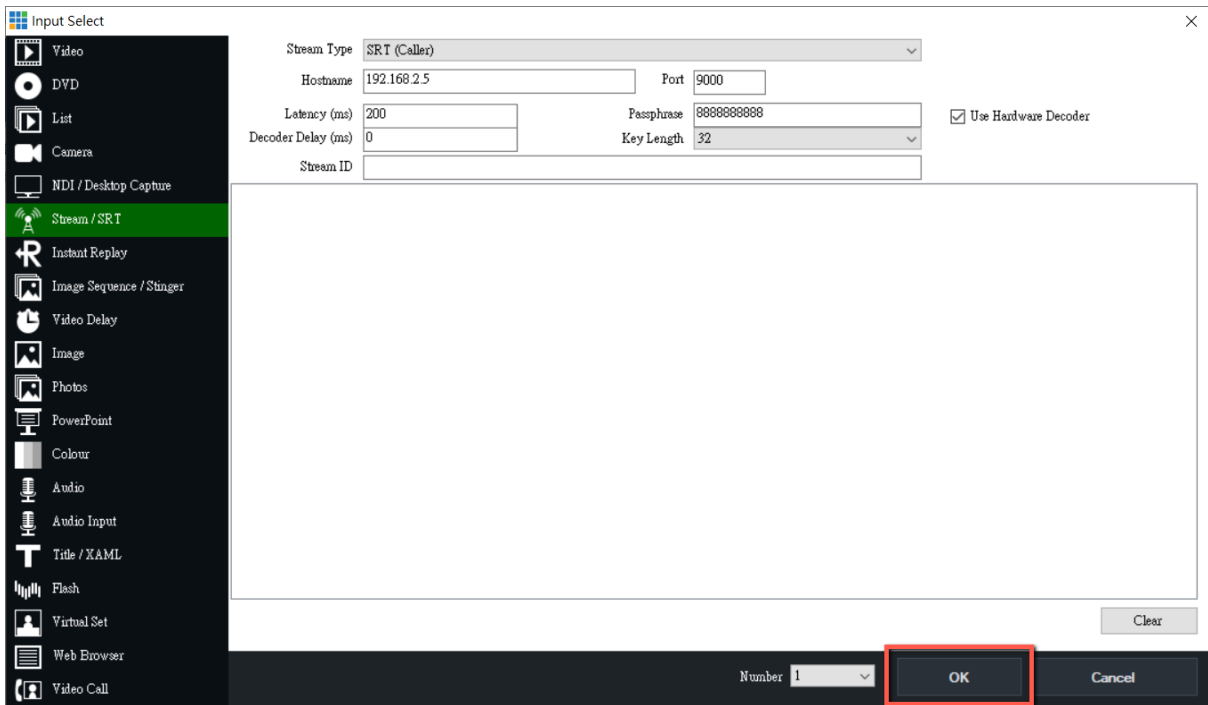
On the PC or laptop where the vMIX is installed, open vMIX then click "Add Input" and select "More".
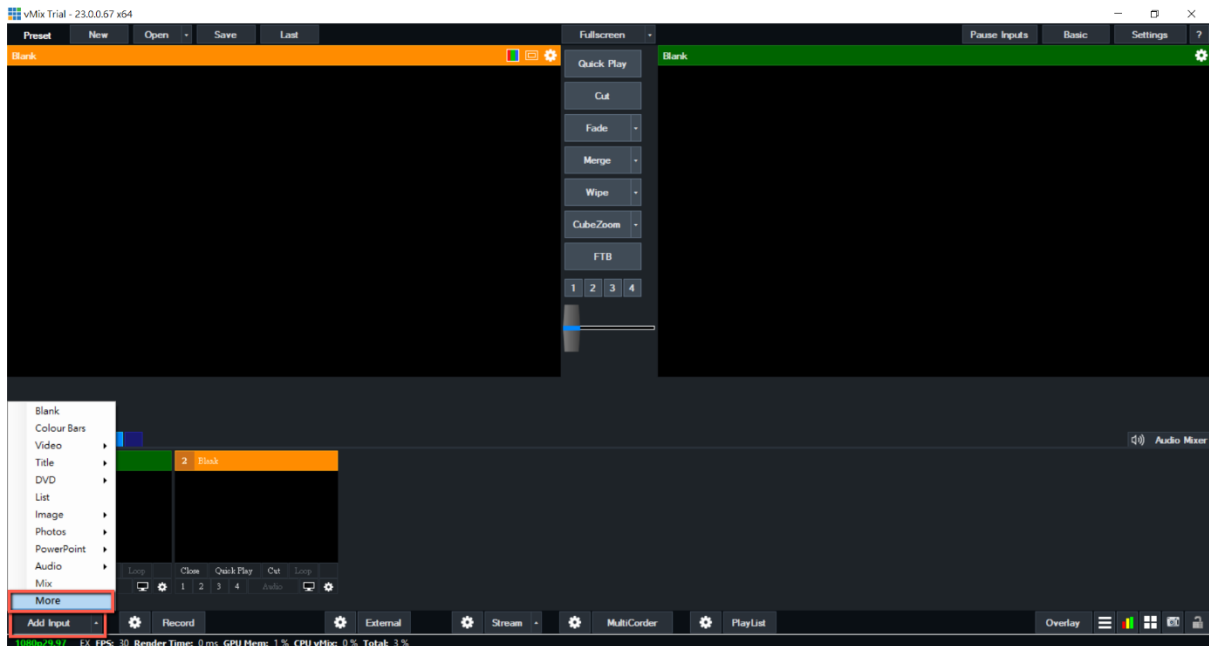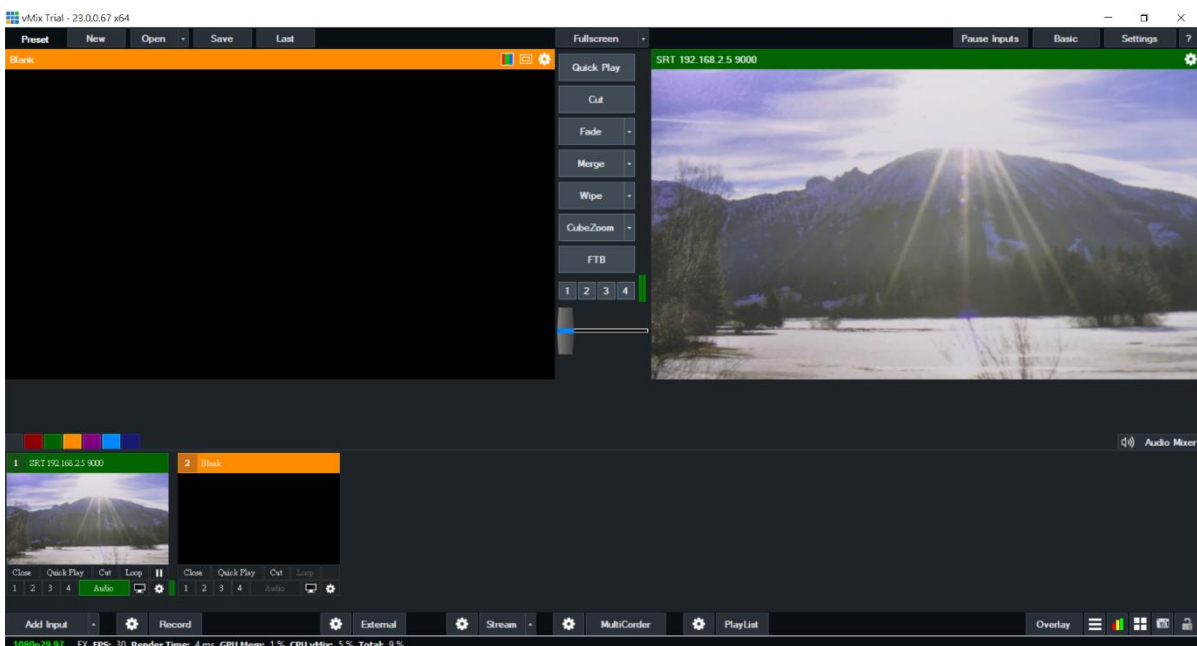


On the Input Select window, click "Stream/SRT" then select "SRT Caller" from the "Stream Type" drop-down list. After that, enter the following into the respective fields.

- Hostname: IP address of the video source which is the NVS-32 in this case.
- Port: 9000 (SRT port number ranges from 1024 to 65535.)

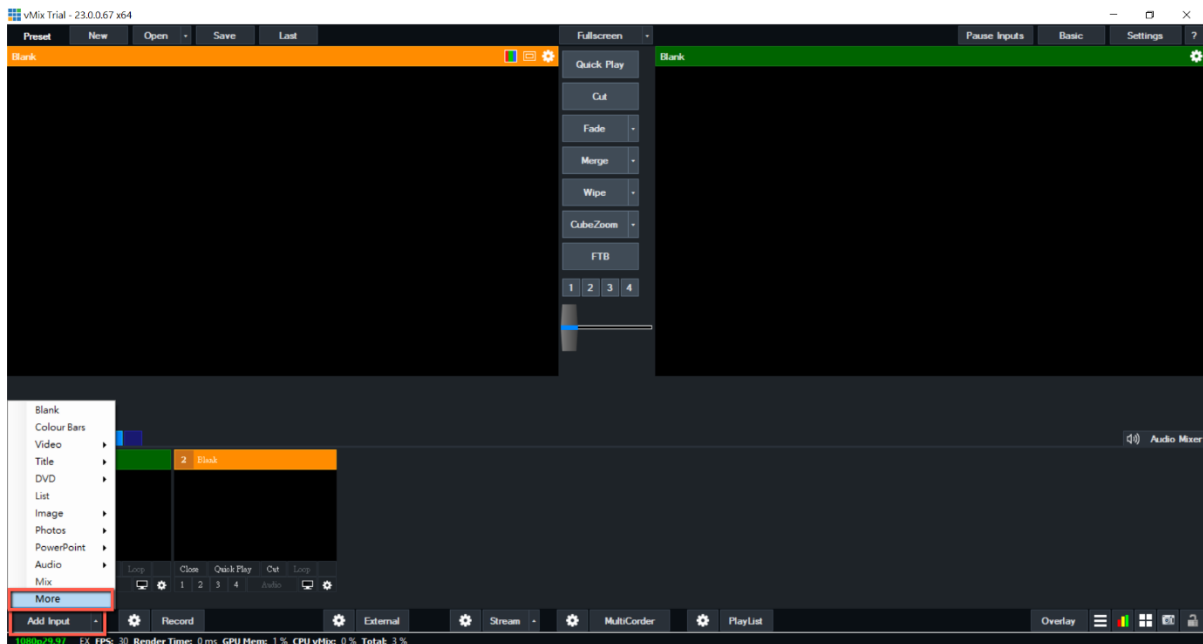You can leave passphrase empty as it is not supported on the NVS-32.

Click the "**OK**" button to start streaming to vMIX from NVS-32 via SRT.



*Caller*

Open the web UI and on the **Encoder** page, select **SRT Caller** from the **Protocols** drop-down list of the encoder. Then enter the **SRT port number 9000** in the **SRT URL** textbox and the IP address of the destination device in the **Caller IP/URL** textbox. You can also enter a stream ID but it is entirely optional. Lastly click the **Apply** button to save the SRT settings and the **Start** button to activate the stream.

On the PC or laptop where the vMIX is installed, open vMIX then click "Add Input" and select "More".
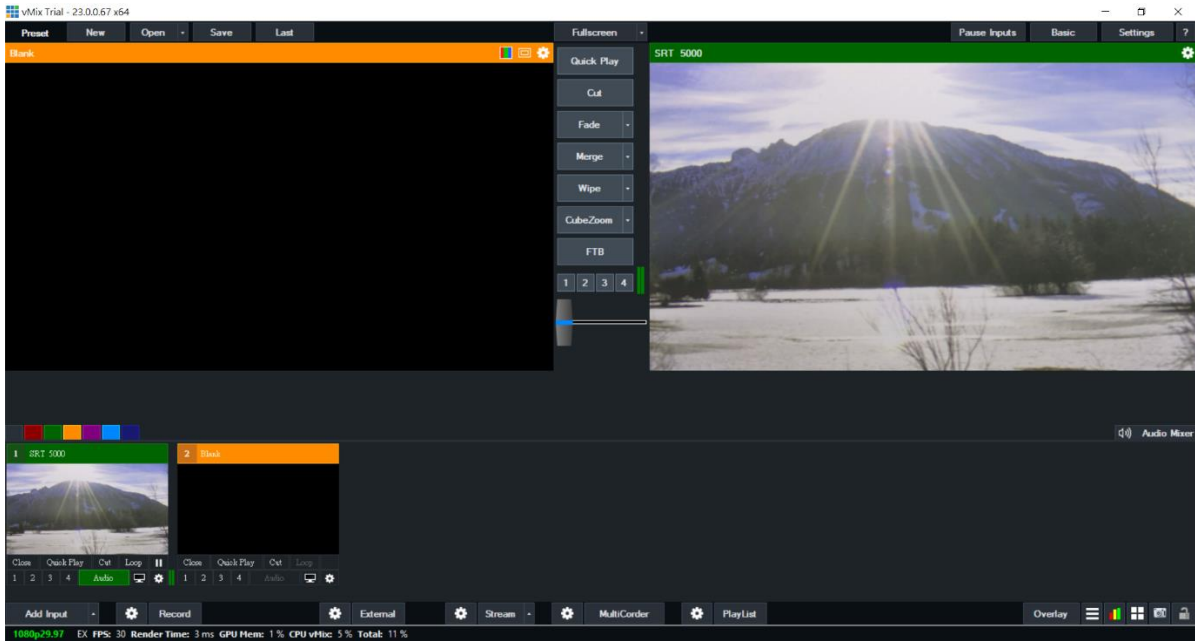
On the Input Select window, click "Stream/SRT" then select "SRT Listener" from the "Stream Type" drop-down list. After that, enter the following into the respective fields.

- Port: 9000 (SRT port number ranges from 1024 to 65535.)

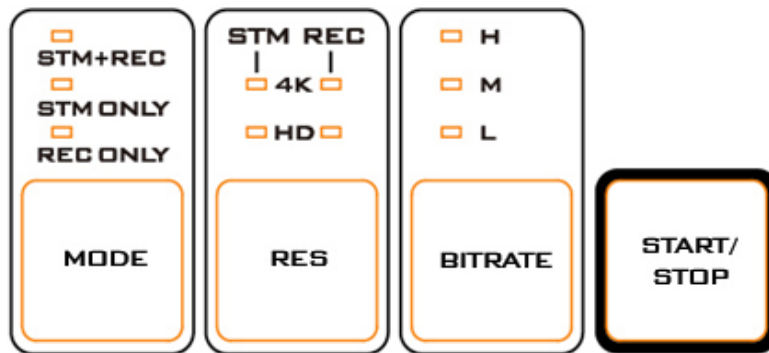You can leave passphrase empty as it is not supported on the NVS-32.
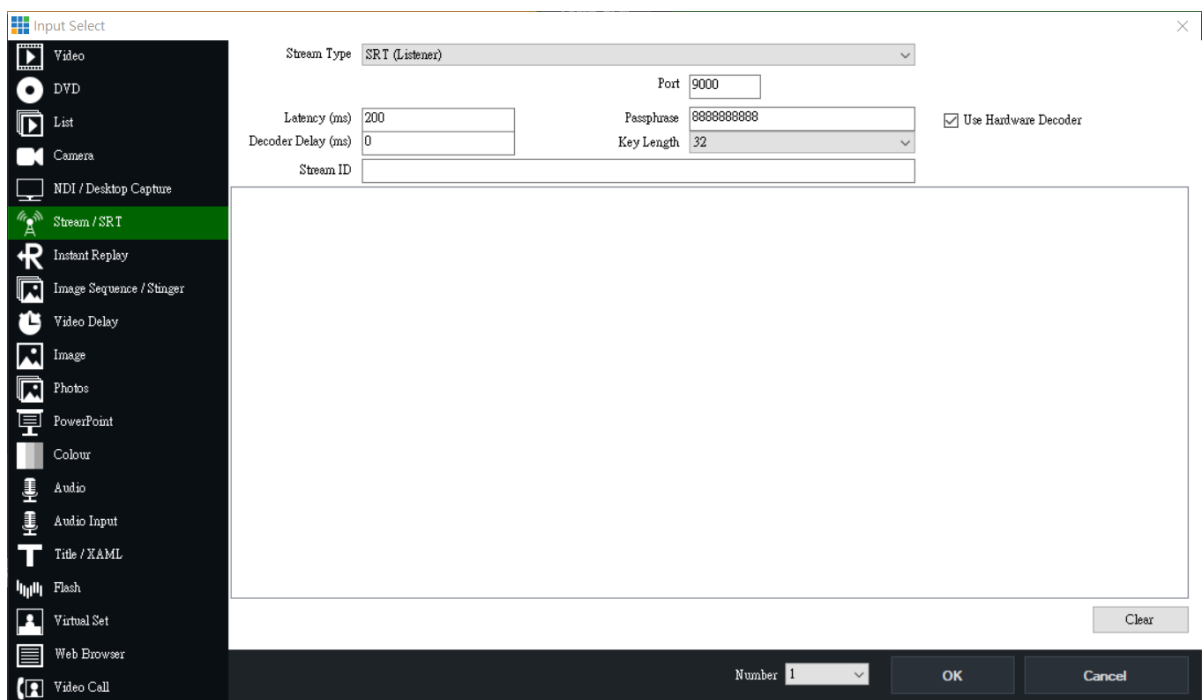


Click the "**OK**" button to start streaming to vMIX from NVS-32 via SRT.

## 9.4 Panel Buttons

The **START/STOP**, **BITRATE**, **RES** and **MODE** buttons on the front panel of the HS-4000 give the user certain controls of the record and stream functions. In this section, we will cover operations of these four buttons in detail.



### *Button and LED Behavior*

See the table below for button and LED behavior.

| | | MODE | RES | BITRATE | START/STOP |
|---|---|---|---|---|---|
| **LED states before button push** | **Blinking White** | N/A | N/A | N/A | N/A |
| | **Solid White** | Push to switch operation mode. | Push to change resolution according to the mode selected. | Push to switch between H, M and L. | Push and hold for at least 2 seconds to start device operation. |
| | **Blinking Red** | N/A | N/A | N/A | Error; check the Message box for error code. |

| | Solid Red | Mode change in progress | Resolution change in progress | Bitrate change in progress | Push and hold for at least 2 seconds to stop device operation. |
|---|---|---|---|---|---|

## *MODE Button*

Press the **MODE** button to select the device's mode of operation. The available modes are listed as follows:
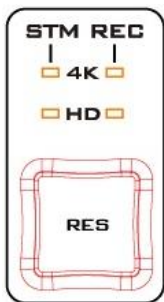
- **STM+REC:** Stream and record simultaneously
- **STM ONLY:** Stream only
- **REC ONLY:** Record only
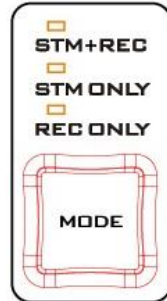
The LED indicator of the selected mode of operation should turn ON.

Please note that when STM+REC is selected, you can only set either one of the stream and record channels to 4K or both channels to HD. Use the RES button to select resolution.

## *RES Button*

Press the **RES** button to switch between 4K and HD resolutions.

The LED indicators should indicate the resolution selected for the stream and record channels.

## *BITRATE Button*

Press the **BITRATE** button to select the bitrate mode for video streaming and recording. The available bitrate modes are listed as follows:

- H: High
- M: Moderate
- L: Low

**Note: The default bitrate is M.**

The correlated video bitrates of the encoder and the recorder in each mode are summarized in the table below:

| Modes | Encoder | Recorder |
|---|---|---|
| Low | 6 Mbps | 20 Mbps |
| Medium | 8 Mbps | 30 Mbps |
| High | 10 Mbps | 40 Mbps |

You can also change the video bitrate using the web user interface, see *Encoder* for details.

*START/STOP Button*

Lastly, after you've configured the operation mode, press and hold for at least 2 seconds to enable/disable live streaming/recording.

## 9.5 Resetting Login Credentials

If you forget your username and/or password, follow the steps below to reset the web UI's login credentials.

1. Press the stream control buttons in the following order:
   **Start/Stop → Bitrate → Res → Res → Mode → Mode → Mode**

2. The **Mode** button will flash red/white colors for about 5 seconds.

3. The device will start resetting the login credentials.

4. Use admin/admin to log in next time.

# Chapter 10   Appendices

## Appendix 1        Tally Outputs

The HS-4000 has a D-sub 25 pin female tally output port. These connections provide bi-colour tally information to a number of other Datavideo products, such as the ITC-100 eight channel talkback system and the TLM range of LCD Monitors.

These ports are open collector ports and as such do not provide power to tally light circuits.

Dielectric strength: Max. DC 24V

Current:          Max. 50mA
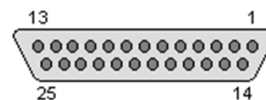
(D-sub 25-Pin Female)

The pin outputs are defined as follows:

| Pin No. | Signal name | Input/Output | Signal Description |
|---------|-------------|--------------|--------------------|
| 1 | Program 1 | Open collector output | Tally output of input video Program 1 |
| 2 | Program 2 | Open collector output | Tally output of input video Program 2 |
| 3 | Program 3 | Open collector output | Tally output of input video Program 3 |
| 4 | Program 4 | Open collector output | Tally output of input video Program 4 |
| 5 | Program 5 | Open collector output | Tally output of input video Program 5 |
| 6 | Program 6 | Open collector output | Tally output of input video Program 6 |
| 7 | Program 7 | Open collector output | Tally output of input video Program 7 |
| 8 | Program 8 | Open collector output | Tally output of input video Program 8 |
| 9 | Program 9 | Open collector output | Tally output of input video Program 9 |
| 10 | Program 10 | Open collector output | Tally output of input video Program 10 |
| 11 | Program 11 | Open collector output | Tally output of input video Program 11 |
| 12 | Program 12 | Open collector output | Tally output of input video Program 12 |
| 13 | GND | Ground | Ground |
| 14 | Preview 1 | Open collector output | Tally output of input video Preview 1 |
| 15 | Preview 2 | Open collector output | Tally output of input video Preview 2 |
| 16 | Preview 3 | Open collector output | Tally output of input video Preview 3 |
| 17 | Preview 4 | Open collector output | Tally output of input video Preview 4 |
| 18 | Preview 5 | Open collector output | Tally output of input video Preview 5 |
| 19 | Preview 6 | Open collector output | Tally output of input video Preview 6 |
| 20 | Preview 7 | Open collector output | Tally output of input video Preview 7 |
| 21 | Preview 8 | Open collector output | Tally output of input video Preview 8 |
| 22 | Preview 9 | Open collector output | Tally output of input video Preview 9 |
| 23 | Preview 10 | Open collector output | Tally output of input video Preview 10 |
| 24 | Preview 11 | Open collector output | Tally output of input video Preview 11 |
| 25 | Preview 12 | Open collector output | Tally output of input video Preview 12 |

# Example of tally connections

TALLY OUTPUT

(Max. current: 50mA)    Tally LED    (Max.voltage:24V)

R    VCC

Ground
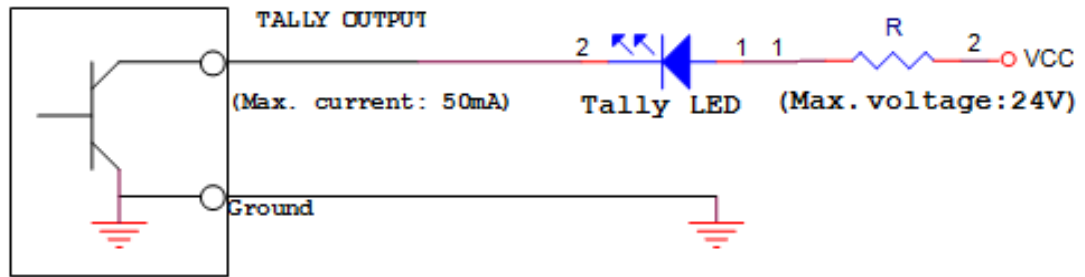
## Appendix 2    GPI / GPO Connections

The HS-4000 can control external recorder/playback devices like the HDR-80 and HDR-90 via a simple contact closure GPI / GPO switch.

The GPI interface is a 3.5mm Jack Socket which is situated on the rear panel of the HS-4000. Contact closure between the Outer and Inner contacts on the jack plug will trigger a user selected event. Power is supplied by the HS-4000 and is less than 5V DC.

3.5 mm Stereo Jack Plug

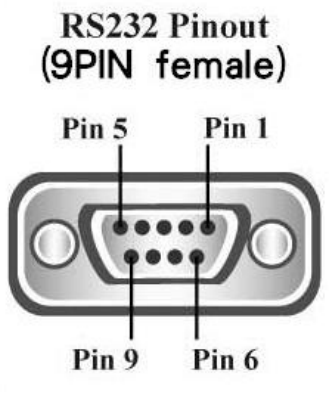Contact closure between inner and outer will send a GPI Trigger
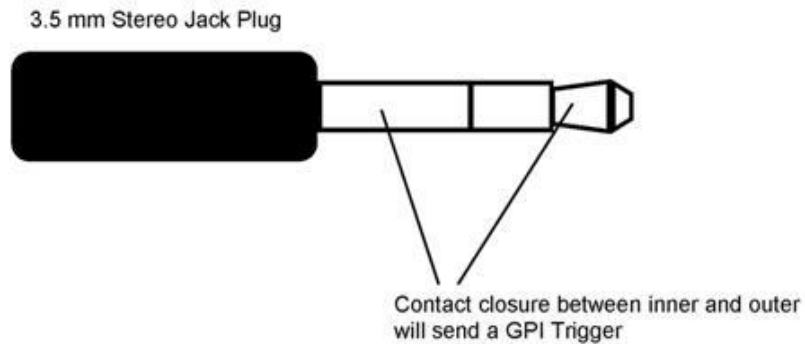
This GPI socket can also be used as a GPO socket to trigger record or playback events with other equipment such as the Datavideo HDR-80 or HDR-90 recorder.

***SAFETY FIRST*** The cabling required needs to be designed specifically to connect the HS-4000 to the chosen record or playback device as they are not all the same. The cabling required can be made by yourself or a competent technician. Please speak with your Dealer or local Datavideo office to get further help and advice.

# Appendix 3    RS-232 Serial Port Pinout

The user is allowed to connect a custom keyboard controller to the HS-4000 via RS-232 interface (the user may also enable RS-422 if necessary). The table below provides the RS-232 serial port pinout on the device end (HS-4000). Note that the RS-232 port is a 9 pin D-sub female connector.

| Pin No. | Signal |
|---------|--------|
| Pin 1 | GND |
| Pin 2 | TXD (RS-232) |
| Pin 3 | RXD (RS-232) |
| Pin 4 | GND |
| Pin 5 | GND |
| Pin 6 | GND |
| Pin 7 | TXD (RS-422) |
| Pin 8 | RXD (RS-422) |
| Pin 9 | GND |

RS232 Pinout
(9PIN female)

Pin 5    Pin 1

Pin 9    Pin 6

You may download the RS-232 control protocol from the product page.

# Appendix 4    Recommended SD Cards

**You should only use Class 10 SD card or above. In this appendix, you will find a list of SD cards recommended by Datavideo.**

| No. | Brand | Model | Pictures |
|---|---|---|---|
| 1 | **Kingston** | SDHC I C10<br>16GB |  |
| 2 | **SANDISK Extreme** | SDXC I C10 U3 V30<br>64GB |  |
| 3 | **SONY** | SDXC I C10 U1<br>64GB |  |
| 4 | **SANDISK Extreme PRO** | SDXC I C10 U3<br>128GB/64GB |  |
| 5 | **SONY** | SDXC I C10 U3<br>64GB |  |
| 6 | **TOSHIBA** | SDHC C10<br>16GB |  |

| Recommended SD Cards | | | |
|---|---|---|---|
| No. | Brand | Model | Pictures |
| 7 | **SANDISK Extreme** | SDHC C10<br>16GB |  |
| 8 | **ADATA Premier Pro** | microSDXC I UHS-I U3 Class 10 with SD adapter<br>64GB/16GB |  |
| 9 | **SANDISK ULTRA®** | SDHC™/SDXC™ UHS-I<br>128GB |  |
| 10 | **Transcend** | 300S UHS-I SDHC<br>64GB/32GB |  |

# Appendix 5　　Firmware Update

Datavideo usually releases new firmware containing new features or reported bug fixes from time to time. Customers can either download the HS-4000 firmware as they wish or contact their local dealer or reseller for assistance.

**The existing HS-4000 settings should persist through the *firmware upgrade process, which should not be interrupted once started* as this could result in a non-responsive unit.**

**Successful firmware upgrade on HS-4000 requires:**

➢ PC or laptop
➢ USB drive
➢ Access to the Internet for software download

## *Upgrade Procedure*

You can upgrade the device either via the **USB Service Port** or **Ethernet Port**.

**Service Port**

Follow the steps outlined below to upgrade via the USB Service Port.

1. Download the latest firmware and the update tool from the path below.
**www.datavideo.com → products → Switchers → HS-4000 → Downloads → Latest Firmware**
2. Extract the contents of the compressed file to the Desktop.
3. Insert a USB thumb drive into the PC or laptop and format the drive to FAT or FAT32 system. Save the latest firmware files on the drive.
4. Remove the USB drive from the PC or laptop.
5. Insert the USB drive into the **Service** port at the rear of the switcher.
6. Power ON the switcher and if you see an image showing on the output screen after about 40 seconds, then your HS-4000 has been successfully upgraded so remove the USB drive from the **Service** port.

**Ethernet Port**

Follow the steps outlined below to upgrade via the Ethernet Port.

1. Download the CTL Upgrade Tool. Check your laptop's Windows version before download, make sure the right tool is downloaded for your operating system.
2. Unzip the downloaded file.
3. Open the directory where the CTL Upgrade Tool is unzipped to.
4. Open the CTL Upgrade Tool by double clicking the tool icon.
5. Enter the switcher's IP address; please note that the default IP address is 192.168.100.101.
6. Click **Source Selection** to browse the hard drive for the latest firmware file (zip).
7. Click **Start** to begin upgrading the switcher's firmware.
8. When you are prompted "Upgrading Done", the HS-4000 has been successfully upgraded.
9. Click **CTL Reboot** to reboot the device to finish the upgrade.

## *T-Bar Calibration*

1. Press the SETUP button on the control panel to open the SETUP sub menu on the 5 inch touch screen.
2. At the bottom right of the 5 inch touch screen, tap 7 times until "Force to upgrade" appears at the bottom of the screen.
3. Tap SETUP/Keyboard and you will see two options which are Tbar DOWN Arrow Bound and Tbar Upper Arrow Bound.
4. Push the T-Bar down then tap the Tbar DOWN Arrow Bound value on the 5 inch touch screen.
5. Push the T-Bar up then tap the Tbar Upper Arrow Bound value on the 5 inch touch screen.
6. Reboot the machine then test the calibrated T-Bar.

# Appendix 6    Frequently-Asked Questions

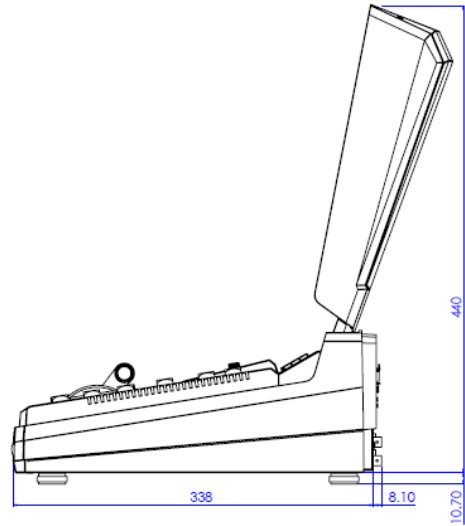This section describes problems that you may encounter while using the HS-4000. If you have any questions, please refer to related sections and follow all suggested solutions. If problem still exists, please contact your distributor or the service center.

| No. | Problems | Solutions |
|-----|----------|-----------|
| 1 | **Why isn't the logos transitioned?** | Logos will not be transitioned as the CUT or AUTO button is pressed, nor will it be transitioned as the T-bar is pushed. |
| 2 | **Is there any other way alternative to GUI to reset the machine's IP address?** | Use a needle to push the reset hole next to the USB FW Upgrade port to restore the default IP address. Push the reset button then hold for about 5 to 10 seconds until the machine reboots itself to restore the IP address to 192.168.100.101. |

# Appendix 7    Dimensions & Weight

| Closed |
|---|
|  |
| **Weight:  9.2 kg**                                 **All measurements in millimeters (mm)** |

| Open |
|---|



455

440

338    8.10    10.70
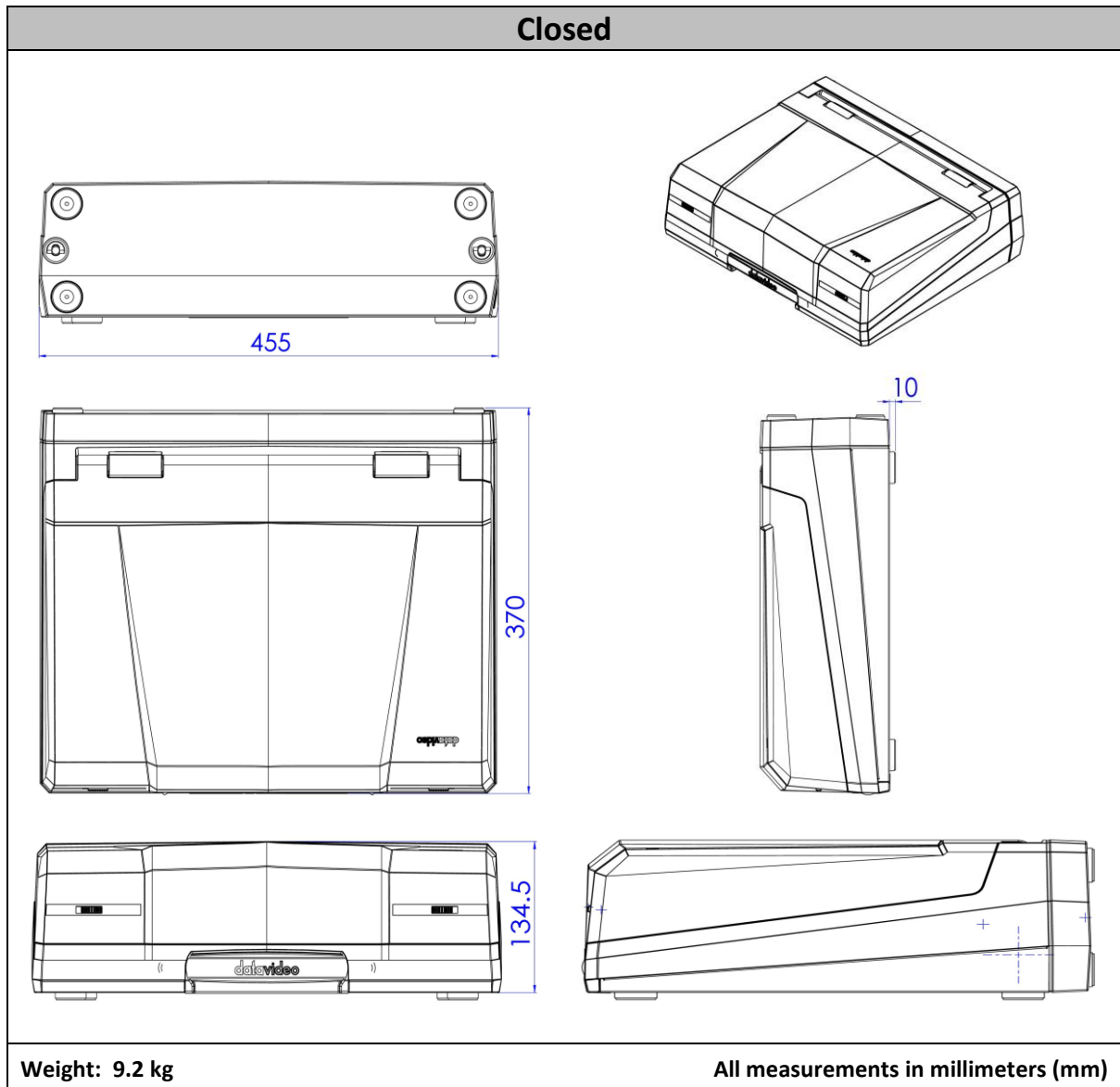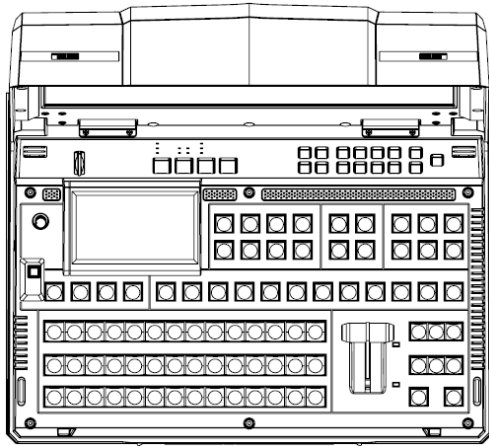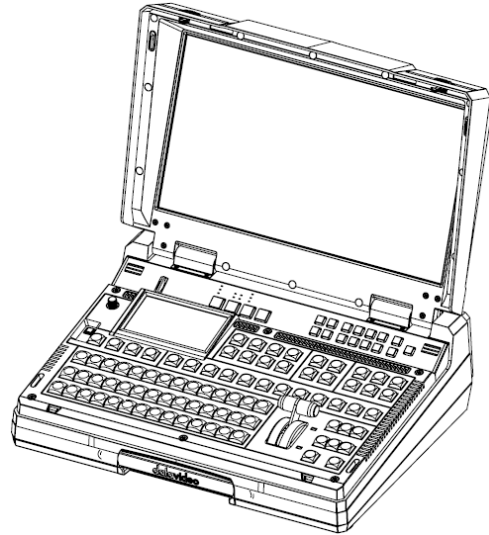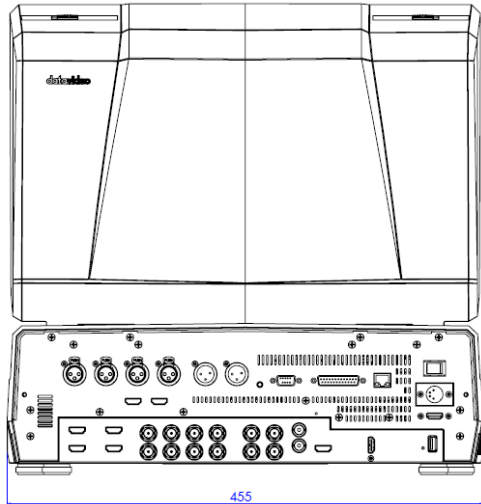
| Weight: 9.2 kg | All measurements in millimeters (mm) |
|---|---|

# Appendix 8　　Specifications

| Model Name | HS-4000 |
|---|---|
| **Product Name** | **4K 8-Channel Portable Video Studio** |
| **Video Standard** | 4K & HD |
| **Video Format** | Input<br>3840x2160p: 60/59.94/50/30/29.97/25<br>1080p: 60/59.94/50/30/29.97/25<br>1080i: 60/59.94/50<br>Output<br>3840x2160p: 60/59.94/50/30/29.97/25<br>1080p: 60/59.94/50/30/29.97/25<br>1080i: 60/59.94/50<br>Latency<br>50-60 Hz: 1 frame delay (2 frame delay for PIP output)<br>25-30 Hz: 2 frame delay (3 frame delay for PIP output) |
| **Video Processing** | SDI: 4:2:2<br>HDMI: YUV 4:2:2 10 bit, RGB: 4:4:4 8/10 bit |
| **Input Routable / Crosspoint** | Yes |
| **Video Input** | Total 8 live inputs (select 8 from 12)<br>8 x 12G-SDI<br>4 x HDMI |
| **Computer Graphical Interface** | 4 via HDMI |
| **Video Output** | 4 x 12G-SDI / 1 x HDMI assignable:<br>• Multiview<br>• Program<br>• Preview<br>• Program + DSK<br>• Clean Program<br>• Clean Preview<br>• Input 1 – 12<br>2 x HDMI PGM only<br>1 x HDMI Multiview |
| **Downconverted Output** | Yes |
| **Built-in Multi-View Monitoring Out** | HDMI & SDI assignable |
| **Analogue Audio Input** | 4 x Analogue XLR |
| **Analogue Audio Output** | 2 x Analogue XLR |
| **Digital Embedded Audio Support** | Input: 4 Channels<br>Output: 4 Channels |
| **Audio Delay Calibration** | up to 16 Fields or 8 Frames per Channel |

| | |
|---|---|
| **A+V Switching** | Yes |
| **Chromakey** | 4 |
| **Title Creator** | 4 via HDMI; download CG-200 for free |
| **USK** | 4 Keyers supporting Chromakey & Linear/ Luma Key |
| **DSK** | 2 x DSK supporting Lumakey & Linear key (Key / Fill) |
| **Picture in Picture** | 2 |
| **Logo Insertion** | 2 |
| **Still Store** | 250 |
| **Effects** | FTB, Cut, 32 Wipe with border |
| **Transition Preview** | Full Transitions Preview |
| **Sync / Reference In / Out** | Built-in Genlock<br>Support external sync with loop thru |
| **Tally Output** | 1 x D-sub 25pin, Dual Color |
| **PC Remote Control** | DVIP (Ethernet) |
| **Built-in Audio Mixer** | Yes |
| **Firmware Update** | USB/Ethernet |
| **Special Features** | 5 inch touchscreen display<br>17.3 inch 4K Monitor<br>4 Chroma-Key Virtual Studio<br>Streaming Encoder and Recorder |
| **Chassis** | Reinforced Plastic Case |
| **Dimensions (LxWxH)** | 455 x 370 x 134 mm |
| **Weight** | 9.2 kg |
| **Power** | DC 56V, 4.46 A |
| **Operating Temperature** | 0 - 40°C [32 - 104°F] |

**Notes**

**Notes**

# Service & Support

It is our goal to make owning and using Datavideo products a satisfying experience. Our support staff is available to assist you to set up and operate your system. Contact your local office for specific support requests. Plus, please visit www.datavideo.com to access our FAQ section.

Please visit our website for latest manual update.
www.datavideo.com/product/HS-4000

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