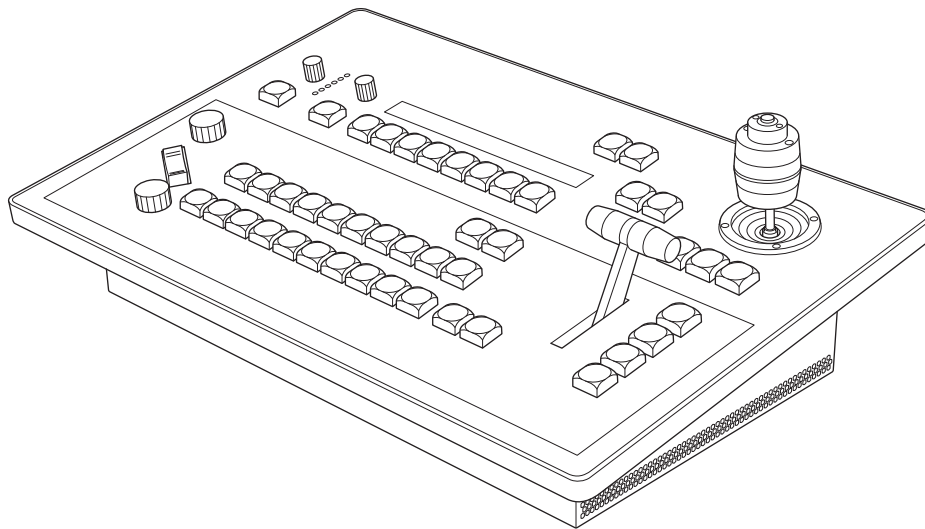# Panasonic®

# Operating Instructions

### Live Production Center
Model No. **AV-HLC100P**
Model No. **AV-HLC100E**

Before operating this product, please read the instructions carefully and save this manual for future use.
Before using this product, be sure to read "Read this first!" (pages 3 to 7).

## ■ Trademarks and registered trademarks

- Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and other countries.
- Apple, Mac and OS X are registered trademarks of Apple Inc., in the United States and other countries.
- Photoshop is a trademark or registered trademark of Adobe Systems Incorporated in the United States and/or other countries.
- Other names of companies and products contained in these Operating Instructions may be trademarks or registered trademarks of their respective owners.

## ■ About copyright and licence

Distributing, copying, disassembling, reverse compiling, reverse engineering, and also exporting in violation of export laws of the software provided with this unit are expressly prohibited.

## ■ Abbreviations

The following abbreviations are used in this manual.
- Personal computers are referred to as "computers".

## ■ Illustrations and screen displays featured in the manual

- What is shown in the manual's illustrations and screen displays may differ from how it is actually appears.
- The screenshots are used in accordance with the guidelines of Microsoft Corporation.

# Read this first!

**WARNING:**
This equipment must be earthed.
To ensure safe operation, the three-pin plug must be inserted only into a standard three-pin power point which is effectively earthed through the normal household wiring.
Extension cords used with the equipment must have three cores and be correctly wired to provide connection to the earth.
Wrongly wired extension cords are a major cause of fatalities. The fact that the equipment operates satisfactorily does not imply that the power point is earthed or that the installation is completely safe. For your safety, if you are in any doubt about the effective earthing of the power point, please consult a qualified electrician.

**WARNING:**
• To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.
• To reduce the risk of fire or electric shock, keep this equipment away from all liquids. Use and store only in locations which are not exposed to the risk of dripping or splashing liquids, and do not place any liquid containers on top of the equipment.

**CAUTION:**
Do not remove panel covers by unscrewing.
To reduce the risk of electric shock, do not remove the covers.
No user serviceable parts inside.
Refer servicing to qualified service personnel.

**CAUTION:**
The mains plug of the power supply cord shall remain readily operable.
The AC receptacle (mains socket outlet) shall be installed near the equipment and shall be easily accessible. To completely disconnect this equipment from the AC mains, disconnect the power cord plug from the AC receptacle.

**CAUTION:**
In order to maintain adequate ventilation, do not install or place this unit in a bookcase, built-in cabinet or any other confined space. To prevent risk of electric shock or fire hazard due to overheating, ensure that curtains and any other materials do not obstruct the ventilation.

**CAUTION:**
To reduce the risk of fire or electric shock and annoying interference, use the recommended accessories only.

**CAUTION:**
Do not leave the unit in direct contact with the skin for long periods of time when in use.
Low temperature burn injuries may be suffered if the high temperature parts of this unit are in direct contact with the skin for long periods of time.

**CAUTION:**
A coin type battery is installed inside of the unit.
Do not expose the unit to excessive heat such as sunshine, fire or the like.

**CAUTION:**
Excessive sound pressure from earphones and headphones can cause hearing loss.

indicates safety information.

For AV-HLC100P

**CAUTION (U.S.A. Canada Only):**

This apparatus can be operated at a voltage in the range of 100 – 240 V AC.
Voltages other than 120 V are not intended for U.S.A. and Canada. Operation at a voltage other than 120 V AC may require the use of a different AC plug. Please contact either a local or foreign Panasonic authorized service center for assistance in selecting an alternate AC plug.

**FCC NOTICE (USA)**

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.

**CAUTION:**

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**FCC Warning:**

To assure continued FCC emission limit compliance, follow the attached installation instructions and the user must use only shielded interface cables when connecting to host computer or peripheral devices. Also, any unauthorized changes or modifications to this equipment could void the user's authority to operate this device.

**NOTIFICATION (Canada)**

CAN ICES-3 (A)/NMB-3(A)

☐ indicates safety information.

**<For USA-California Only>**
This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material – special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

**Notice (U.S.A. only):**
Disposal may be regulated in your community due to Environmental considerations.
For disposal or recycling information, please visit Panasonic website:
http://www.panasonic.com/environmental or call 1-888-769-0149.

For AV-HLC100E

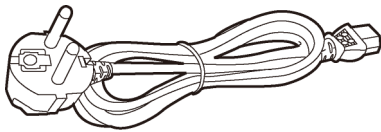# Caution for AC Mains Lead

**FOR YOUR SAFETY PLEASE READ THE FOLLOWING TEXT CAREFULLY.**
**This product is equipped with 2 types of AC mains cable. One is for continental Europe, etc. and the other one is only for U.K.**

Appropriate mains cable must be used in each local area, since the other type of mains cable is not suitable.
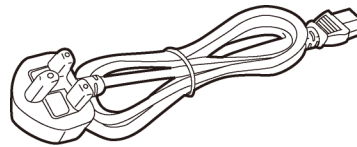
**FOR CONTINENTAL EUROPE, ETC.**
Not to be used in the U.K.

**FOR U.K. ONLY**
If the plug supplied is not suitable for your socket outlet, it should be cut off and appropriate one fitted.

**FOR U.K. ONLY**
This appliance is supplied with a moulded three pin mains plug for your safety and convenience.
A 13 amp fuse is fitted in this plug.
Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 13 amps and that it is approved by ASTA or BSI to BS1362.
Check for the ASTA mark ⬦ or the BSI mark ⬙ on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.
If you lose the fuse cover the plug must not be used until a replacement cover is obtained.
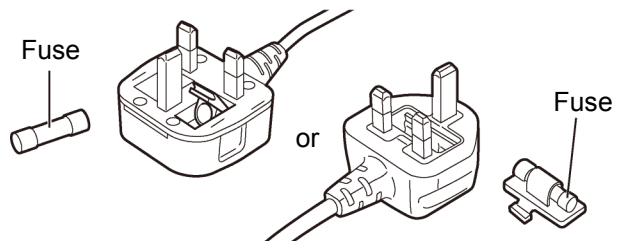A replacement fuse cover can be purchased from your local Panasonic Dealer.

**How to replace the fuse**
1. Open the fuse compartment with a screwdriver.

or

2. Replace the fuse.

Fuse

or
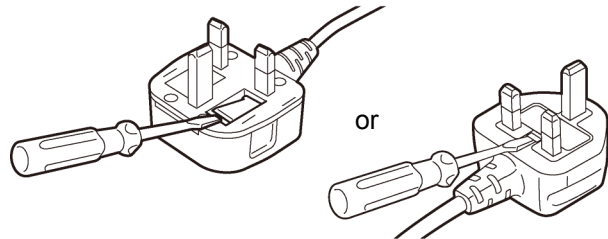
Fuse

**WARNING:**
This equipment is compliant with Class A of CISPR 32.
In a residential environment this equipment may cause radio interference.

▭ indicates safety information.

For AV-HLC100E

---

## EMC NOTICE FOR THE PURCHASER/USER OF THE APPARATUS

**1. Pre-requisite conditions to achieving compliance with the above standards**

**<1> Peripheral equipment to be connected to the apparatus and special connecting cables**
- The purchaser/user is urged to use only equipment which has been recommended by us as peripheral equipment to be connected to the apparatus.
- The purchaser/user is urged to use only the connecting cables described below.

**<2> For the connecting cables, use shielded cables which suit the intended purpose of the apparatus.**
- Video signal connecting cables
  Use double shielded coaxial cables, which are designed for 75-ohm type high-frequency applications, for SDI (Serial Digital Interface).
  Coaxial cables, which are designed for 75-ohm type high-frequency applications, are recommended for analog video signals.
- Audio signal connecting cables
  If your apparatus supports AES/EBU serial digital audio signals, use cables designed for AES/EBU.
  Use shielded cables, which provide quality performance for high-frequency transmission applications, for analog audio signals.
- Other connecting cables (IEEE1394, USB)
  Use double shielded cables, which provide quality performance for high-frequency applications, as connecting cables.
- When connecting to the DVI signal terminal, use a cable with a ferrite core.
- If your apparatus is supplied with ferrite core(s), they must be attached on cable(s) following instructions in this manual.

**2. Performance level**

The performance level of the apparatus is equivalent to or better than the performance level required by these standards. However, the apparatus may be adversely affected by interference if it is being used in an EMC environment, such as an area where strong electromagnetic fields are generated (by the presence of signal transmission towers, cellular phones, etc.). In order to minimize the adverse effects of the interference on the apparatus in cases like this, it is recommended that the following steps be taken with the apparatus being affected and with its operating environment:
1. Place the apparatus at a distance from the source of the interference.
2. Change the direction of the apparatus.
3. Change the connection method used for the apparatus.
4. Connect the apparatus to another power outlet where the power is not shared by any other appliances.

---

**Turkey Only**
**AEEE Yönetmeliğine Uygundur.**
**AEEE Complies with Directive of Turkey.**

For AV-HLC100E

Manufactured by: Panasonic Corporation, Osaka, Japan
Importer's name and address of pursuant to EU rules:
   Panasonic Marketing Europe GmbH
   Panasonic Testing Centre
   Winsbergring 15, 22525 Hamburg, Germany

**Disposal of Old Equipment and Batteries**
**Only for European Union and countries with recycling systems**

These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries must not be mixed with general household waste.
For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points in accordance with your national legislation.
By disposing of them correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment.
For more information about collection and recycling, please contact your local municipality, dealer or supplier.
Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

**Note for the battery symbol (bottom symbol)**

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.

# Contents

# PART I  Getting Started

Introducing Your Panasonic AV-HLC100 – connections and registration, a top-level overview of primary features, and a hands-on tour to get you started.

# Chapter 1 Accessories

Check that the following accessories are present and accounted for.
• After removing the product from its container, dispose of the power cable cap and packing materials in an appropriate manner.

● AC adaptor .................................................................. 1
● Power cable
  AV-HLC100P.............................................................. 1
  AV-HLC100E.............................................................. 2

● Keyboard................................................................... 1
● Mouse ....................................................................... 1

# Chapter 2 Precautions for use

● **Condition for use**
AV-HLC100 is only intended to be used by or operated under the supervision of responsible adults able to ensure the safe operation of professional audio/video equipment.

● **Handle carefully.**
Do not drop the product, or subject it to strong shock or vibration.
Do not carry or move the product by the fader lever. This is important to prevent malfunctioning or accidents.

● **Use the product in an ambient temperature of 0 °C to 40 °C (32 °F to 104 °F).**
Avoid using the product at a cold place below 0 °C (32 °F) or at a hot place above 40 °C (104 °F) because extremely low or high temperature will adversely affect the parts inside.

● **Power off before connecting or disconnecting cables.**
Before plugging or unplugging the cables, be sure to switch power off.

● **Avoid humidity and dust.**
Avoid using the product at a humid, dusty place because much humidity and dust will cause damage to the parts inside.

● **Maintenance**
Turn off the unit's power and wipe the product using a dry cloth. To remove stubborn dirt, dip a cloth into a diluted solution of kitchen detergent (neutral), wring it out well, and wipe the product gently.
Then, after wiping the product with a moist cloth, wipe it again with a dry cloth.
<Caution>
• Avoid using benzine, paint thinners and other volatile fluids.
• If a chemical cleaning cloth is to be used, carefully read through the precautions for its use.

● **Precaution to be observed during production**
This product's image switching and image effect functions can be used to produce images which flicker rapidly or images which change rapidly.
However, bear in mind when using these functions in production that the kinds of images produced may have an adverse effect on the viewer's physical well-being.

● **When the product is to be discarded**
When the product is to be discarded at the end of its service life, ask a specialized contractor to dispose of it properly in order to protect the environment.

These Operating Instructions are organized into the following sections:

➢ *PART I – Getting Started*
Introduction to Panasonic AV-HLC100 – connecting devices (cameras, monitors, etc.).

➢ *PART II – Reference*
This section covers the fine details of using your system (for those who need it, or simply like to know everything there is to know).

➢ *PART III – Appendices*
Leads off with a discussion of audio/video latency challenges. Appendix B lists all shortcut keys. You will also find a comprehensive keyword index in Part III.

# Chapter 4   Introduction

## Section 4.1   Overview

Your Panasonic AV-HLC100 Live Production Center is a powerful video production system, supporting web streaming and capture, internal media players, and an integrated control surface complete with PTZ (pan-tilt-zoom) camera control.

AV-HLC100 lets you produce live video programs from diverse sources in high definition formats all the way up to 1080/60p. This system fully supports NewTek's NDI (Network Device Interface) protocol.

## Section 4.2   Control Surface
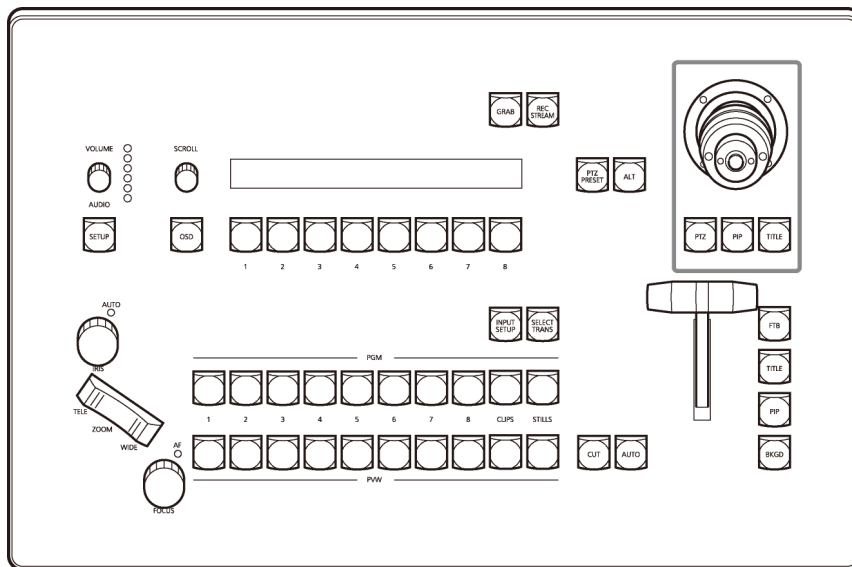


FIGURE 1

AV-HLC100's control surface (Figure 1) features a traditional video mixer's Program and Preview row configuration, with *Cut* and *Auto* buttons and *Fader lever* along with overlay (*Picture in Picture* and *Title*) controls. It also features audio input and output controls, media players (*Clip* and *Still*), and a 3-axis joystick to control up to eight individual PTZ cameras.

The rear panel provides connections to a wide range of A/V equipment (Figure 2). Keyboard, mouse and external storage solutions can be connected to the USB 3.0 connectors at left, while a monitor for the user interface is supported by nearby HDMI and Display ports.
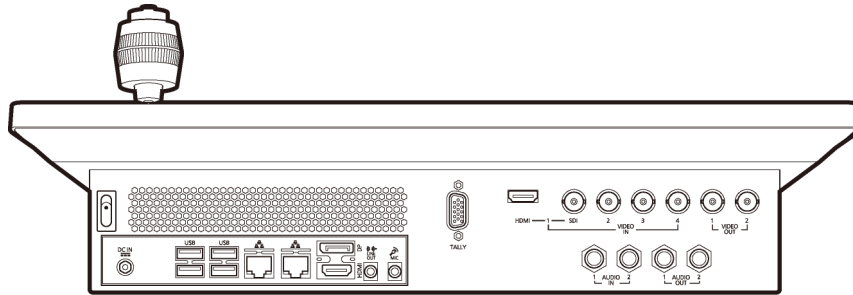


FIGURE 2

Connect HDMI and SDI video sources, or use the two network inputs for a/v input and output using NDI (Network Device Interface) supported by many video products – including a number of Panasonic professional cameras.

## Section 4.3   User Interface

### 4.3.1   Administration Panel

AV-HLC100's Administration panel appears when you first launch your system. This is where you choose which "session" you wish to open and choose its video format, but the panel also provides access to a number of other utilities, settings, and information.

The settings you choose are retained for the currently selected session, as are any assets you might import into it, along with its configuration options for video and audio inputs and control states.

> Hint: See Section 7.1.1 for more detail on sessions.

*NOTE THAT THE ADMINISTRATION PANEL WILL NOT BE SHOWN EVERY TIME YOU LAUNCH AV-HLC100.* Rather, AV-HLC100 will automatically open the last session you worked in.

To deliberately open another session instead, the Administration panel can be displayed from the Windows *Start menu* folder named "Panasonic AV-HLC100", or you can choose to display it when exiting from the Live Desktop.
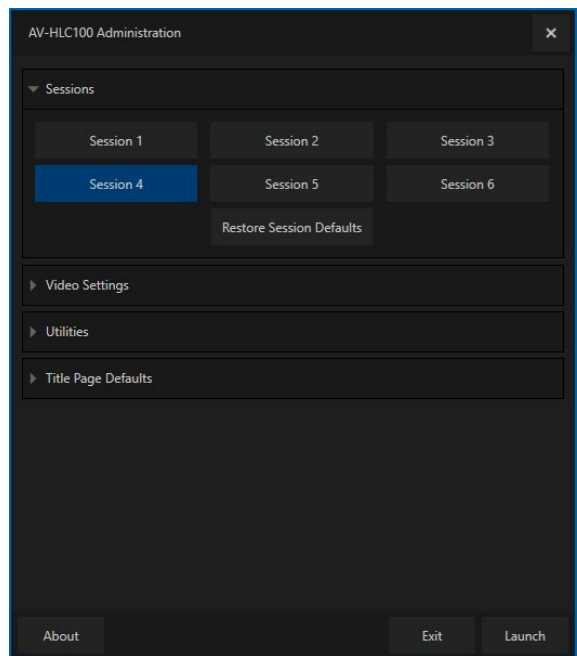


FIGURE 3

Clicking the Launch button at lower right opens the currently highlighted session, and takes you directly to the *Live Desktop* to begin production.

## 4.3.2    Live Desktop

AV-HLC100's live production features are all available from its *Live Desktop* (Figure 3).
The various features and controls and modules comprising the *Live Desktop* are arranged in horizontal bands, as seen in Figure 4.



FIGURE 4

- The top-most band comprises the *Dashboard*.
- The area just below the *Dashboard* is devoted to a multi-viewport monitoring display, providing visibility of all connected video sources, Program output and Preview.
- The central *Live Control* section is home to the *Video Mixer*, *Transitions, and Overlay* channels, including PiP (Picture in Picture) and Titles controls.

## Section 4.4    Features

Let's take time for a brief overview of just *some* of the key features of your AV-HLC100.

## 4.4.1    Physical

- Compact, sturdy chassis, with easily accessible audio, video, monitoring and network connectors from the rear for convenient installation in industry standard configurations.
- Professional grade fader lever and 3-axis joystick for video mixing, PTZ control and more.
- Audio and video connectors (except HDMI) use industry standard BNC and ¼" (6.35 mm) TRS jacks.
- Fast USB 3.0 connectors support connectivity for external storage devices for capture.

16

- 15-pin DE-15 ('VGA-style') Tally output connector.

### 4.4.2 Multi-Tier Failsafe

'Always on Air' features provide multi-tiered redundant software failsafe mechanisms. To name just a few:

- AV-HLC100 also has a comprehensive integrated system restore feature. You can quickly restore factory defaults, or create a custom drive image on another volume and either restore from that.
- Multiple software failsafe systems continually monitor and safeguard the live performance. Recoverable software error conditions are quickly and unobtrusively dealt with.

### 4.4.3 A/V Input and Output

- Connect and switch up to 8 external video sources, and two internal sources. AV-HLC100 supports SDI video input and output, internal, NDI and *NDI|HX video sources, and both analog and digital audio input and output.
  * requires installation of the NewTek NDI|HX driver for Windows®.
- Distribute your program over two SDI outputs, which can carry the main program or another individually selected video source.
- Transmit output to other NDI-enabled systems across the network. AV-HLC100's NDI output can substitute for multiple traditional outputs, without requiring an external distribution amp.
- BNC connectors provide increased durability and reliability for camera connections.
- Control supported robotic (*PTZ*) cameras via network connection.
- Freely mix 16:9 or 4:3 SD formats, and output as UHD, HD and SD simultaneously.
- *Media Player* modules allow you to insert pre-recorded video and imagery into your live presentations.
- Select Microsoft® Windows® or Apple Macintosh computers on the same network as *Switcher* inputs for your live productions using NDI Scan Converter clients.
- Mix and route internal and external audio sources, including analog or (digital) embedded audio.

### 4.4.4 Skype TX

- AV-HLC100's support for Microsoft's powerful Skype TX platform allows you introduce Skype calls from almost anywhere in the world into your programs. Skype TX requires nothing more than a network connection to an external computer running the (free) Skype TX control application that provides call management.

### 4.4.5 Monitoring
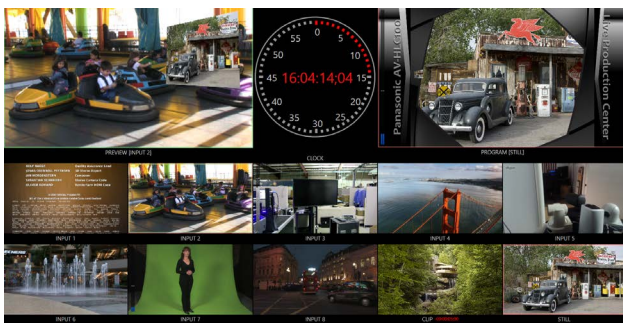


FIGURE 5

The *Live Desktop* includes a large *monitoring pane* with multiple viewports showing *Program* output and *Look Ahead Preview* monitors along with all external sources and *Media Players*.

## 4.4.6  Video Processing

- Full 4:4:4:4 32-*bit floating* point internal processing of all video sources.
- *Proc Amps*, *White* Balance and *Auto Color* features for every source preserve pristine color fidelity.

## 4.4.7  The Switcher

AV-HLC100's switcher and NewTek's NDI (Network Device Interface) support puts countless video sources at your fingertips.
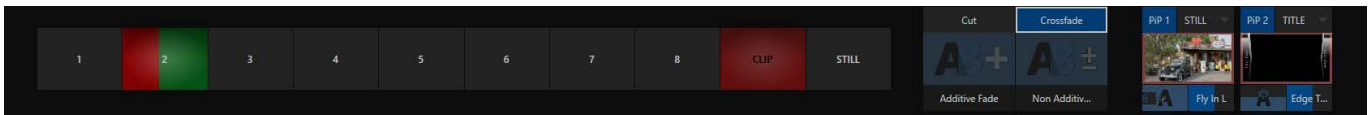


FIGURE 6

VIDEO LAYERS AND TRANSITIONS

The *Transition* section of the *Live Desktop* provides tools for arranging and displaying the numerous video and graphics layers contributing to the ultimate program output.
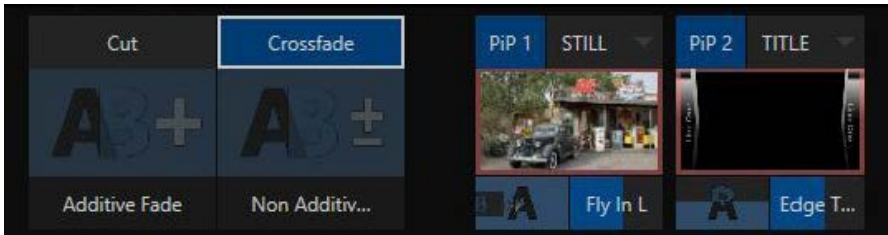


FIGURE 7

- Freely *hot-punch* or *transition* external or internal video sources.
- *PiP* and *Title* sources are displayed in the interface by small full-motion confidence monitors.
- Use any of the hundreds of transitions supplied to reveal either *Background* or *Overlay* channels with animated wipes, trajectories and dissolves.
- Select individual transition effects for any layer and adjust *Speed*, *Reverse* and *Ping Pong* options.

OVERLAY CHANNELS
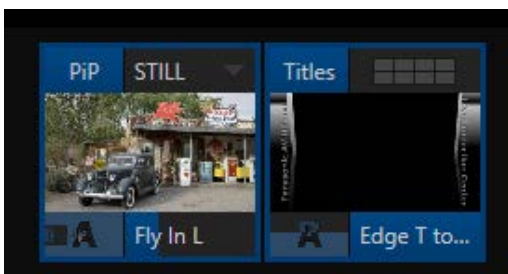


FIGURE 8

18

- Assign any connected external or internal video source to either the PiP or Title overlay channels.
- Both *Overlay* channel *s*ources are displayed in compact full-motion confidence monitors.
- Display *PiP* or *Titles* independently with custom transitions.
- Independent *Crop*, *Position, 3D Rotation*, and *Scale* controls for each *Overlay* channel.

### 4.4.8 Record and Stream

- *Record your live-switched production, and easily grab still images from Program or external inputs.
- *Stream to multiple Internet destinations for redistribution.
    * Requires the NewTek Streaming for AV-HLC100 plugin.

### 4.4.9 Automation

Use the audio Follow feature to ensure you hear the sources you want in your audio mix based on visible Switcher sources.

### 4.4.10 Audio Mixer

AV-HLC100 provides extensive multi-channel audio control and management.

- Adjust and sweeten audio sources for your program manually or automatically. Control external audio sources supplied via SDI, analog, or NDI.
- Control output levels for program and headphones.
- Extensive and flexible 'audio follow video' options.
- Exclusive or latched *Solo* controls.
- Independent 7-band *EQ*, *Compressor/Limiter* and *Noise Gate* for each source and output.
- Configurable *VU meter* scales: Show *VU meter* calibration as digital (dBFS) or analog (dBVU or dBu).

### 4.4.11 Integrated Clip and Still Players, Plus Titles

- Create playlists including a/v clips, sound files or still image files.
- Trim and re-order playlist entries.
- The playback controls include variable *Speed* and *Loop* options.
- Control *Clips player* volume and other advanced audio options in the *Audio Mixer*.
- *Autoplay* feature starts and stops *Clips* playback automatically based on *Switcher* activity.
- Edit titles live, even while 'on air'.
- Quickly switch between 8 different title presets.
- Automatically update text values in title pages based on media metadata.
- Import layered Photoshop® PSD files and automatically convert these to live-editable title pages.

## Section 5.1   Control Panel
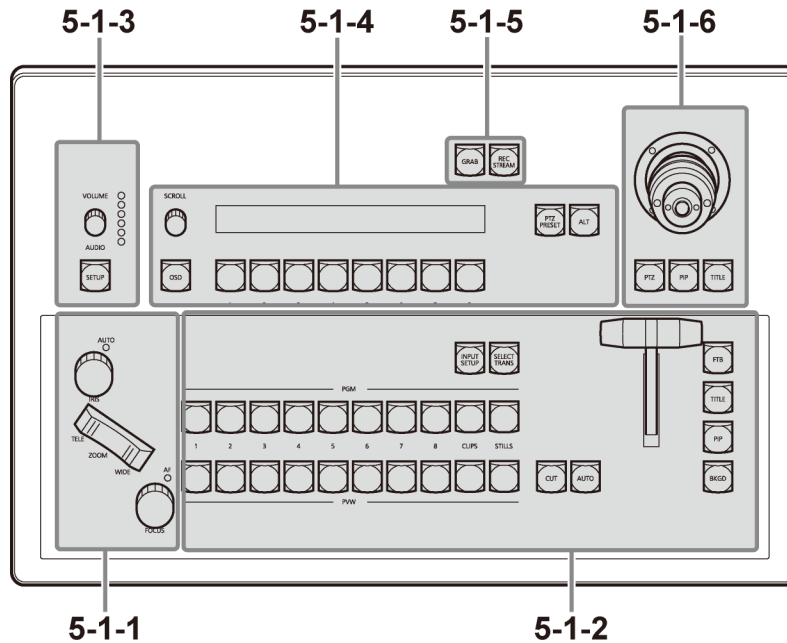


**5-1-1.** Camera control area
**5-1-2.** Switcher area
**5-1-3.** Audio area

**5-1-4.** Menu control area
**5-1-5.** Grab & stream/record area
**5-1-6.** Joystick area

### 5.1.1   Camera control area
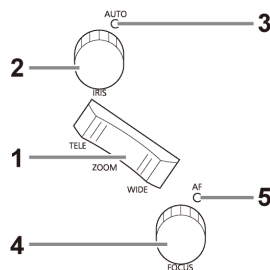


1. **[ZOOM] button**
   This adjusts the zoom of a camera connected to the network. Press the [TELE] button to enlarge (zoom in), and the [WIDE] button reduce (zoom out).

2. **[IRIS] dial**
   This manually adjusts the iris of the camera lens.
   - Turn the dial clockwise to operate the iris in the open direction, and counterclockwise to operate it in the close direction.

3. **[AUTO] indicator**
   This lights in red when automatic adjustment of the iris is enabled.
   - Check the iris setting (auto/manual) on the camera. For details, refer to the operating instructions of the camera.

4. **[FOCUS] dial**
   This manually adjusts the focus of the camera lens.
   - Turn the dial clockwise to move the focus farther away, and counterclockwise to move it nearer.

5. **[AF] indicator**
   This lights in red when automatic adjustment of the focus is enabled.
   - Check the focus setting (auto/manual) on the camera. For details, refer to the operating instructions of the camera.

20

## 5.1.2　Switcher area
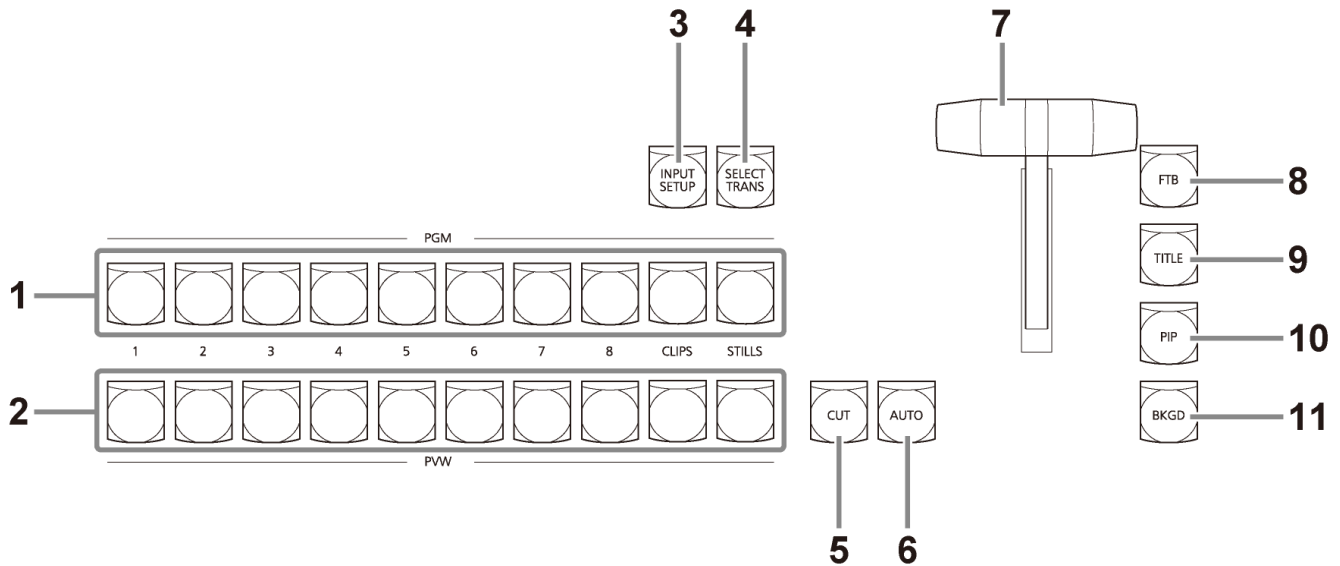


1. **Program bus selection buttons**
   **[PGM 1 to 8/CLIPS/STILLS]**
   These select the video source (background) for
   program output. The button of the selected video
   signal lights in red.

2. **Preview bus selection buttons**
   **[PVW 1 to 8/CLIPS/STILLS]**
   These select the video source for preview output.
   The button of the selected video signal lights in
   green.

3. **[INPUT SETUP] button**
   This sets the video source to input.
   - When the [INPUT SETUP] button is pressed, a
     list of the video sources appears on the LED
     display in the menu control area. Select the
     video source to input with the menu selection
     buttons.

4. **[SELECT TRANS] button**
   This selects the transition of the video layer.
   - When the [SELECT TRANS] button is pressed,
     the preset numbers of the transitions appear on
     the LED display in the menu control area.
     Select the preset to use with the menu selection
     buttons.

5. **[CUT] button**
   This executes a straight cut for all selected video
   layers (title, picture-in-picture, and video source).

6. **[AUTO] button**
   This executes the transition assigned to the
   selected video layer.
   - Pressing the [AUTO] button during transition
     execution allows you to stop operation. Press it
     once again to complete the operation.

7. **Fader lever**
   This controls the selected video layer.

8. **[FTB] button**
   This fades the program output to a black screen.

9. **[TITLE] button**
   Press this to control the display of the title page.

10. **[PIP] button**
    Press this to control the display of the picture-in-
    picture (PIP).

11. **[BKGD] button**
    Press this to control the display of the video
    source.

### 5.1.3 Audio area
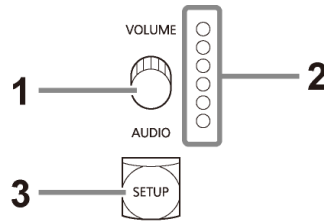


**1.   [VOLUME] dial**
This adjusts the volume level.

**2.   Volume indicator**
This indicates the volume level.
- When lit in red, it indicates that clipping has occurred.

**3.   [SETUP] button**
This configures the settings of each audio channel.
- When the [SETUP] button is pressed, a list of the audio sources appears on the LED display in the menu control area. Select an audio source with the menu selection buttons and then configure the necessary settings.

### 5.1.4 Menu control area
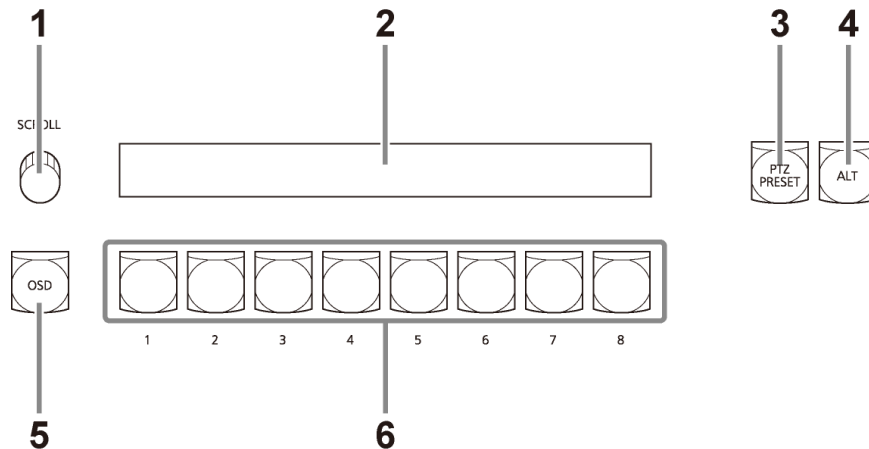


**1.   [SCROLL] dial**
This changes the page to display on the LED display.
- Turn the dial to change the page, and press it to return to the previous display.

**2.   LED display**
This displays various menus.
- The same menu as the input setting panel ([Color] tab) of the live desktop is displayed.

**3.   [PTZ PRESET] button**
This displays the preset list of the camera being controlled by the joystick on the LED display.

**4.   [ALT] button**
This is used to operate the functions (PTZ PRESET, etc.) of the menu control area.

**5.   [OSD] button**
This displays the OSD menu of a camera connected to the network.
- The settings of the OSD menu can be changed with the buttons and dials of the menu control area.

**6.   Menu selection buttons**
These select the menus and options displayed on the LED display.

22

## 5.1.5 Grab & stream/record area

*Note: The following two buttons are enabled only when the NewTek Streaming for AV-HLC100 plugin is installed.*

1. **[GRAB] button**
   This captures a still image from the program output.

2. **[REC/STREAM] button**
   This switches between the STREAM and RECORD functions on the dashboard of the live desktop.
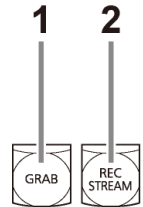


## 5.1.6 Joystick area
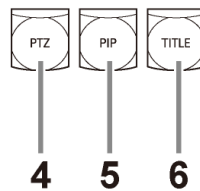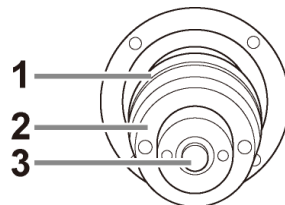


1. **Joystick**
   This controls the function of each of the [PTZ], [PIP], and [TITLE] buttons.

2. **Adjustment ring**
   Turn this ring to adjust the function (zoom/focus) selected with the top button.

3. **Top button**
   Each press of this button switches the function of the adjustment ring (zoom/focus).

4. **[PTZ] button**
   This selects the camera to control using each of the buttons in the menu control area.

5. **[PIP] button**
   This allows you to move and resize the picture-in-picture (overlay) using the joystick.

6. **[TITLE] button**
   This allows you to move and resize the title (overlay) using the joystick.

23
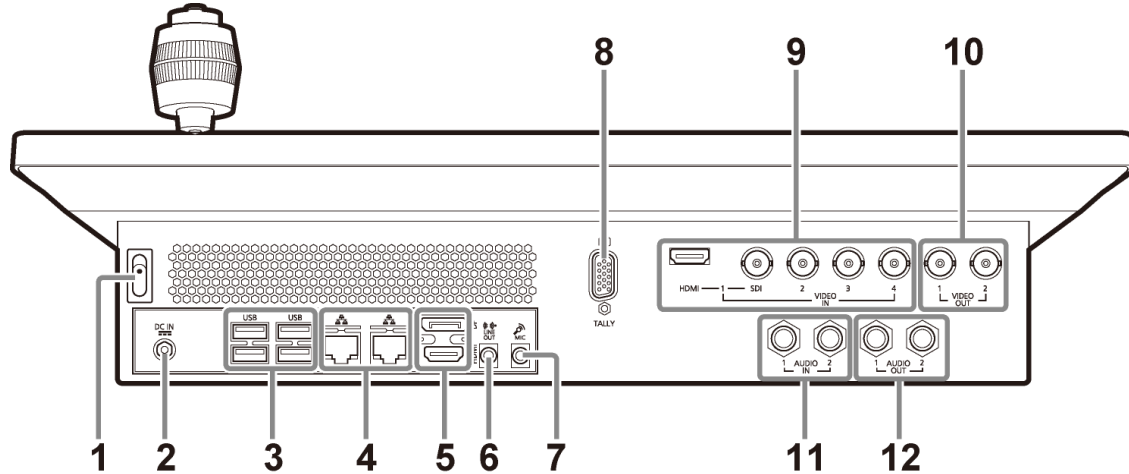
**1.   Power switch**
Press the [●] button to turn on the power and start up the unit. To turn off the power, press the [●] button again.

**2.   Power input socket**
Connect the supplied AC adaptor.

**3.   USB connectors**
Connect a keyboard and mouse.

**4.   LAN connectors (RJ-45)**
Connect with a local network using a LAN cable.

**5.   HDMI/DP connectors**
Connect with an external computer monitor using an HDMI cable or DisplayPort cable.

**6.   [LINE OUT] connector**
This outputs audio.

**7.   [MIC] connector**
This inputs audio.

**8.   [TALLY] connector**
Connect an external tally light or similar device.
- External tally output occurs only when switched to VIDEO IN 1 to 4. Output does not occur for a camera connected via the network. For details, refer to the operating instructions.

**9.   VIDEO IN connectors**
These input video signals (HDMI or SDI) from an external device.

**10.   SDI VIDEO OUT connectors**
These output SDI video signals to an external device.

**11.   Analog AUDIO IN connectors**
These input analog audio signals from an external device (audio mixer, etc.).

**12.   Analog AUDIO OUT connectors**
These output analog audio signals to an external device.

NDI Camera

Camera

(IP Control)

(AV+IPControl)

NDI|HX Camera

Camera

Ethernet

SDI

SDI

SDI Monitor

SDI

Keyboard

SDI Monitor

Mouse

USB

HDMI 1 SDI 2 VIDEO 3 4 VIDEO
IN OUT

DC IN

USB USB

TALLY

1 AUDIO 2 1 AUDIO 2
IN OUT

1/4" (6.35mm)balanced line<L/R>

PC Monitor

HDMI

Audio Output

Audio Source
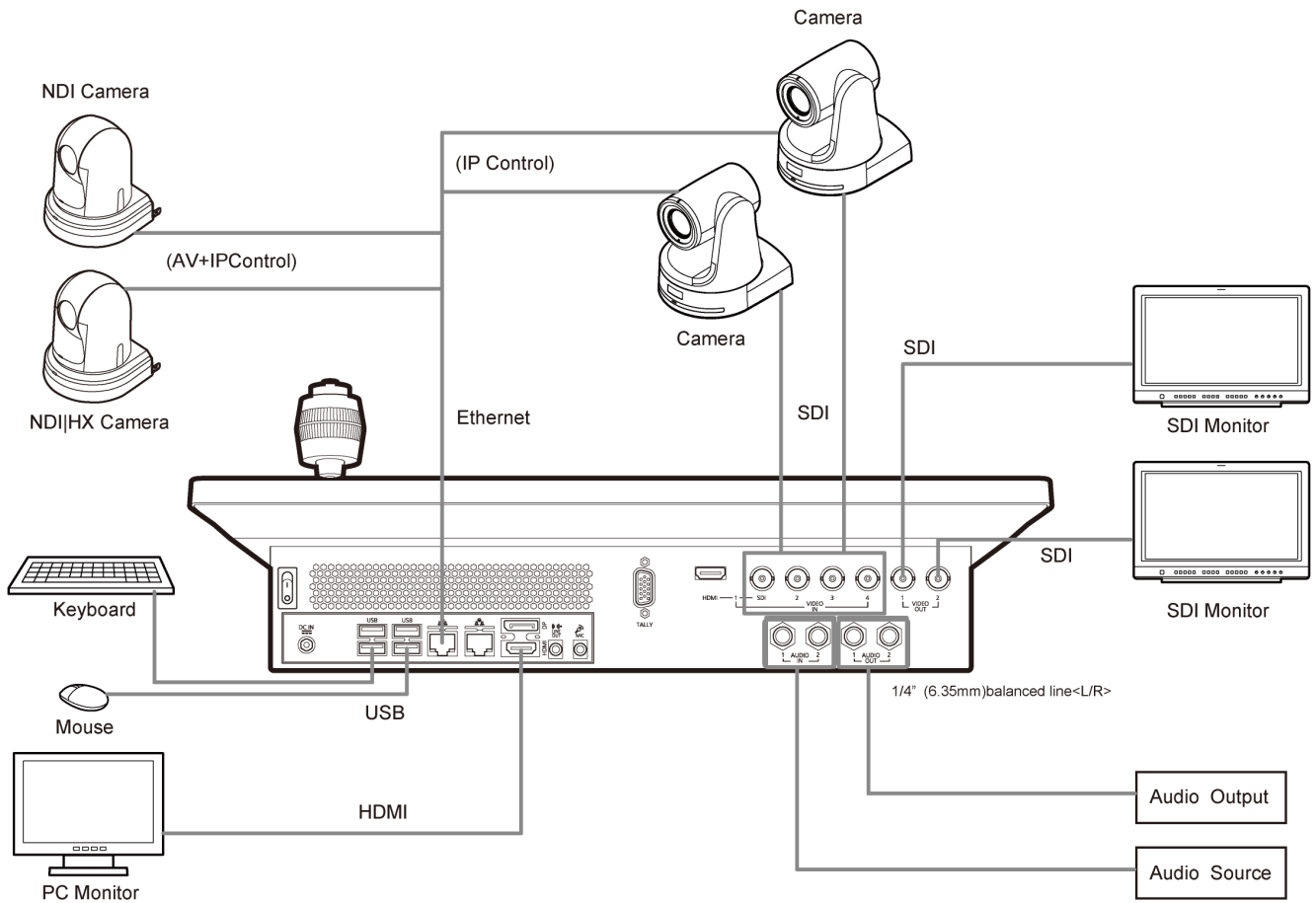
## Section 6.1   Command and Control

> *Hint: Use the graphical user interface at a monitor resolution between 1600x900 and 1920x1200 pixels, inclusive.*

1. Connect an external computer monitor to one of the ports in the HDMI/DisplayPort group on the left of the rear panel.

2. Connect the *mouse* and *keyboard* to the USB ports.

3. Turn on the computer monitor.

4. Connect the AC adaptor power cord to an A/C power receptacle and connect the DC connector to the power input socket.

5. Press the *Power* rocker switch located just above the power input connector on AV-HLC100's rear panel.
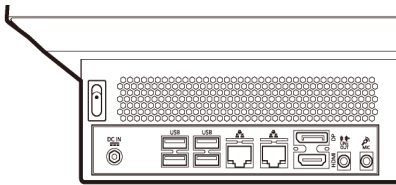
FIGURE 9

6. (Optional) Connect AV-HLC100 to your local network using the standard RJ-45 Ethernet connector on the motherboard backplate (Figure 9).

At this point, the *LED* display will illuminate. (If this does not happen, check your connections and retry).

Though not a requirement, we do encourage the use of an uninterruptable power supply (UPS), as for any 'mission critical' system. Likewise, consider A/C "power conditioning", especially in situations where local power is unreliable or 'noisy'. (Surge protection is especially important in some locales.)

Power conditioners can reduce wear on power supplies and other electronics, and provide a further measure of protection from surges, spikes, lightning and high voltage.

# Section 6.2   Input Connections

## 6.2.1   Connect A/V Sources
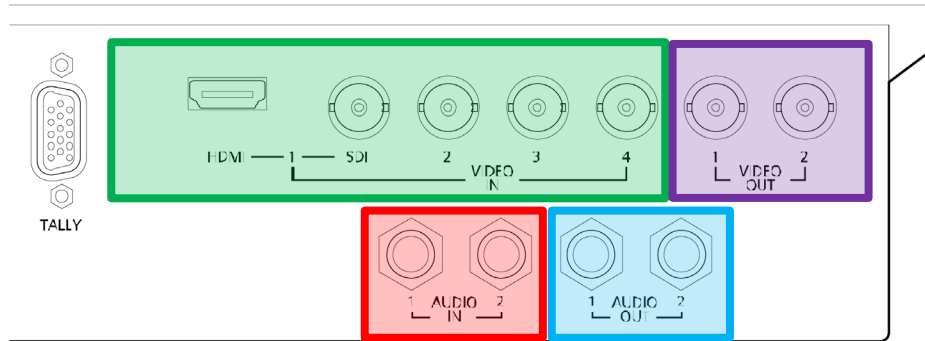


FIGURE 10

- **Analog audio inputs**
- **Analog audio outputs**
- **Video Inputs 1-4**
- **SDI Video Outputs**

1. Connect local SDI or HDMI video sources to connectors in the *VIDEO IN* section (note that input 1 can be used to connect and HDMI source or an SDI one, but not both at once).

*Note: Video sources with embedded audio do not necessarily require separate audio connections.*

2. Connect any analog audio sources you wish to use (such as output from an external audio mixer) to the Audio IN jacks; note that these are Line level, balanced audio inputs.

# Section 6.3   Output Connections

Next we'll discuss the audio and video output connectors along with relevant settings.

## 6.3.1   A/V Output

AV-HLC100 provides two SDI video output connectors, and a stereo pair of analog audio outputs.

1. Connect downstream video production devices to the connectors in the *SDI OUT* section as desired.

*Hint: The output video format is configured in the Administration panel (see Section 7.1.2).*

2. Network (NDI and Stream) output obviously requires a network connection; in addition to optional add-on software, streaming usually also requires an Internet connection.

3. Connect external audio devices to the connectors in the *AUDIO OUT* section.

## Section 6.4    Tally Lights
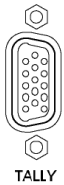


Tally Light support allows you to connect external tally lights and similar devices. These typically provide a red LED for the video input that is currently selected on the Switcher's Program row. (NDI outputs also natively support tally over the network, without a separate connection.)

FIGURE 11

### 6.4.1    Connection Details

Here is a pin-out listing for the HD15 Tally connector:

- Pin1 – LED1
- Pin2 – LED2
- Pin3 – LED3
- Pin4 – LED4
- Pin5 – unused
- Pin6 – unused
- Pin7 – unused
- Pin8 – unused
- Pin9 – GND
- Pin10 – GND
- Pin11 – unused
- Pin12 – unused
- Pin13 – unused
- Pin14 – 3.3V (20 Ohms current limit)
- Pin15 – unused

### Engineering Notes

▪ Pins 1-4 are 'hot' when the LED should be illuminated.

▪ Each LED pin (1 – 4) has a 200 ohm current limiting resistor inside AV-HLC100.

▪ With no load (open circuit) the LED pins can reach 5V. With a typical LED load, they can be expected to reach about 3V.

▪ To prevent damage to internal components when making connections to the tally light jacks, care should be taken that connection to Pins designated GND (Ground) are always at ground potential.

## Section 6.5 Starting a Production Session

1. If AV-HLC100 is not already running, power it up now to reveal the *Administration* panel.

*Hint: If the Live Desktop is already visible you may need to use the File menu item "Exit to Administration" to return to the Administration panel.*

## Section 6.6 The Administration Panel
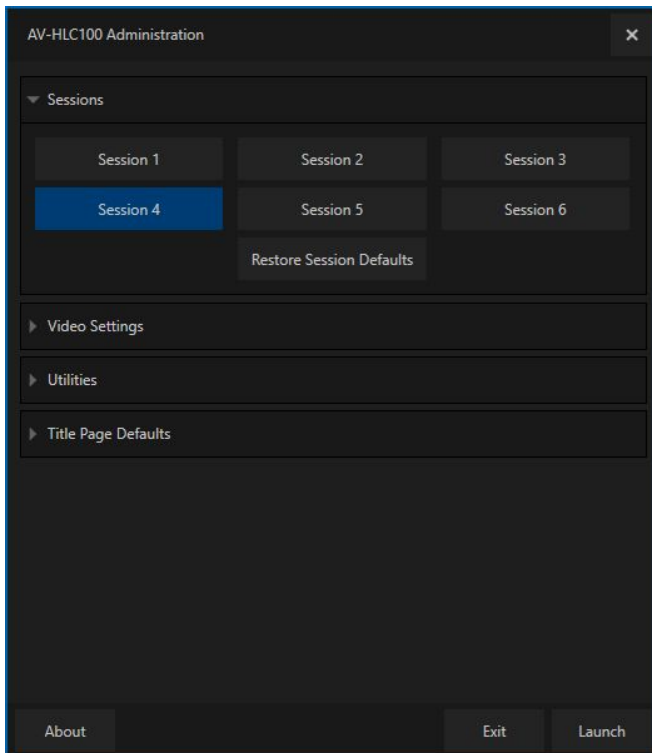


FIGURE 12
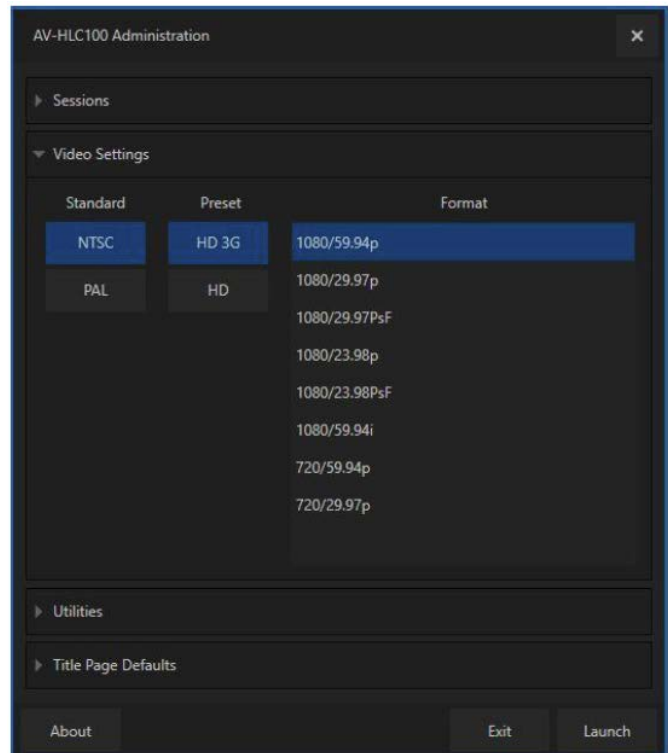


FIGURE 13

2. If necessary, expand the Sessions control group (Figure 12) and click one of the session labels to activate it.

   *Hint: Right-click a session label to rename it.*

3. Continue preparing for production by expanding the Video Settings control group (Figure 13) and designating the video *Standard* used in your locale, either *NTSC* or *PAL*.

4. For now, click the nearby *HD 3G* format preset button (even if the cameras you plan to connect output something different).

5. Finally, click the *Launch* button at the bottom of the panel.

29

## Section 6.7   The Live Desktop
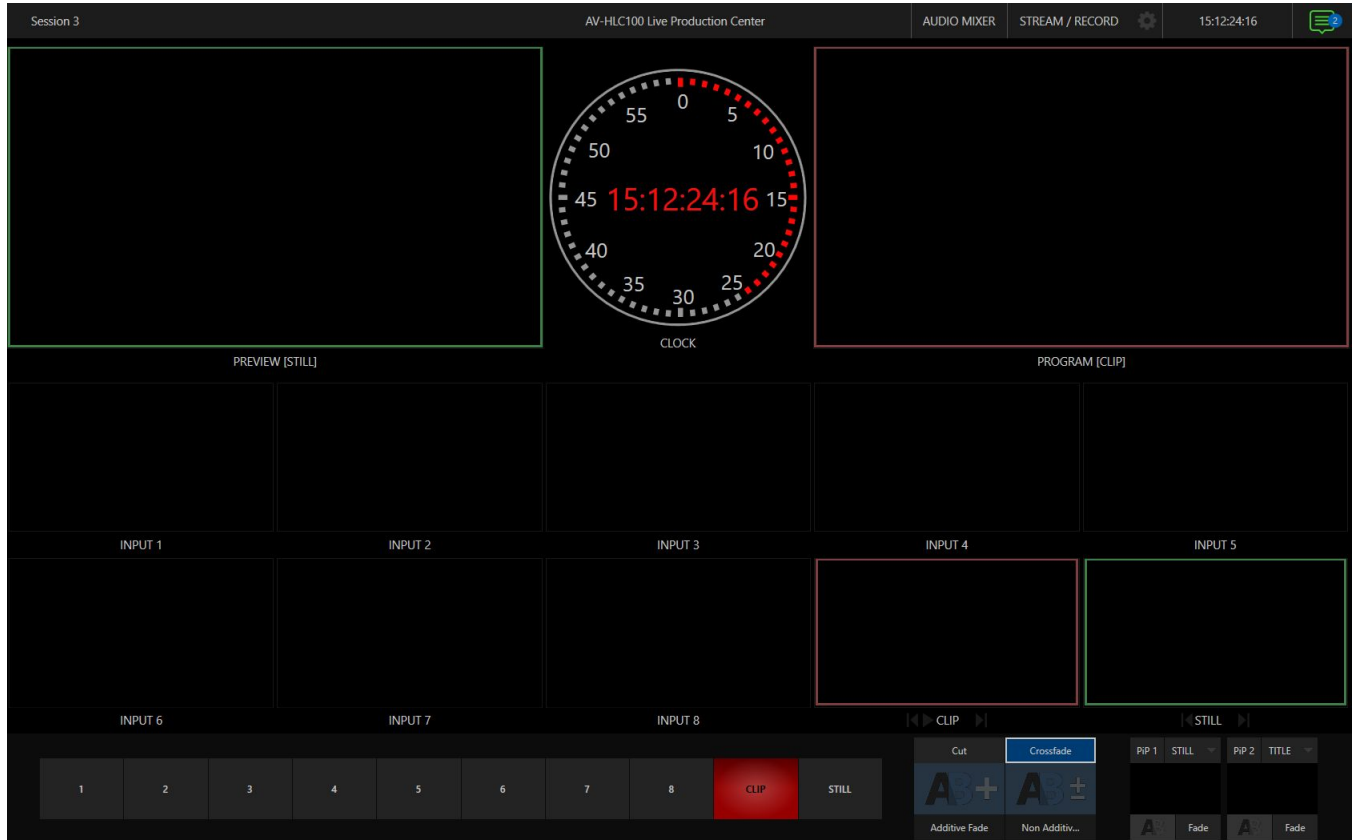


FIGURE 14

 Initially, as you have not yet configured inputs or added content, the *Live Desktop* looks a bit barren (Figure 14). Take a quick look around, but then let's continue to configure your devices. (We had a brief glimpse at the *Live Desktop* back in 4.3.2, but we'll examine it more closely in Chapter 8.)

## Section 6.8   Configure Video Inputs

Source selection settings for video inputs can be accessed in the *Live Desktop's* monitoring section, so let's spend a few moments there. We'll look into this in depth in the *Reference Section* of this manual, but for now let's configure the video sources you connected earlier (Section 6.2.1).

1.  Move your mouse over the viewport for *INPUT 1,* and notice that a *Configure button* (*gear* icon) appears on it at lower-right.

2.  Click this *Configure button* to open a tabbed settings panel.
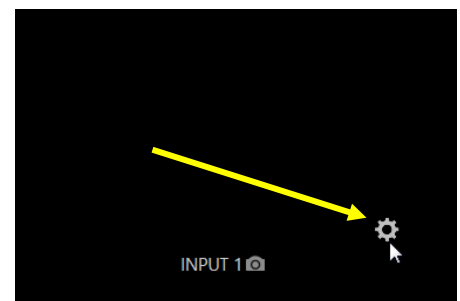


FIGURE 15

Hint: As a quicker way to access the Input configuration panel, simply double-click the viewport.
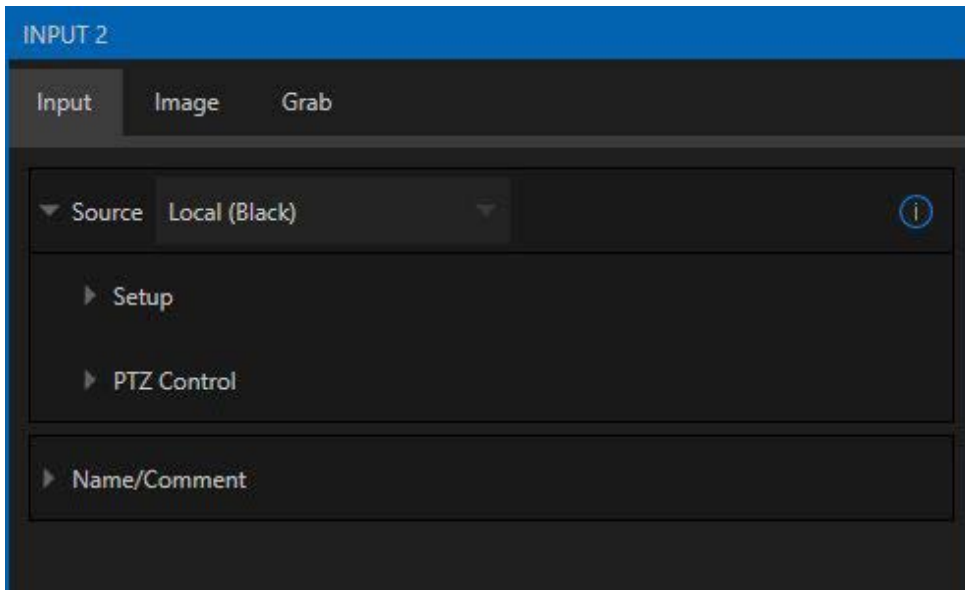
FIGURE 16

3. Click the *Source* drop-down menu to see a list of available sources (Figure 17). The *Local* inputs, *Black* and *Input 1-4*, are listed first along with the *Skype TX Caller* option which we will discuss later. NDI (Network Device Interface) sources discovered by AV-HLC100 are grouped below under headings identifying channel(s) provided by the source device, or in some cases, device type.
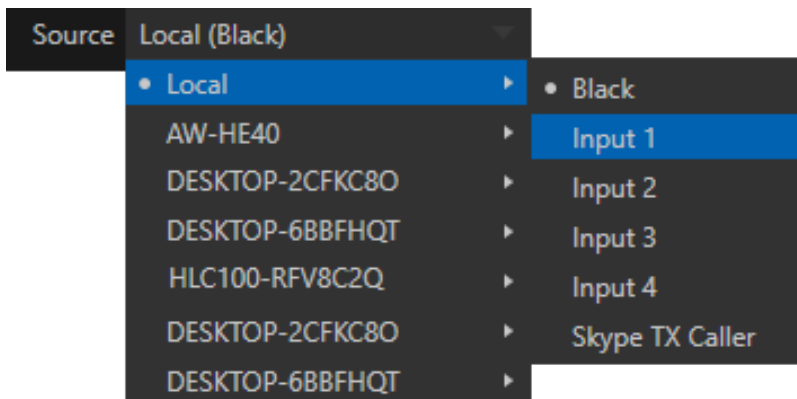


FIGURE 17

Hint: If an NDI source is no longer sending frames but remains connected, in some cases the last frame seen may be shown.
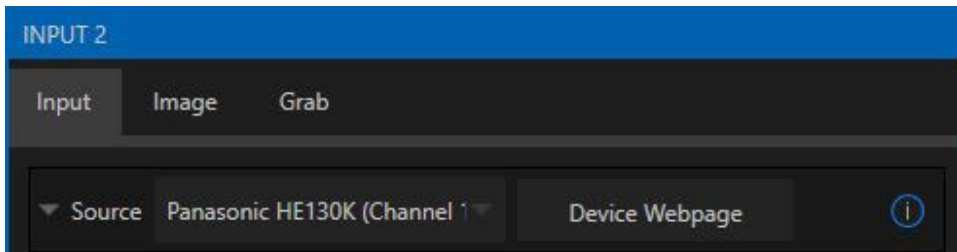
FIGURE 18

       a. For NDI video sources, simply making a selection completes the connection setup.

*Note: To receive NDI|HX sources, such as the output from NDI-enabled Panasonic cameras, the NewTek NDI|HX driver for Windows® must be installed on AV-HLC100. Crosspoint switching may take longer with higher bitrate settings of NDI|HX sources.*

       b. HDMI sources (Input 1 option only) also configure *Format* automatically.

       c. If you connect an SDI source, the *Format* menu defaults to SDI Auto. If auto-detect is unable to determine a suitable format you can specify a format manually.

    4. Continue to connect and configure additional video sources in the same manner.

We'll look at the other options and settings later, but at this point you should be able to view the video inputs you have configured on the *Live Desktop* multiview monitors.

## Section 6.9    Configure Audio

Click the *Audio Mixer* button in the *Dashboard* at the top of the *Live Desktop* to reveal the Audio Mixer, which provides configuration controls for all internal and external audio sources and output (Figure 19).



FIGURE 19

32

In addition to internal sources and output, the *Audio Mixer* supports eight independent external audio source connections. Each input (and output) has its own control panel with *Volume* slider, *VU* meters, and other features.

An identifying label sits at the top of each control panel. Roll the mouse pointer over a label to reveal a *Configuration button* (gear) at right which, when clicked, opens the *Configuration* panel (Figure 20) for that Mixer column.
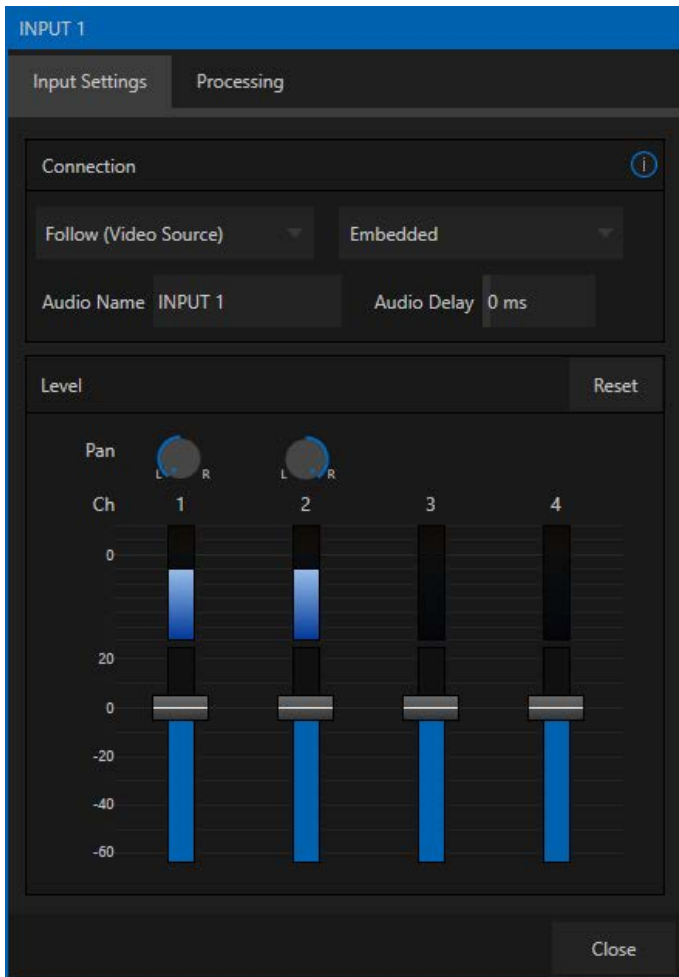


FIGURE 20

In the *Configuration* panel's Connection control group, the *Connection* menu group displays optional sources for inputs. You will see the four local hardware inputs listed first (after Silence) in the menu as "Input 1", "Input 2", etc.).

Each of the Local connections can be assigned to:

- Follow the video source – this is the default setting.
- A selected embedded audio source (SDI, HDMI or NDI) from among those connected to any Video Switcher input.

33

- Input 2 uniquely provides access to the analog audio inputs on AV-HLC100's backplane, and is available in any *Audio Mixer* column assigned to Input 2 when the Line option is selected in the Format menu at right.

*Note: Analog audio levels conform to SMPTE RP-155. The maximum input/output level is +24 dBu and the sample rate is 48 kHz. Analog inputs comprise "line level, balanced" connections.*

Returning to the audio *Input Configuration* panel, note that it holds both basic and advanced audio features. In the former category, volume sliders are provided below *VU meters* for each audio source and output. Source sliders default to their 0 dB gain setting on first launch. After adding audio sources, adjust these sliders as required.

*Hint: Most numeric controls in the interface can be reset to their defaults by pressing Shift while double-clicking the control knob in the interface.*

### 6.9.1   Audio Headroom

In digital audio systems, levels exceeding 'legal' values are 'clipped' (uniformly assigned the maximum value). This results in audible issues that cannot be easily or fully corrected later. For this reason, it's customary to configure normal operating level (Also referred to as the 'alignment level', or 'nominal level') well below the clipping limit so that occasional excessively loud sounds (for example, loud laughter or applause) can be accommodated without risk.

This range above between nominal level and the highest *possible* level is referred to as 'audio headroom'. What is considered a suitable headroom allowance varies from one locale to another, in different industry applications, and even in individual studios. AV-HLC100's audio calibration follows well-established conventions, providing 20 dB of headroom above nominal level (+4 dBu at 0 dB on the VU scale).

*Hint: Confusion can sometimes arise because different calibration scales are common in various audio realms, and even for different device types and software. For example, analog mixers commonly show levels on VU scales indexed as just described. In contrast, digital devices and editing software usually display levels in dBFS (Decibels Full Scale), with 0 dBFS – the absolute maximum signal level that can be recorded – at the top. AV-HLC100's VU meters have selectable calibration, allowing you to view a traditional dB VU scale or dBFS as you please (see Section 13.9.1).*

Whatever scale you choose, use the *Gain* controls in the audio *Input Configuration* to avoid over-modulation. The *Compressor/Limiter* feature (also located in the *Input Configuration*) is a tool to help you prevent clipping – see Section 13.8.

## Section 6.10 Networking

Of course, AV-HLC100 provides extensive support for NDI sources and NDI outputs across a network. This feature requires your system to be connected to the network.

The AV-HLC100 supplies two 'Gigabit' network connections. And simply connecting a suitable cable from an Ethernet port on the unit's back plate to your local network is all that is required to connect to a *local area network* (LAN). In some settings, additional steps may be required. You can access the Windows

*Network and Sharing* control panel to accomplish more extensive configuration tasks. If further help connecting is required, please consult your system administrator.

---

*Note: To receive NDI|HX sources, such as the output from NDI-enabled Panasonic cameras, the NewTek NDI|HX driver for Windows® must be installed on AV-HLC100.*

---

# PART II  Reference

A thorough examination of the various aspects of your AV-HLC100 system: every button, menu item, feature and control is considered in this section, so you can take full advantage of your system.

# Chapter 7   Administration Panel

We introduced the Administration panel (Figure 21) briefly back in Section 4.3.1, and mentioned it again in Section 6.6. It's time now to look at it in closer detail.
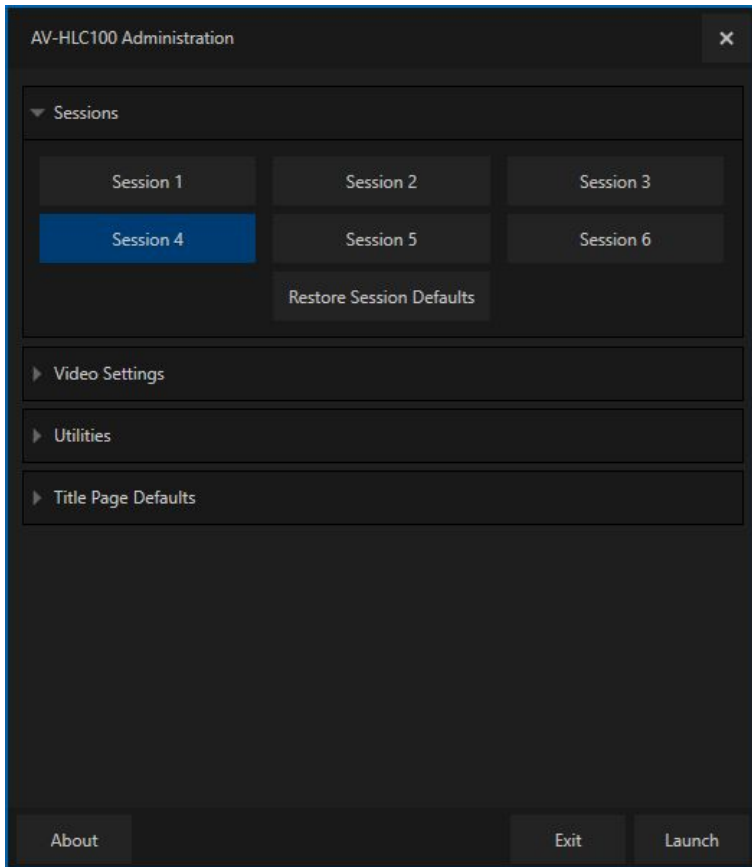


FIGURE 21

## Section 7.1   Displaying the Administration Panel

Initially, this panel is the first thing you encounter on launching AV-HLC100, in order to allow you to configure your system for your locale an applications. On subsequent launches, it is normally bypassed, but you can display it easily later if you wish to make modifications to your established settings, to launch a different session, or to access the utilities it hosts.

To recall the *Administration panel*, access the Windows *Start menu* folder named *Panasonic AV-HLC100*, and select the *AV-HLC100* link. Alternatively, if AV-HLC100's *Live Desktop* is displayed, you can chose *Exit to Administration* from the *File* menu.

## 7.1.1 Sessions

HLC100's *session* implementation lets you quickly recall a specific operating environment on demand. You might think of sessions as 'slots' you use to store unique configurations for different shows you produce. Settings stored with each of the six sessions available include the following:

- The broadcast standard used in your locale? Is it *PAL*, common in Europe among other places, or perhaps *NTSC*, standard throughout North American?
- Are cameras connected using SDI connections, HDMI, NDI, or a mixture of these?
- If you use SDI sources, what video format are these supplying?
- Have you assigned custom labels to your sources in the interface?



FIGURE 22

During live production, you may make other adjustments:

- You might have adjusted video signal color attributes using the *Proc Amps* provided in *Input Configuration* panels.
- What are your output configuration preferences?

  - What video stream do you want to route to the AUX output?
  - What audio settings have you chosen?

- Are you using custom title pages, or other graphic elements for overlays?
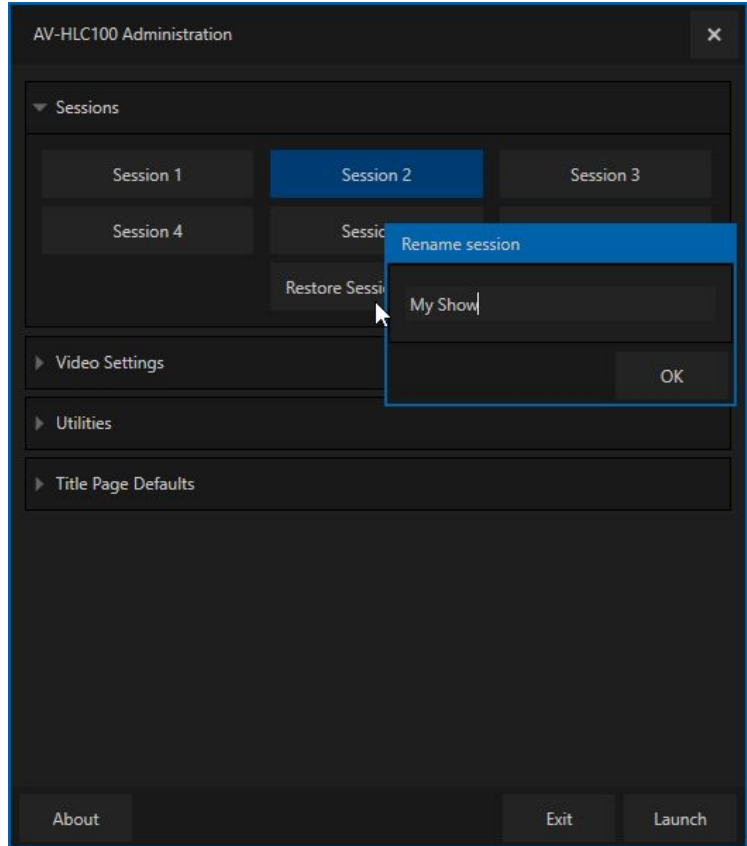
During the actual live production, you may dynamically perform further fine-tuning, and you could also add to the media content used in the presentation:

- You might grab a series of still images from *Program Output*.
- And archive the network *Stream/Record* output to disk.

> Hint: Right-click a session button and select Rename to change the name of the session – see Figure 22.

The list of adjustments, activities and assets in a specific production goes on; the main point to grasp is that the *session* is comprised of all of the above collectively. If you do not deliberately restore a session's defaults, all of your session's media and settings are ready for immediate recall and re-use. When you re-open an existing session, it's just as if you were continuing an earlier event.

Thus, if you return to the same venue another day under similar conditions, simply re-open your prior session and you are virtually ready to go. (Of course, it's the professional course of wisdom to test *everything* before beginning any event.) The session system simplifies management of files associated with unique programs, and also accommodates different users with individual requirements and preferences.

## 7.1.2   Video Settings
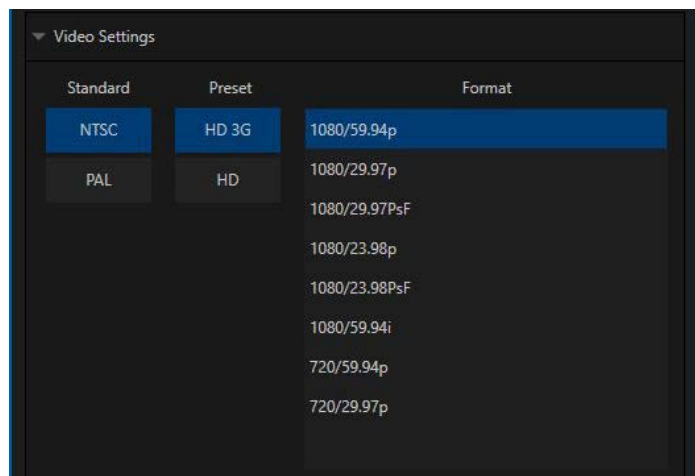
The *Video Settings* control group allows you to choose the operating format for your local video standard and production purposes.

> *Note: The choices you make here will govern not only the current operating Video Standard, but also the format of the system's video output, and the expanded list of input connection types supported.*

1. Select *NTSC* or *PAL* under the label *Standard*.
2. Choose a video format.
   o Clicking a format *Preset* button such *HD 3G*, *HD*, or *SD* automatically selects a suitable entry in the Format menu at right.
   o Or you can manually select another suitable format using the *Format* menu.

Having made your selections, you would normally click the *Launch* button at lower right to display the *Live Desktop* – but first, let's explore a few other features of the *Administration panel*.

## 7.1.3   Utilities
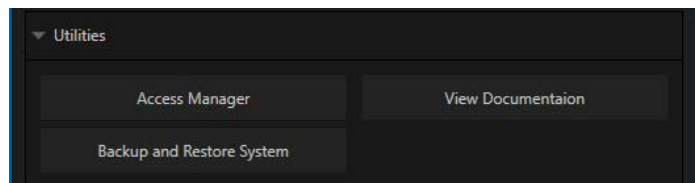
An array of important functions are provided in the *Administration* panel's *Utilities* control group.

Learn more about the capabilities of the Network Device Interface (NDI) and make greater use of the 'Video over IP' sources.
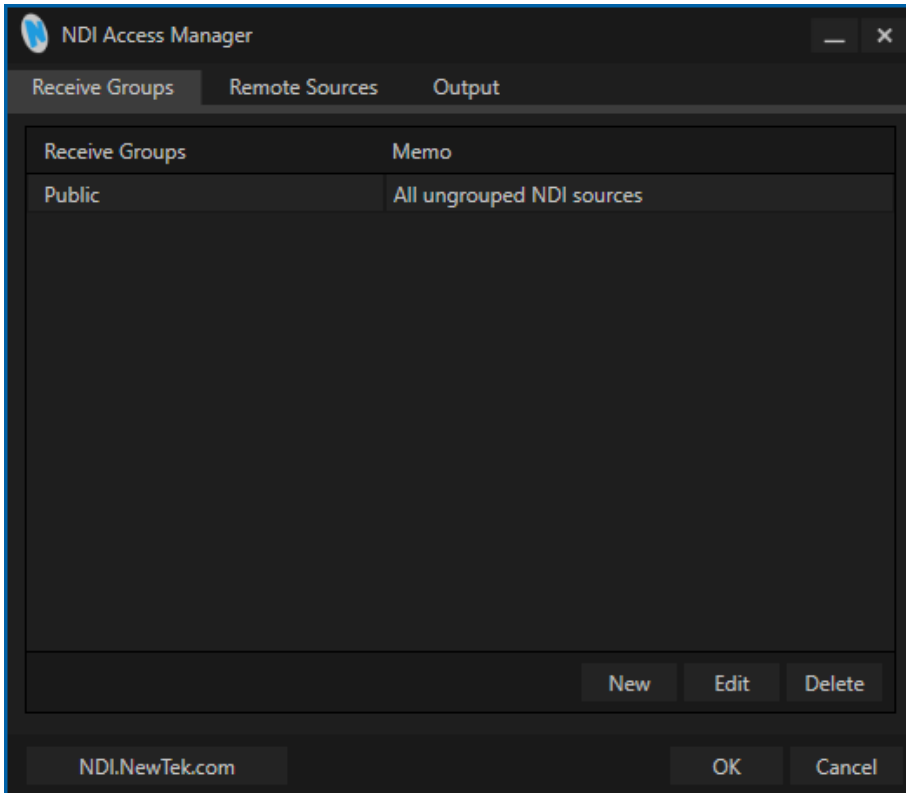


FIGURE 25

The *NDI Access Manager* lets you assign sources on individual host systems to groups, and choose which of these group that you receive. You can also access NDI sources from other subnets or even other networks.

### RECEIVE AND OUTPUT GROUPS

The *Receive Groups* tab lists all NDI groups from remote systems that will be visible to the local system. By default, NDI sources all contribute channels to the "Public" group, whose members are visible to all NDI clients on the same subnet whose host systems include a matching "Public" entry in their own *Output* tab.

Adding a custom group in the *Output* tab lets other users access the system's NDI output by adding a matching to their own Receive group list (Figure 26). If remove "Public" from your *Output* groups list, only systems configured to receive one of your custom groups will see your NDI output. Similarly, from your *Receive* entries groups tells your local system to ignore channels that aren't supplied by a *Receive* groups.
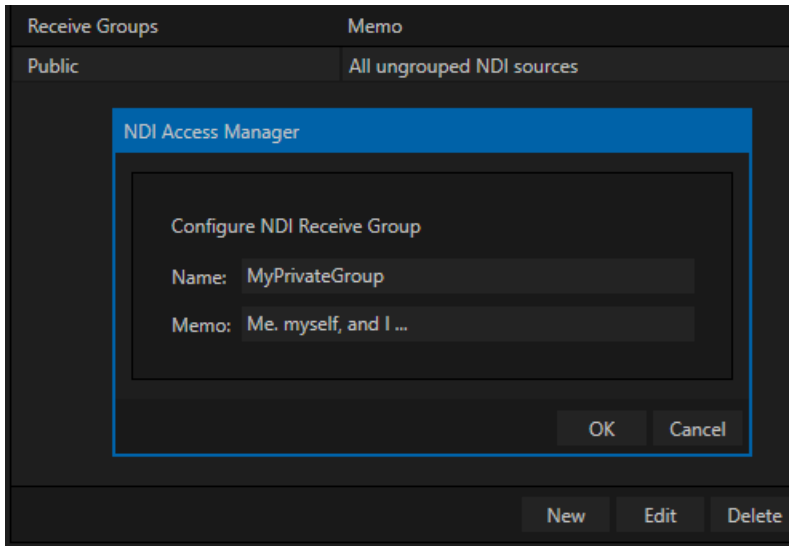
FIGURE 26

To add a custom group to either the *Receive* or *Output* tab, click the *New* button in the footer of the panel.

REMOTE SOURCES
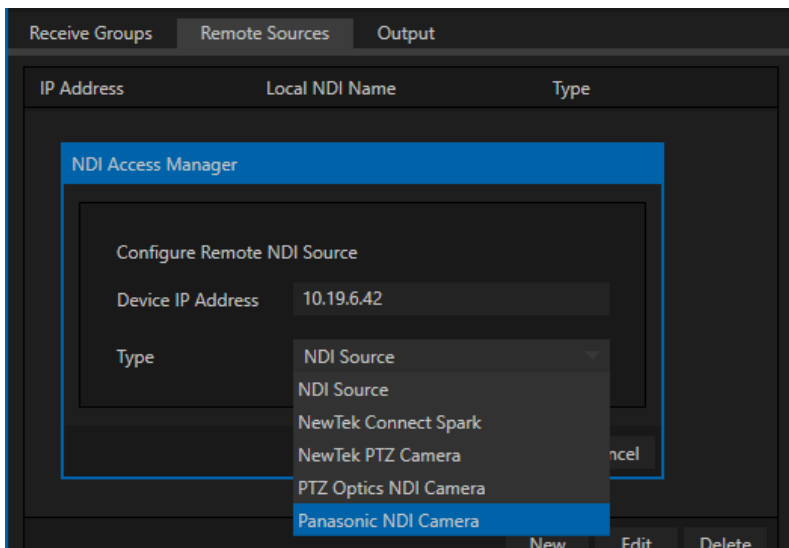


FIGURE 27

The items in the Remote Sources do not identify NDI groups, but rather individual remote NDI and *NDI|HX sources (including Panasonic cameras supporting NDI|HX). Remote sources are identified in this panel by their IP address, rather than their NDI device or channel name.

* To receive NDI|HX sources, the NewTek NDI|HX driver for Windows® must be installed on AV-HLC100.

Note that sources listed in this panel can traverse subnets on the local network, and even connect across different networks when specific criteria are met. (This may require opening specific ports for this traffic. Please refer to NDI documentation for more information.)

### Restore Session Defaults

AV-HLC100 retains various configuration settings, including video and audio sources used in your production, along with the CLIPS and STILLS media playlists you create (and so on) from one production session to the next.

Clicking *Restore Session Defaults* clears out your playlists and resets controls to default settings. <u>Note that content stored in the default folders will be deleted</u>, including imported clips, images and titles, and any clips captured to the default session folders (unless you have deliberately saved the projects and related files to locations outside the default production folders).

### Backup and Restore System
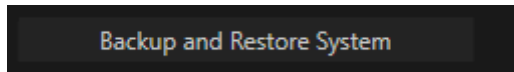


FIGURE 28

AV-HLC100 provides a powerful system restoration feature to aid you should your software installation ever be corrupted. Use this feature to renovate the system partition by using a hidden software backup partition on the local hard drive. However the utility can also create a complete custom system backup on an external USB hard drive with a capacity of at least 256 GB.

### View documentation
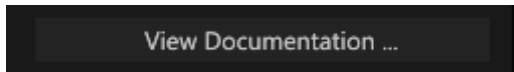


FIGURE 29

Click this button to view user documentation and licenses installed on AV-HLC100.

## 7.1.4   Title Page Defaults
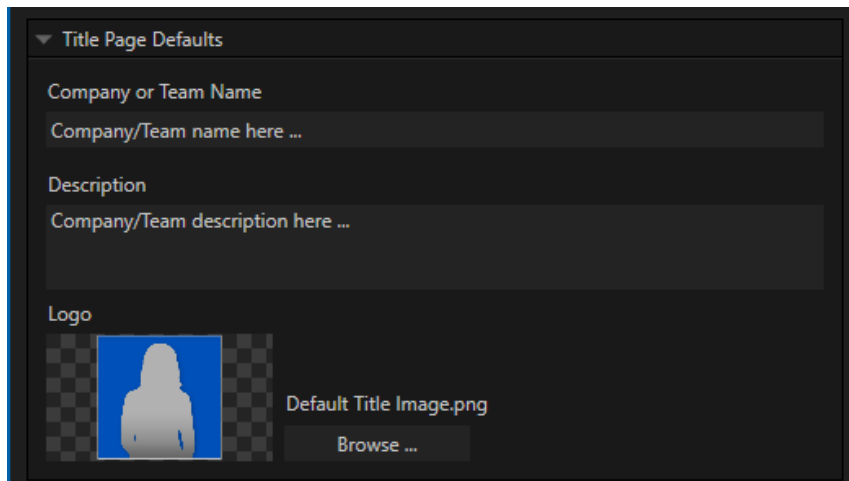


FIGURE 30

Naturally, AV-HLC100's *title pages* support embedded text and images, and these can be modified on the fly using the integrated Title Editor (see Chapter 12). However, the *title pages* also support NewTek's Datalink system, which provides an alternative method to update text and images.

Briefly, DataLink allows *title pages* to be updated automatically using data served by various local host or network sources. It works like this:

- *DataLink* tracks values assigned to a set of special variables called *DataLink keys.* When used in title pages, these *keys* are identified by a name wrapped in % signs – for example, *%Session Title Name%*.
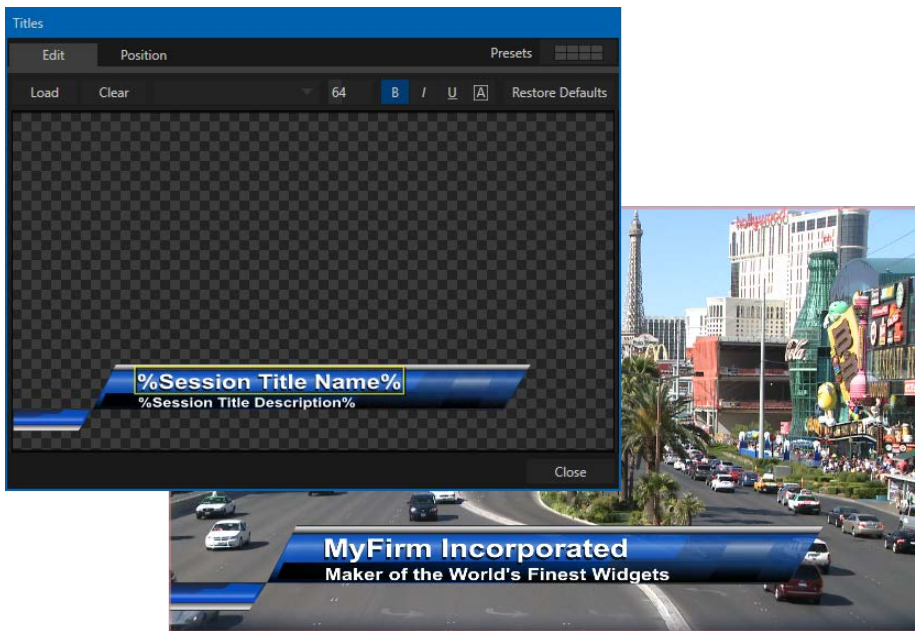


FIGURE 31

- So, while you might add a company name to a title page as a literal entry, e.g., "MyFirm Incorporated", the very same text value could be supplied by a *DataLink key* instead.

  o You would enter %Session Title Name% on the title page, and assign "MyFirm Incorporated" as the value of the corresponding *DataLink key*.

  o When displayed on output, *DataLink keys* are dynamically evaluated, with the result that "MyFirm Incorporated" is shown in place of the *key* (Figure 31)

Both methods of supplying text to a title page provide the same result when displayed, but here are some examples of the value of using Datalink:

- Almost all of the hundreds of *title pages* supplied with AV-HLC100 include the %Session Title Name% and %Session Title Description% *keys*. Some also use %Session Title Image%.

- The *Title Page Defaults* control group in AV-HLC100's Administration panel allows you to easily modify these three *DataLink key* in one convenient location.

- Having set these name, description, and image *key values* here, every single title page on the system where those *keys* have been used will immediately update to show the new values without any need to manually edit them.

  Whether you set the value for %Session Title Name% to a company or team name, or something else, this can be a huge timesaver. Likewise, assign your company logo as the value for the key %Session Title Name%, and it will automatically appear in scores of title pages.

*Hint: DataLink keys can serve in many other ways, too. For example, some DataLink keys can automatically insert time and date information into a title page. We'll consider other way DataLink can serve in Section 12.2.*

### 7.1.5 Footer Tools
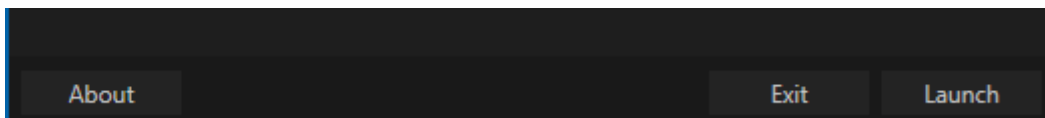


FIGURE 32

The footer of the *Administration panel* is home to a few important buttons, too.

- Click the *About* button to view AV-HLC100's software version information.
- If you wish to close the *Administration panel* without opening the *Live Desktop*, click Exit.
- Click *Launch* to display the *Live Desktop* and begin video production.

# Chapter 8  Live Desktop

*Live Desktop* provides a visual representation of all live productions, each connection, control, and options. It launches from the *Administration panel*, or automatically on logging into the system.

## Section 8.1  Display Requirements

Use the *Live Desktop* at a monitor resolution between 1600x900 and 1920x1200 pixels, inclusive.
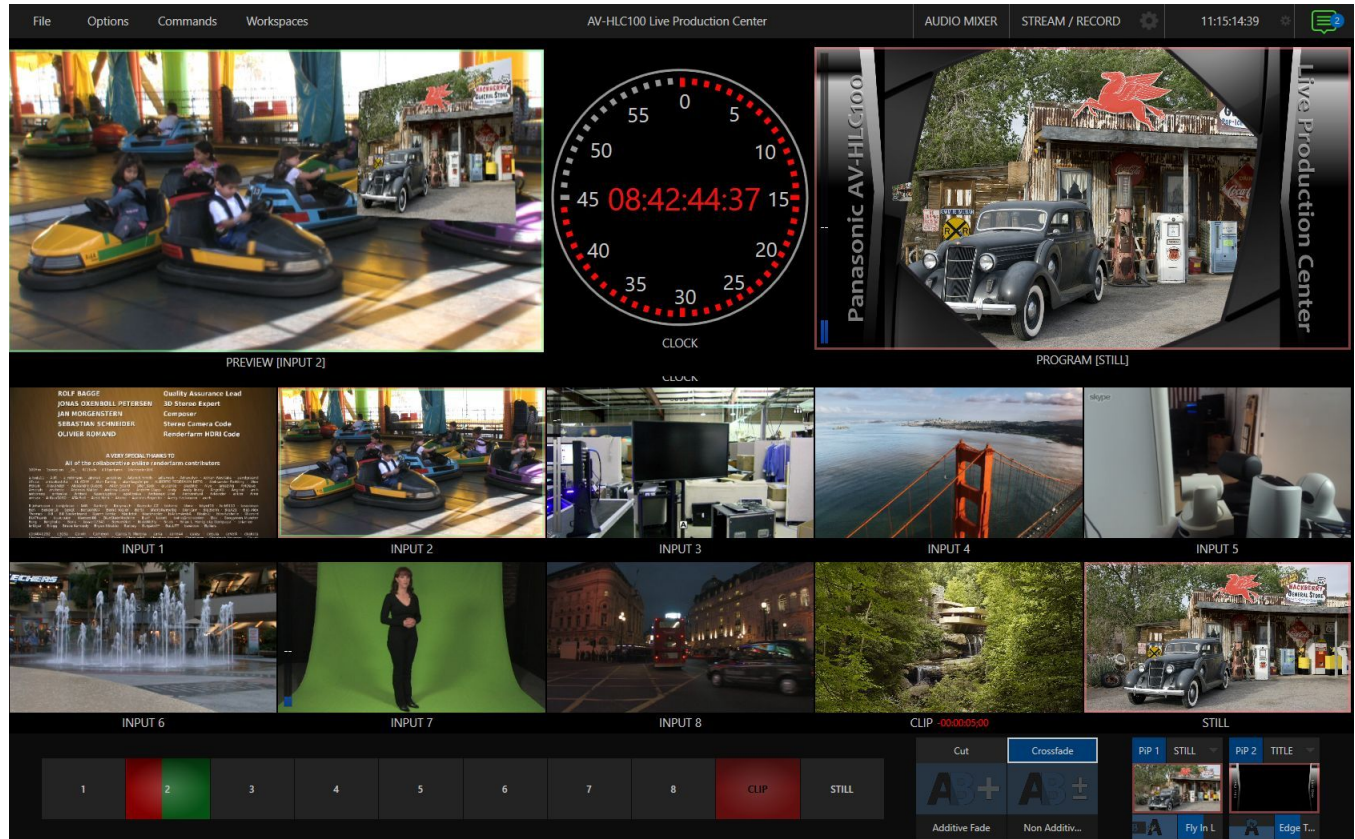


FIGURE 33

## Section 8.2  Overview

The *Live Desktop* provides visual feedback for operations, including monitoring, live switching, and so on. It can be divided into three horizontal bands.

From top to bottom, the three bands are:

## 1 - Dashboard

- Quick access to *File, Options, Commands* and *Workspace* menus, and important tools including *optional Record and Stream features*
- *Audio M*ixer – open to access input configuration tools, level control, *EQ* and *Compressor/Limiters*
- *Clock* and related feature controls
- *Notificationpanel* -system status messages and more

## 2 - Monitors
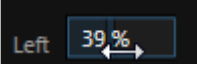
- Monitor external video inputs along with internal sources, plus *Look Ahead Preview* and *Program* output
- Configuration inputs and output, and work with playlists for *CLIPS*, *STILLS*, and *TITLES*
- *PTZ* (robotic) camera controls
- Grab still images from video sources

## 3 - Switching

- *The Switcher* row – provides quick and easy control over your primary program output
- *Transition* controls – choose *Cut* or selectable *Transition* mode
- *Overlay* video layer configuration and controls
- *Overlay Transition* selection

8.2.1   Control Types

You will find various control types used repeatedly in the *Live Desktop*. Some examples are shown in the table below.

| Control Type | Type | Examples | Usage |
|---|---|---|---|
| Left 39 % | Numeric Slider | Gain, Pan | Drag in line with the control's orientation to raise or lower the current value. |

| | Rotary slider | Position, Size, Rotate | • Drag up-down to adjust one value, left-right to adjust the other value, diagonally to adjust two different values simultaneously.<br>• Hold down Alt while dragging vertically to modify the third value (Z) when provided. |
|---|---|---|---|
| | Rotary Knob (single-value) | Audio Gain | • Drag left-right to adjust the current value. |
| | Combo-Slider | Transition, Zoom Duration | • Drag left/right to raise or lower the current value.<br>• Click the digits to type in a new value.<br>• Click the triangle to open a drop-down menu. |

To make very fine adjustments to slider values, hold down the Ctrl key while dragging the mouse (this increases accuracy by 10x). Hold down the *Shift* key and double-click most controls to reset them to their default values.

## Section 8.3   The Dashboard

The *Dashboard* is home to a number of important features. Prominently located at the very top of the *Live Desktop*, the *Dashboard* occupies the full width of the screen.



FIGURE 34

The various components of the *Dashboard* are listed below (starting from the left):

1. *File menu*
2. *Options menu*
3. *Commands menu*
4. *AUDIO MIXER* button (see Chapter 13)
5. *STREAM/ RECORD* button and *Configuration* (see Chapter 14)

47

The latter two items are so important that they rate their own chapters in this manual. In this chapter, we'll focus on the other *Dashboard* controls and options.

### 8.3.1 Menus
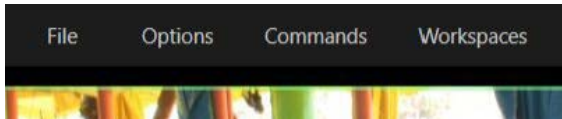


FIGURE 35

Note that the *Dashboard's* menus (Figure 35) are normally hidden during operation, but appear when you roll the mouse pointer to the top of the screen.

### 8.3.2 File Menus
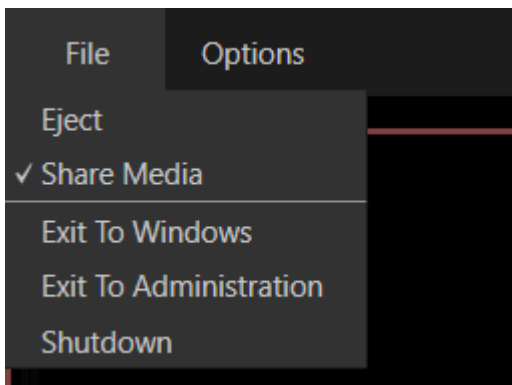


FIGURE 36

This menu drops down to reveal the following items:

- *Eject*:                          opens a sub-menu that lets you safely disconnect selected storage volumes
- *Share Media*:                  enable this option to expose AV-HLC100's default media folders
- Exit To Windows:             close your live production session (current settings are retained), and return to the Windows desktop
- Exit To Administration:      close your live production session (current settings are retained), return to the Windows desktop, and launch AV-HLC100's Administration panel
- Shutdown:                      close your live production session and safely power the unit down

### 8.3.3 Options Menu



FIGURE 37

48
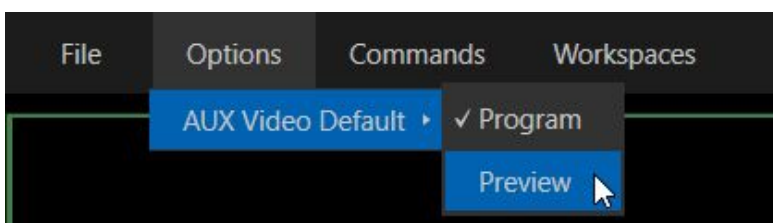
The *Options* menu allows you to set the *AUX Video Default.* AV-HLC100's AUX video output is carried by SDI Output 2, and also the AUX NDI output channel. Initially, this output duplicates the Program video stream shown on the primary output.

Using either the user interface or integrated control surface, it is possible to toggle the display of any single *Switcher* source on AUX. For example, you might want to send output from the *STILLS* player to a projection system, to complement your main video presentation. When you toggle *STILLS* output to *AUX* off again later, the video source for *AUX* automatically reverts to the default chosen in the *Options menu* – either *Program*, or *Preview* (please note that when displayed on Aux, Preview is actually "Clean Preview", thus does not show any overlays).

### 8.3.4 Commands Menu
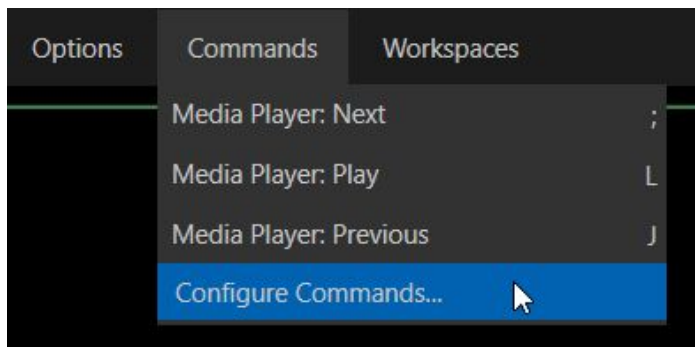


FIGURE 38

The *Commands* menu contains the *Configure Commands* option, which opens the Configure Commands panel (Figure 39).
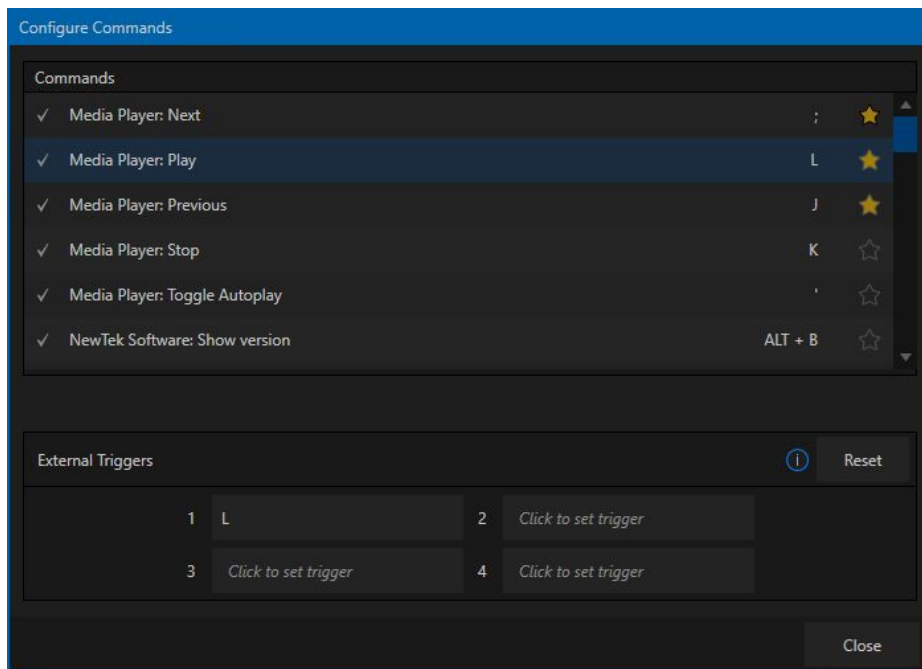


FIGURE 39

This panel has a number of helpful features. Each row in the Command lister identifies a specific command (operation) and shows the first 'trigger' currently assigned to it. (Initially, these will be the default keyboard shortcuts.)

The *Triggers* control group below allows you to configure up to four different triggers for any command. Clicking in a trigger box causes AV-HLC100 to 'listen' for input. (For example, you could click in the box numbered 2, then press a keyboard button to add a secondary shortcut key.)

> *Hint: While the most common triggers are those entered on the keyboard, you can also use supported external control devices (such as a Novation Launchpad™, or selected X-keys® programmable keypad).*
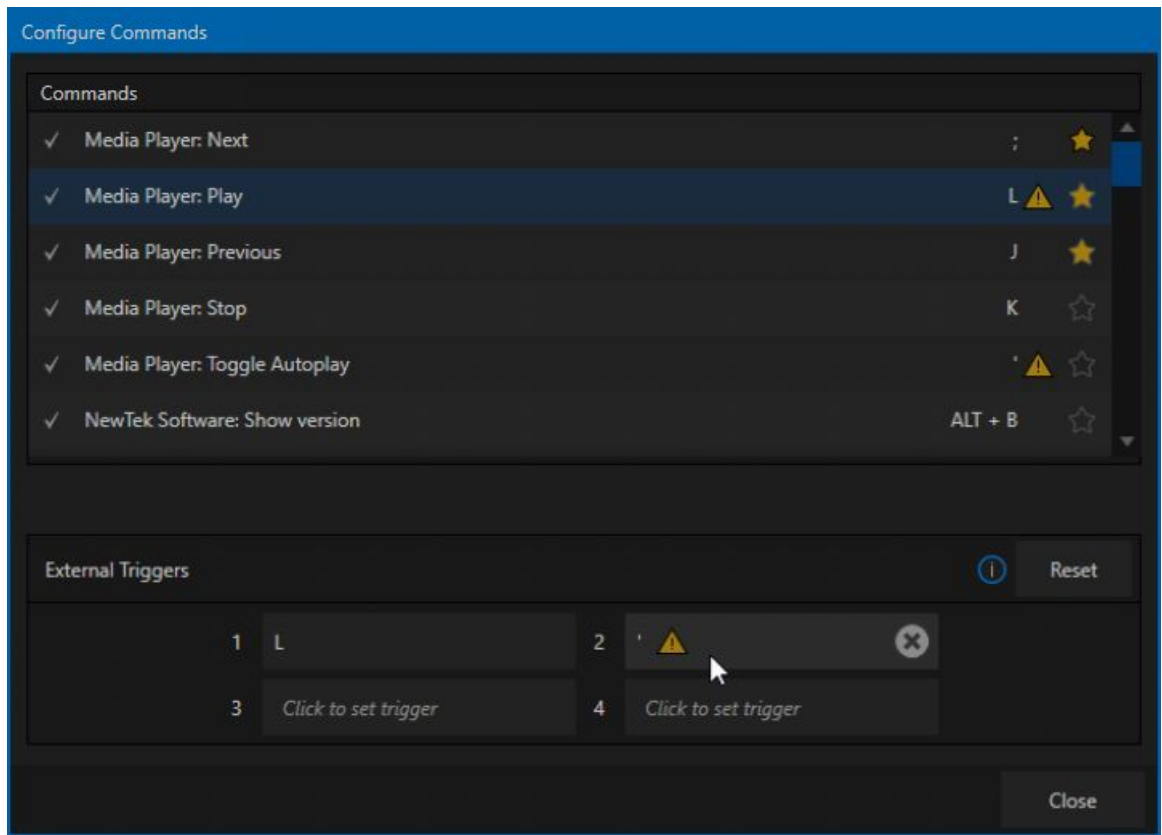


FIGURE 40

It's possible that you might a choice that conflicts with the trigger for another command. In Figure 40, trigger 2 conflicts with another entry, so a yellow triangle (also known as a 'bang') is shown in both the lister and Triggers control area. Click this warning icon causes the lister to jump to the conflicted command so you can correct the conflict. (If more than one command is conflicted, click again to cycle to the next command that requires your intervention).

> *Hint: Occasionally you might deliberately assign the same trigger to several commands. For example, you can perform multiple operations with a single key press in this manner.*

Click *Reset* at right in the Triggers area to restore all triggers for the selected command to their default state.

Notice that, in Figure 39, several entries in the *Command* lister show a gold star at right. Clicking an un-filled star gadget adds the associated command to the *Commands* menu for quick recall (see Figure 38).

> *Hint: Removing the checkmark at left on command's row de-activates the entry, preventing an accidental keyboard button press from triggering the command.*

### 8.3.5   Workspaces Menu
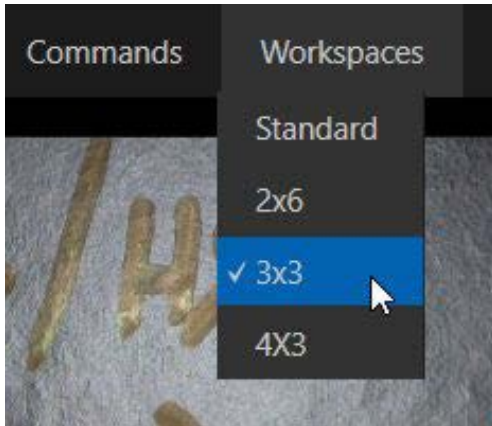
This menu, shown in Figure 43, controls the layout of video viewports in the Live Desktop monitoring section. Several alternatives allow you to make the best use of the available space according to your local requirements and taste.

### 8.3.6   Clock Options
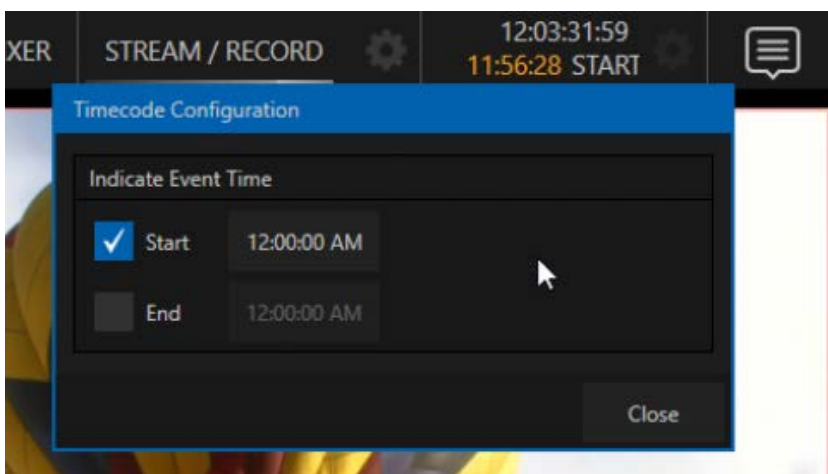
Click the gear icon next to the *Dashboard* clock to open the *Timecode Configuration* dialog. Note that you can set *Start* and *End* times for your production or event. When you do so, additional 'countdown' information is displayed in the *Dashboard.* Additionally, clocks shown in the monitor Workspaces will also update to show a second display with similar countdown information.

## Section 8.4   Notification Panel

An information display at right in the *Dashboard* at the top of the display, beside the clock, posts useful information about AV-HLC100.
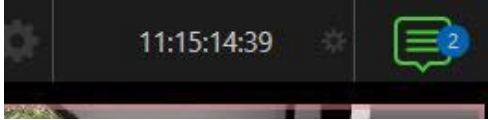
The *Notification* panel is represented in the *Dashboard* by a 'text balloon' icon, The icon color indicates the type of the most important item it received since you last reviewed the messages, as follows:

- **White**: No new messages have been posted since you last reviewed them.

- **Green**: A status update message has been received (Figure 43). Status messages typically provide operating feedback.

- **Amber**: A (non-urgent) cautionary message has been received.

- **Red**: A warning alert has been received (remedial measures may be suggested).
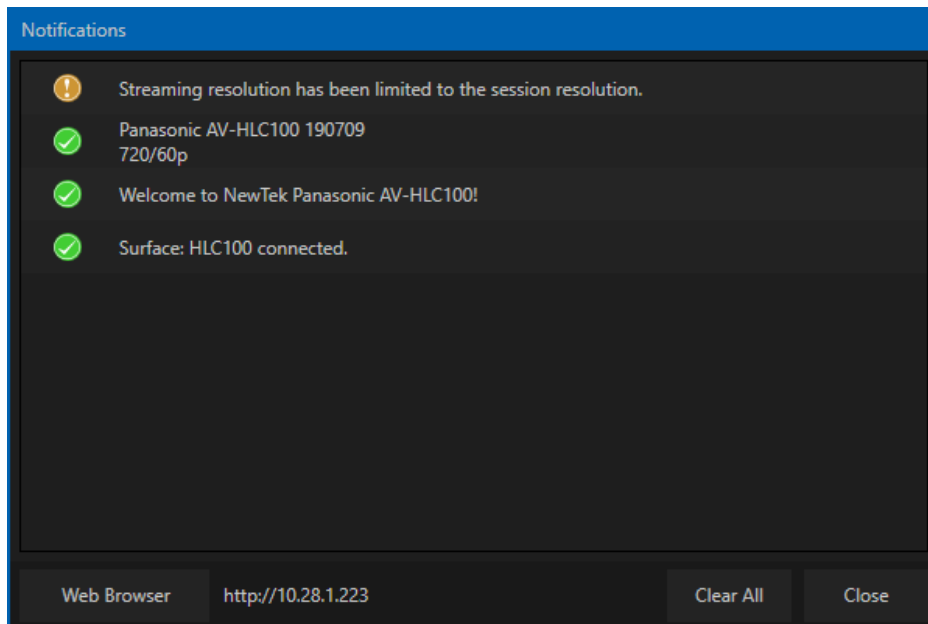


FIGURE 44

At the bottom of this panel, you can click a button to *Clear All* messages and another to open the *Web Browser*, which will automatically open to the IP address for the local host system, as shown at right of the button.

> Hint: Press ALT+ b on the keyboard to post a message listing the installed AV-HLC100 software version and current session format to the Notifications panel.

### 8.4.1  Web Control

By default, the web browser shows AV-HLCs *Web Control* panel when opened. Note that this handy external control system is not designed or intended for local use on AV-HLC100. It opens here merely to let you preview it, and alert you to the fact entering the same IP address in the URL bar of a modern web browser (such as Chrome™ or Firefox™) on a tablet, laptop, or even a phone on the same subnet will let you control your system remotely.

More details on Web Control can be found in Chapter 16.

### 8.4.2  Information Display

An information display in the center of the *Dashboard* at the top of the *Dashboard* posts useful information of various kinds about AV-HLC100.



FIGURE 45

This display may show simple status updates, as in Figure 45; or the information displayed may alert you to environmental conditions that are cautionary in some form, like the example in Figure 46.



FIGURE 46

Status messages may pertain to operations or system conditions; they may be benign notifications, as in Figure 45 or cautionary (Figure 46). The display automatically clears itself a few moments later so as not to pose an unnecessary distraction. Messages here are color coded (green, amber, and red) by importance or severity. Generally, the high priority alerts indicate that remedial steps might be in order.

> *Hint: Press ALT+ b on the keyboard to display the installed AV-HLC100 software version.*

# Section 8.5   Monitoring

As you would expect, your AV-HLC100 provides complete monitoring capabilities to help you control your live productions. The monitoring section of the *Live Desktop* occupies by far the largest part of the interface.



FIGURE 47

This area also provides access to input setup controls, audio VU 'confidence' meters, a large clock, and also advanced options providing quality control and creative alternatives.

## 8.5.1   Program

The *Program* monitor could hardly be more important, hence it's prominent default location at upper-left on the *Live Desktop.*



FIGURE 48

Normally, *t*he *Program* monitor shows what AV-HLC100 is displaying to your principal viewing audience at any moment. Thus it displays the *BKGD* video layer as well as any *Overlay layers* displayed above it (FTB, or 'Fade to Black', constitutes a final, completely opaque video layer that completely hides all other output).

> *Note: By default, Program output is sent to both SDI 1, the primary NDI output channel, labeled "MIX 1", and also the "AUX" NDI output.*

Please notice that a semi-transparent red border surrounds the Program monitor. A similar red border is shown around the viewport for any Switcher source that is currently visible on Program output. This is referred to as 'tally' notification, which is also supplied to upstream NDI video sources that support tally, and the hardware *Tally port* on AV-HLC100's backplane (see Section 6.4).

### 8.5.2 Preview and Source Viewports

The *Live Desktop* also prominently displays the *Look Ahead Preview* monitor (labeled simply *Preview*) at upper-right.

The *Look Ahead Preview* is versatile and powerful. Instead of showing just one video source (the *Preview* row selection), it displays the final result of a *Cut* operation performed using the *Control Surface.*

- When *BKGD* is delegated, the *Preview* monitor will show the source selected on the *Preview* row on the *Control Surface*.

- *Overlay layers* are shown on *Preview* when they will be displayed after the next transition.

- When *BKGD* is not delegated on the *Control Surface*, that layer will not change during a transition (initiated using the *Control Surface*). Consequently, in this case the *Preview* and *Program* monitors share identical backgrounds.

> *Hint: The background video layer is always included in any Live Desktop transition, but the Control Surface allows you to assign the CUT, AUTO and Fader lever controls independently to the background layer, Overlay layers, or any combination of these, using the delegate buttons beside the fader lever.*

Again, 'what you see (on *Preview*) is what you *will* get' – after performing the next *Cut, Auto or Fader lever* operation. This lets you set up the next shot, check its composition (including *TITLES* and *PiP* positioning), and switch to it with confidence. Note that the Preview monitor has a green *tally border*, and a similar border is shown around the viewport for any *Switcher* source that is currently visible on *Preview*. Ten source viewports complete the monitoring section of the *Live Desktop*.
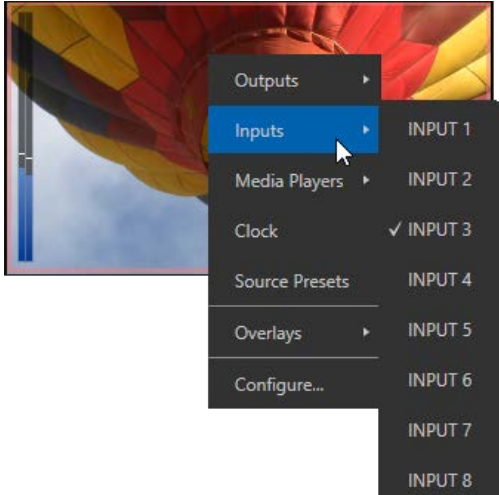
### 8.6.1   Context Menu



FIGURE 49

Right-click a viewport to display its context menu, which allows you to select among numerous display options as well as changing the source assigned to the viewport.

For example, any viewport can be assigned to show any *Switcher* source or output. Various overlays can be enabled, such as safe area displays and more.

Another useful option allows you to embed PTZ camera presets right in the viewport. For example, if you set a viewport to show the *Preview* row source, then enable the *Source Presets* switch in the context menu, you'll have immediate access to the PTZ presets of any camera you select on *Preview*.

### 8.6.2   Grab

*To grab an image from any *viewport*, simply move the mouse over the target viewport and click the snapshot (camera) icon that is shown next to the source label immediately below the monitor.

* Requires the NewTek Streaming for AV-HLC100 plugin.

> *Hint: The file path for grabs is set in the Capture control group (Configuration panel for a Switcher Source). Also, note that both the default file name and comment can use DataLink to supply values that are dynamic. (Filenames increment numerically when necessary.) Finally, hold down SHIFT when clicking the snapshot icon to automatically add the grab to the Stills playlist.*



FIGURE 50

56

## 8.6.3 Configuration Options

One final item completes our discussion of monitor viewports. When you move the mouse-pointer over a viewport, a configuration gadget (gear) is shown at lower right above the viewport.
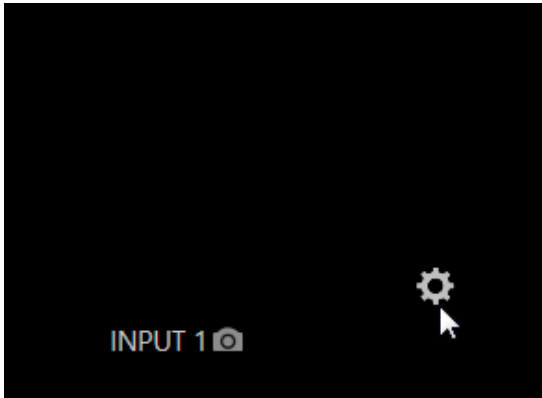


FIGURE 51

Clicking this gear, or double-clicking the viewport (above the label) opens the *Input Configuration* panel for the corresponding *Switcher* input. We'll cover configuring inputs in the next chapter.
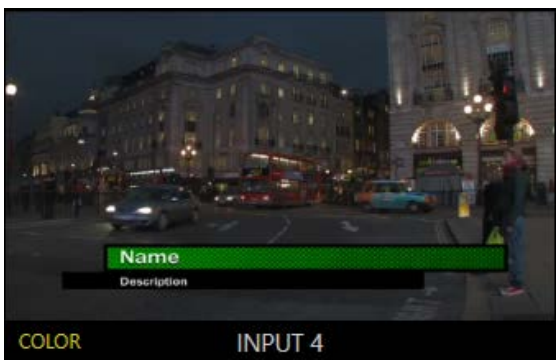


FIGURE 52

In addition to features mentioned above, the viewport label shows an indicator when the integrated *Proc Amp* is applied to modify the source's color characteristics (Figure 52), and the *CLIPS* player monitor displays a timecode countdown.

The addition of NDI (Network Device Interface) support to its four 3G SDI and the HDMI input provides AV-HLC100 a full range of input and output possibilities. Generally, an NDI source needs little if any configuration, but traditional sources may require you to choose between optional connection methods and settings.

> Note: To receive NDI|HX sources, such as the output from NDI-enabled Panasonic cameras, the NewTek NDI|HX driver for Windows® must be installed on AV-HLC100.

These settings are provided in the Input Configuration panel for each *Switcher* source. A gear icon is shown when you move the mouse-pointer over the viewport. Clicking this gear, or double-clicking the viewport above the label opens the *Input Configuration* panel for the corresponding *Switcher* input.



FIGURE 53

## Section 9.1 Input Settings Tab

The first tab is labeled *Input Settings*, and it allows you to manage all source configuration, connection and control, and identification matters.

### 9.1.1 Source Options

We considered *Source* and *Format* settings back in passing back in Section 6.8. Let's take a closer look at these items.

#### Local Sources

Local sources are listed first in the *Source* menu.
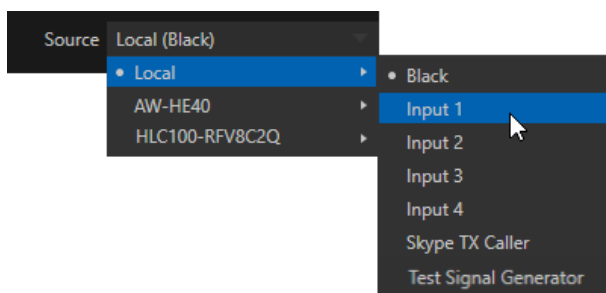


FIGURE 55
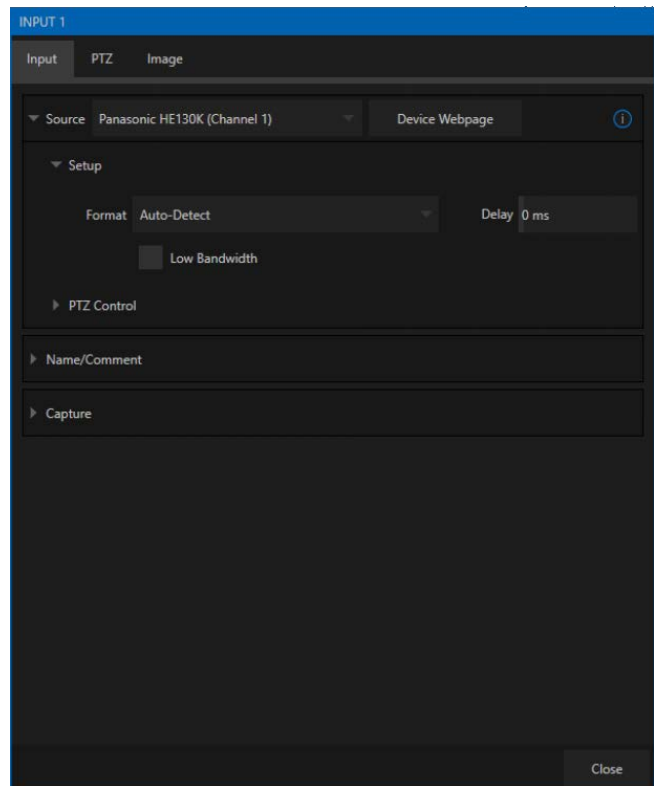


FIGURE 54

Most of the local sources consist of the four hardware inputs found on the rear panel of the unit. (Input 1 being shared between SDI and HDMI input ports). In addition, you will see an entry labeled *Skype TX Caller*, which we will discuss later (see Appendix C), and a convenient *Test Signal Generator*.

### AUTO-DETECT

The *Auto Detect* option in the *Format* menu feature makes configuring SDI, HDMI and NDI sources easy. Generally, you can simply connect a camera and see the signal immediately, without any need to set resolution and framerate options.

*Note: 1080/59.94p and 1080/50p formats are supported by SDI and NDI inputs only.*

For SDI sources, however, you may occasionally need to manually select the format. The *Format* menu lists appropriate options for the current session video standard – *PAL* or *NTSC*.

*Hint: All connected sources must conform to the current session's video standard.*

### SUPPORTED FORMATS

Other standard SDI and HDMI options are described below:

**1080/59.94p, 1080/59.94i, 1080/50p, 1080/50i**

• Digital source, high definition, progressive or interlaced
• 1920x1080 pixels, 16:9 picture aspect
• Optionally carries embedded audio

**1080/29.97p, 1080/29.97PsF, 1080/23.98p, *¹1080/23.98p Telecine, *²1080/25PsF**

• Digital source, high definition, progressive scan, or PsF (a hybrid)
• 1920x1080 pixels, 16:9 picture aspect
• Optionally carries embedded audio

**720/59.94p, 720/29.97p, 720/23.98p, *²720/50p, *²720/25p**

• Digital source, high definition, progressive scan
• 1280x720 pixels, 16:9 picture aspect
• Optionally carries embedded audio

The standard definition options listed below are provided in <u>both</u> 4:3 and 16:9 versions:

**480i, 16:9**

• NTSC digital format , standard definition, interlaced
• 720x480 pixels, anamorphic 16:9 picture aspect
• Optionally carries embedded audio

**480i, 4:3**

- NTSC digital format , standard definition, interlaced
- 720x480 pixels, 4:3 picture aspect <u>or</u> anamorphic 16:9 picture aspect
- Optionally carries embedded audio

**\*2576, 16:9**

- PAL analog format, Standard definition, interlaced
- 720x576 pixels, anamorphic 16:9 picture aspect
- Connected by SDI input connectors
- Optionally carries embedded audio

**\*2576, 4:3**

- PAL digital format , standard definition, interlaced
- 720x576 pixels, 4:3 picture aspect
- Connected by SDI input connectors
- Optionally carries embedded audio

*1 The 'telecine' option removes '2:3 pull-up' in output from cameras claiming 24PsF but actually supplying video at 30 fps (to make it suitable for 24P sessions).

*2 PAL connection type.

## Video Delay

The *Video Delay* setting can be very helpful in cases where upstream audio processing results in sound arriving at AV-HLC100's inputs 'late'.

## Low Bandwidth
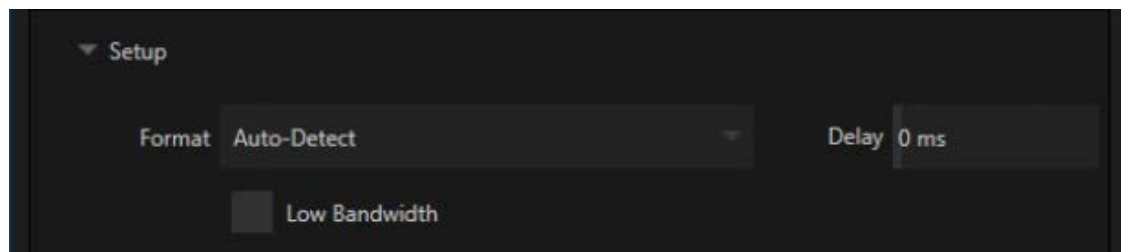


FIGURE 56

The *Low Bandwidth* switch is shown for NDI sources, and allows you to request a lower quality signal. You might use this option for inputs that aren't needed at high resolution – for example a game clock camera that you intend to show as a *Picture in Picture* overlay – or to reduce bandwidth requirements on congested or slow networks.

### 9.1.2 Input Names

Often you will wish to replace the default *Switcher* input names like (*INPUT 1*, 2, etc.) with something more descriptive. The *Input Names* group contains three editable text fields. The *Video* label is displayed beneath viewports. The shorter *Button* label appears on Switcher buttons.
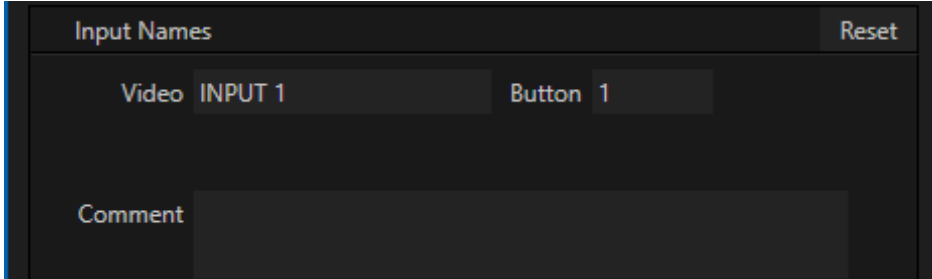


FIGURE 57

The longer *Comment* field can be used as a memo but, like the *Video* label, is also available as a *DataLink key* for use in titling (see Section 12.2 and 7.1.4). Properly prepared title pages can use this to automatically 'pull in' data from these fields from the information you enter here, allowing you to show titles that properly identify their source every time.

### 9.1.3 PTZ (Connection)

AV-HLC100 is able to control multiple PTZ cameras across a network connection.
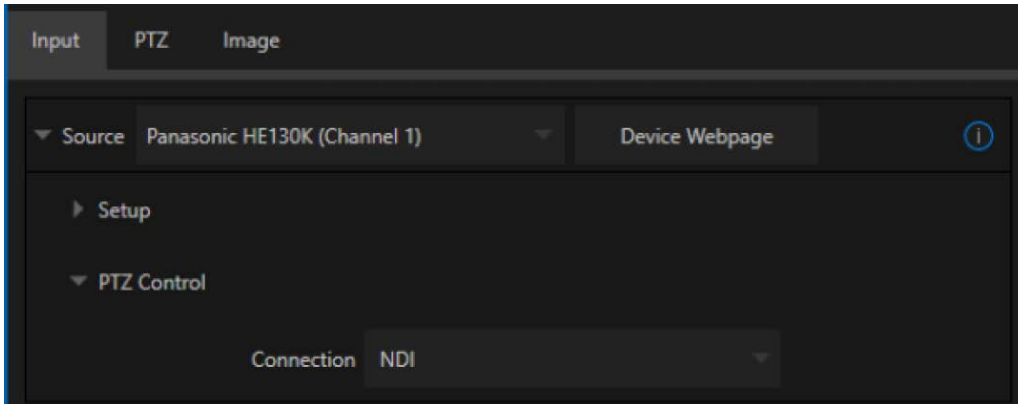


FIGURE 58

*Connection* controls shown in the *PTZ* group vary according to the *Connection* type you select from the following two options:

- *NDI* – Choose this control connection option for NDI-enabled Panasonic cameras or other devices. No other settings are required in this case.

- *Panasonic* – Choose this control connection option for Panasonic PTZ cameras supplying video by SDI or HDMI video connections. Then continue to configure the device by entering values.

Choose your camera protocol using the drop-down menu. For NDI cameras, that is normally all you need to do. To control connection to Panasonic cameras lacking NDI connectivity, you will also need to enter the IP address for the unit.
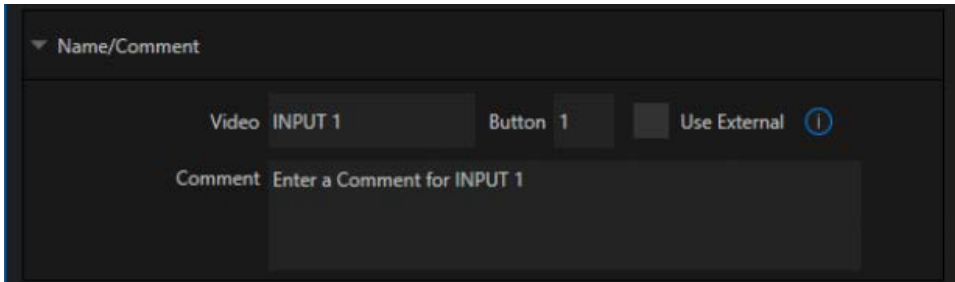


FIGURE 59

There is an added benefit to the NDI camera connection method. When the unit recognizes the camera as an NDI source that can be configured on a webpage, a *Configure* button is added beside the *Source* menu (Figure 59). Clicking this button allows you to configure advanced settings from the AV-HLC100 Web browser.

> Note: To receive NDI|HX sources, such as the output from NDI-enabled Panasonic cameras, the NewTek NDI|HX driver for Windows® must be installed on AV-HLC100.

## Section 9.2   PTZ Tab

Any of AV-HLC100's eight Switcher inputs can be configured as a PTZ camera as just discussed.

Once a control connection is established for a PTZ camera, the camera can be controlled directly from the *Live Desktop* or the *Control Surface* (see Chapter 15).

In the *Live Desktop*, PTZ controls are hosted in a special tab that appears in the *Input Configuration panel* when an NDI camera control connection is detected (default) or when the control option is set to *Panasonic>Ethernet*.

In addition to pan, tilt and zoom control, you can also manage the camera's *White Balance* settings, *Focus* and *Iris* (or 'brightness'), settings for supported cameras.

The AV-HLC100 also provides PTZ preset system allowing you to lock in the shots you want and access them quickly.



FIGURE 60

62
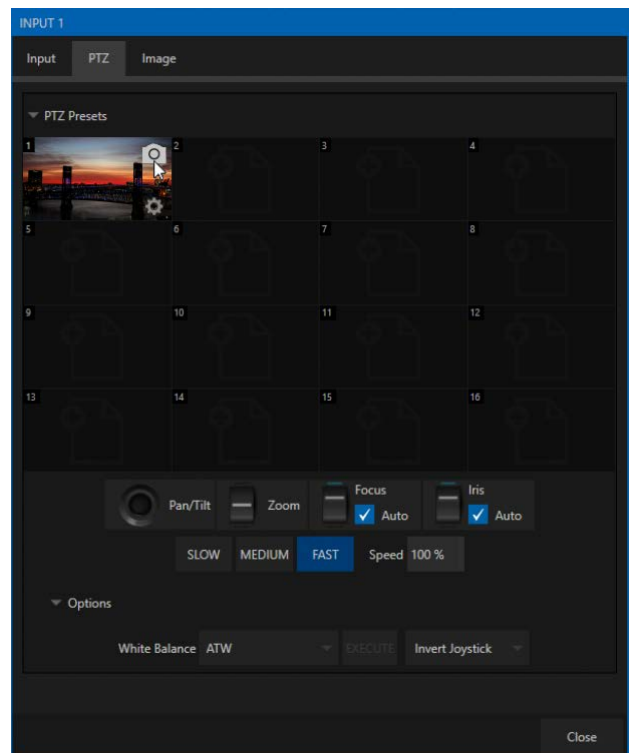
### 9.2.1 Manual Navigation



FIGURE 61

As set of manual *Position, Zoom, Focus* and *Iris* controls sits centrally just beneath the PTZ preset bin. Drag the mouse on these to make manual adjustments. (The latter two items are supplemented by *Auto Focus* and *Auto Iris* toggle switches just beneath.)

### 9.2.2 PTZ Presets
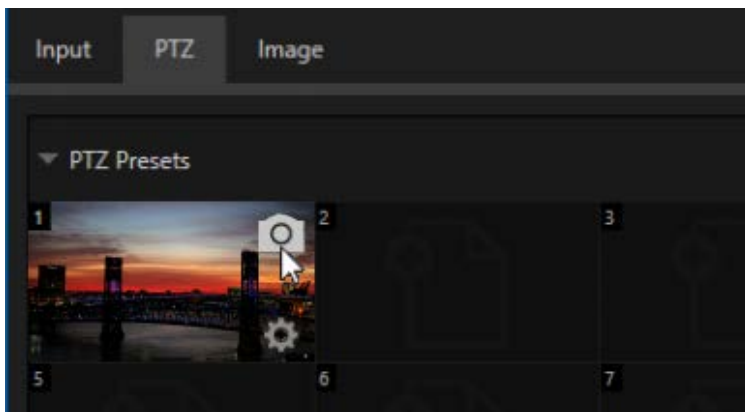


FIGURE 62

The large *Preset Bin* just above shows thumbnail icons for the first 24 of the camera's PTZ presets (the control surface provides access to up to 99 presets). Click a preset icon, and the camera will automatically begin moving to the stored position.

> *Hint: To quickly display this preset panel for a PTZ camera currently selected on the Preview row, press the keyboard asterisk (*) key.*

To configure and store a preset:

1.  Use the *Position, Zoom* and *Focus* controls to navigate to the desired camera angle, etc.

2.  Then move the mouse over the preset icon you wish to store (or update), and click the *Snapshot* (camera) gadget that pops up in the upper-right corner of the icon (Figure 62).

> *Hint: Hold Shift when clicking the Snapshot (camera) gadget to update the representative thumbnail image without modifying the preset already stored in that slot.*

63
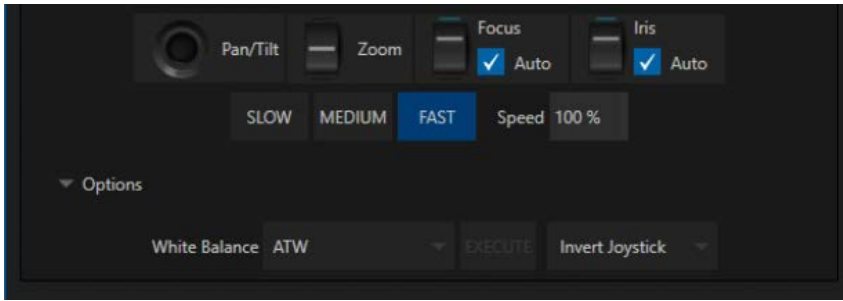
FIGURE 63

For Panasonic PTZ cameras, the *White Balance* menu offers AWA and AWB presets, along with 3200 and 5600 Kelvin options. (White Balance is a 'global' setting, and is not stored in camera presets. By contrast, the *Focus* setting, and the state of its *Auto* switch are stored individually in each preset. This is also true for the *Iris* setting, and its *Auto* switch.)

The *Flip* switch allows you to compensate when the camera is mounted in an inverted configuration. The *Pan*, *Tilt* and *Zoom* switches below in the group labeled *Invert* allow you to reverse the direction of the named control operations.

### 9.2.3   PTZ and the Control Surface

Pan, tilt, zoom control, and preset selection for connected robotic cameras are also directly supported on the control surface. See Chapter 15, Control Surface for details.

## Section 9.3   Image Tab
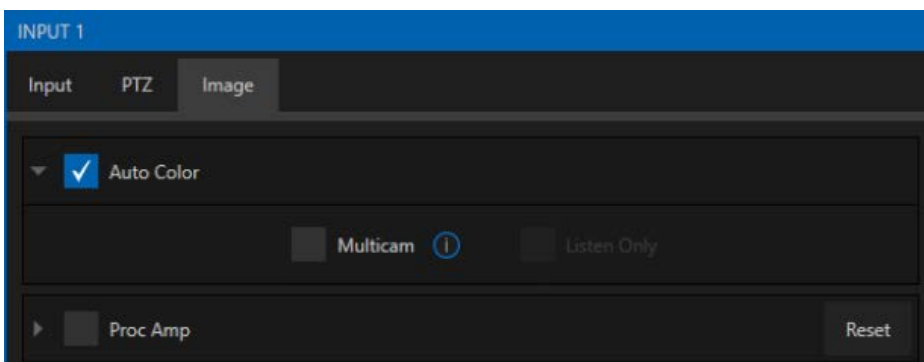


FIGURE 64

AV-HLC100 provides extensive color control processing options for every video source. These are hosted in the *Color* tab of the *Input Configuration* panel.

### 9.3.1   Auto Color

Lighting conditions can change dramatically during many live events, especially those held outdoors. Adding to this problem, production usually involves multiple cameras and these may not have uniform

color characteristics. It may take time for the color correction in response to changes in brightness when the camera is switched or the change of the environment and the time of day.

To help you overcome these problems, the *Auto Color* feature updates the color characteristics of your video sources as lighting conditions vary. In many cases, simply enabling the *Auto Color* switch is all it takes to produce a show that looks amazingly consistent.

### Multicam

By default, each camera with *Auto Color* enabled is processed uniquely – without reference to other sources. Though, even greater consistency can be achieved by treating light sources in a similar illumination environment as a group. Enable *Multicam* for several cameras causes *Auto Color* to evaluate and adjust these cameras in unison. You might, for example, enable *Multicam* for court-side cameras in an interior sports venue, while treating exterior or studio feeds individually.

### Listen Only

The *Listen Only* switch allows you to include a source in the *Multicam* group without adding its own feed to the group evaluation. Thus a camera trained on a giant purple dinosaur can be automatically corrected without disproportionately biasing the group evaluation and consequent *Auto Color* correction. Alternatively, one might enable *Multicam* for a number of sources, turning *Listen Only* on for all but one camera – effectively making that camera the color reference all other cameras in the group will follow.

*Note: The Proc Amp, discussed next, is downstream of the Auto Color system. This allows you to apply further manual color adjustments to your individual sources, whether for fine tuning or to achieve a specific "look".*

### 9.3.2   Proc Amp
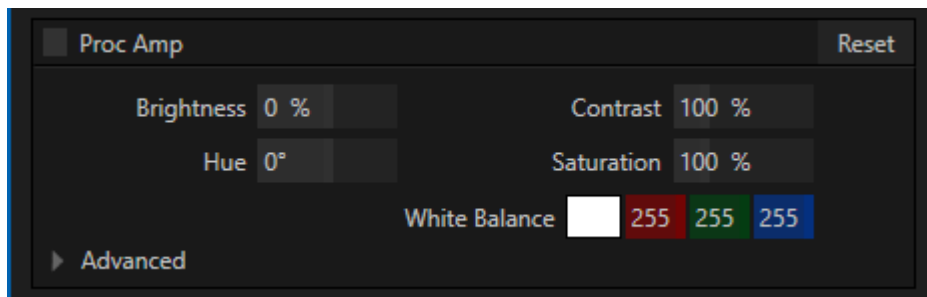


FIGURE 65

A switch at the top of the *Proc Amp* control group toggles the feature on/off. Other controls operate as follows:

- *Brightness*: Adjustment range from -50 to +50 IRE (the default being 0). As reference, the full luminance range of the visible portion of a video signal can be thought of as '100 IRE units' (named for the Institute of Radio Engineers) – ignoring minor regional variations.

- Contrast – Adjustment range from 25 - 400% (default 100%).

- *Hue* – Adjustment range between -180° and +180°. Adjusts the master color of the video signal from the attached source, swinging the entire image through the color wheel's spectrum.

- *Saturation* – Adjustment range from 0-500%. Zero saturation results in a 'black and white' picture; increased saturation results in richer colors. High saturation values can exaggerate the color portion of the signal.

  (Note that over-saturated colors are considered illegal for broadcast transmission, and may result in display problems on some devices.)

> *Hint: Proc Amp adjustments are also applied after LiveMatte is processed, which can help when composing greenscreen shots to match a background or LiveSet.*

- *White Balance* – to *automatically* white balance, click and hold the mouse button on the *Color* well, and then slide the 'eyedropper' pointer onto the monitor for the corresponding source. Release the mouse button over a part of the image that should appear as white after processing.

Advanced Color Controls
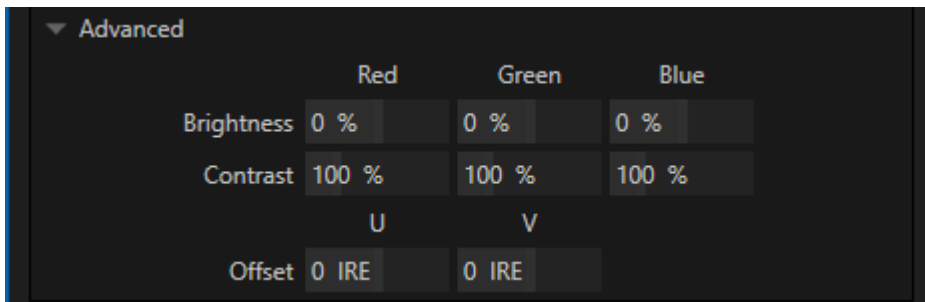


FIGURE 66

This secondary control group is revealed when you click the triangle gadget beside its label.

In addition to per color channel (RGB) *Brightness* and *Contrast* sliders, it adds *U Offset* and *V Offset* controls.

- The U portion of the video signal carries blue and yellow color information. Rotating the *U Offset knob* clockwise shifts the signal toward blue, while a counter-clockwise twist shifts the signal toward yellow.

- The V portion of the video signal carries red and green color information. Rotate *V Offset* clockwise to shift the signal toward red and counter-clockwise to shift the signal toward green.

FIGURE 67

The bottom band of the *Live Desktop,* below the monitoring section, is host to the Switcher and related controls and features, including the *Overlay Controls* (Figure 67).

## Section 10.1 Switcher
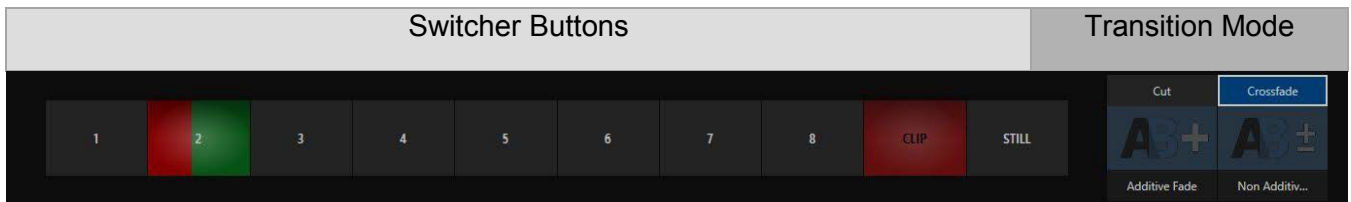


FIGURE 68

AV-HLC100 uses a single-row *Switcher* (Figure 68) to accomplish operations that would otherwise take at least two steps using the *Control Surface*.

Thus a single click on a *Switcher* button thus does several things as follows:

- The clicked source is assigned to AV-HLC100's internal '*Preview*' row (associated audio sources may also be affected by *Switcher* activity – see Section 13.8.4).

- AV-HLC100 performs a transition to display the designated (*Preview*) source by applying transition defined by the *Transition Mode* settings at right.

### 10.1.1  AUX Video Output

The Switcher row can also be used to determine what video source is sent to the *AUX* video bus (carried by the SDI 2 and the AUX NDI outputs).

As noted in Section 8.3.3, the default source can be either *Program* or (clean)*Preview*. However, by holding down *ALT* on the keyboard while punching a *Switcher* row button, any Switcher source can be sent to AUX instead.
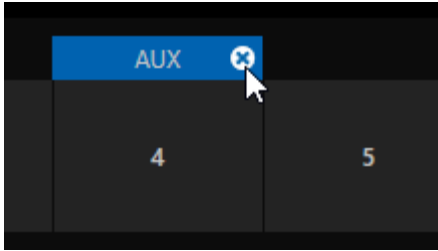
FIGURE 69

An *AUX* tag is added to the *Switcher* display to identify the selected source. To revert to the default *AUX* source, roll the mouse over this tag and click the (x) gadget that it shows.

### 10.1.2 Understanding Video Layers

Although AV-HLC100's internal *Progam* and *Preview* busses are not independently depicted in the *Live Desktop*, they can be seen (and controlled) on the *Control Surface*. We mention here the process of creating a program using multiple video layers.

- **The *Background Layer***

  o The *Background* (also refered to as "BKGD") video layer is the bottom-most layer of the final composition ultimately sent to AV-HLC100's *Program* output.

  o This layer comprises the current blend of two primary video layers, *Program* and *Preview*.

    ▪ The *Program* row selection determines the dominant source of the *Background layer*

    ▪ *T*he *Preview row* selection determines which source is queued up for display in the *Background* layer by the next transition.

  o During a transition, the *Background layer* includes increasing greater portions of the incoming *Preview* row video source until eventually, the outgoing source is completely removed from output (having been swapped into the place of the former Preview row selection).

- *Overlay Layers*

  o Overlay layers (also called "downstream keys" may or may not appear above (or, if you like, in front of) the *Background layer*. *Overlay* layers are typically used for overlaying graphics and titles, etc., though they may serve other purposes as well.

  o AV-HLC100 really provides three *Overlay layers* (only the first two are shown in the *Live Desktop*):

    ▪ *PiP 1 (Picture in Picture 1)* – This layer normally serves to let you display another video or media source as a *Picture in Picture* (PiP) element over your *Program output*.

68

- ▪ *PiP 2* – This video overlay defaults to being used to show title pages, but can be repurposed.

- ▪ *Fade to Black (FTB)* – *FTB* constitutes a final overlay layer – one that obscures all other layers when applied. *FTB* is controlled by the *Control Surface*.



## Section 10.2 Switcher Transitions
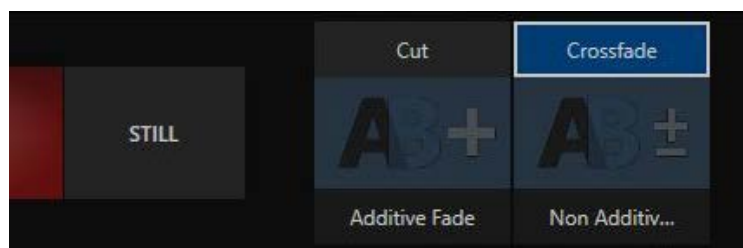
FIGURE 70

As mentioned above, clicking a *Switcher* button performs the *Background layer* transition designated by the *Transition mode* controls at right (Figure 70). This area shows two transition thumbnail icons.

The first, at left, is labeled *Cut*. When *Cut mode* is active, as indicated by a blue border around its icon, AV-HLC100 immediately cuts to any source you click in the *Switcher* row. The second icon in the *Transition mode* control group represents a more elaborate transition. When this icon is selected (has a blue border), the transition shown is applied when you make Switcher selections.

### 10.2.1 Presets

Roll the mouse pointer over this second icon and you will see a gear gadget overlaid on it. Click the gear to open a *transition preset bin* that provides quick access to nine different effects (Figure 71).
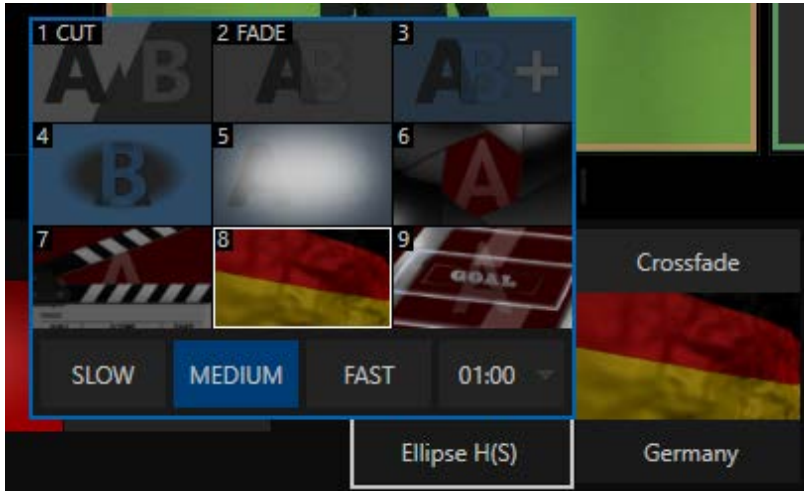


FIGURE 71

You can click one of the preset icons to select it as the current *Transition mode* effect, and adjust its speed using the controls below. Subsequently, clicking a *Switcher* button will use the transition you chose.

Note that the name of the effect in each of the eight preset slots is shown when the mouse is over its icon. The first preset is permanently assigned to *Fade*, but the others can each be replaced by any of the hundreds of transition effects provided on AV-HLC100. To assign a different effect to a preset slot, click the + sign that appears at upper right above the icon when the mouse pointer is over it. This opens AV-HLC100's Media Browser (the *Media Browser* is discussed in Section 11.1.3).

### 10.2.2 Duration

Transition durations are stored on a 'per slot' basis, using the *Slow*, *Medium*, *Fast* buttons at the bottom of the preset bin, or using the numeric duration control at right. You can set the speed using this control's menu, or drag the mouse pointer left or right over the numeric display, or by direct keyboard entry into it.

The *Duration* menu for the *Background* transition offers two additional options:

- *Reverse* – configures the current transition to run in reverse direction the next time it is applied.
- *Ping Pong* – when enabled, this option causes the direction of the transition to be automatically swapped after each time it is applied.

# Section 10.3 Overlays

Two *Overlay layer* controls labeled *PiP 1* and *PiP 2* occupy the right-most, area of the *Switcher* control area.

> *Hint: "PiP" is common shorthand for "Picture-inPicture".*
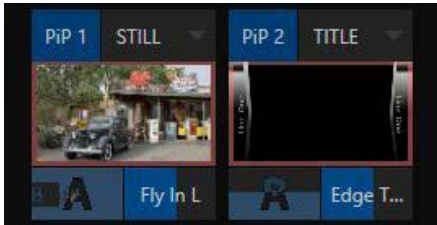


FIGURE 72

The *Overlay* images shown here (Figure 72) are actually live video viewports showing the current video layer for the different modules. The current source for a PiP layer is selected using the menu at right above the viewport.

Clicking this live viewport will hide or display the layer, using the transition effect represented by the icon and label below (a progress meter shown behind the transition label informs you of the current visibility state of the layer).

## 10.3.1 Configuring Transitions

Each *Overlay layer* has its own transition effect. Similar to the *Transition mode* controls for the *Switcher*, click the transition icon below an Overlay viewport to reveal a transition preset bin. Click an entry in the palette to select it, or move the mouse pointer to the "+" sign that pops up for each icon and click to open AV-HLC100's *Media Browser*.

In the *Media Browser*, you can choose from the hundreds of transition effects included with AV-HLC100, including colorful *Animation Store* effects (the *Media Browser* is discussed in Section 11.1.3). The selected effect will replace the current one in the preset bin.

> *Hint: The direction of Transitions applied as Overlay layer effects automatically alternates. If the first click displays the layer using an effect, the next click removes it using the reverse effect. This 'Ping Pong' behavior is optional for Background layer transitions.*

Each *Overlay layer* also includes *Position* controls, to let you resize the overlaid source and place it according to taste.

Roll the mouse pointer over the layer's viewport to reveal the familiar gear icon.

Clicking this opens the familiar *Input Configuration* panel with a new *PiP* tab added to it, which includes control groups for *Position and Crop* settings for the associated layer.

> *Note: Uniquely, the PiP 2 layer can be assigned to Titles. In this case, the Title Editor (which has its own position controls and more) is opened instead. Its features are discussed in Chapter 12.*
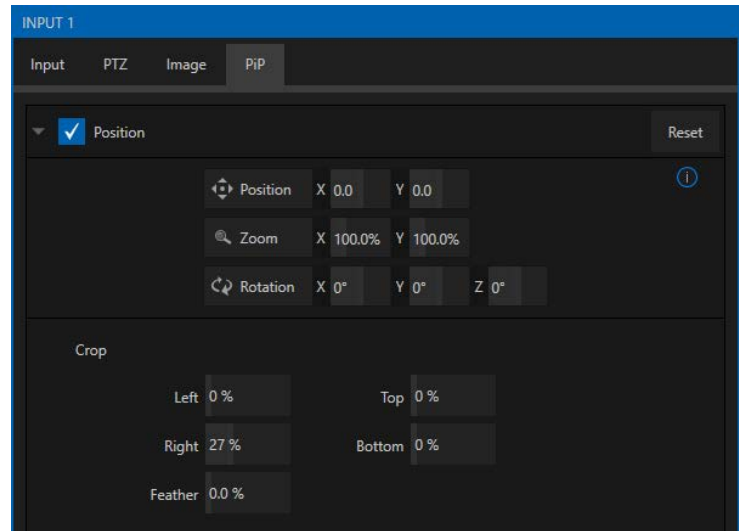


FIGURE 73

### Position Tab

*The Positioning* panel is organized into tabs. The first, *Position*, includes *Position*, *Zoom, and Rotation controls*.

All *Position* settings can be toggled on and off together using the switch provided.

- Click and drag on the *Position* button to relocate the *PiP* layer vertically or horizontally within the frame. Dragging left or right directly on either of the two nearby numeric controls adjusts the position on a single axis only.

> Hint: You can also constrain mouse actions to one axis by holding down the Ctrl key before dragging.

- Dragging the cursor on the *Zoom* button (magnifying glass) affects the apparent size of the overlay.

  Again, if you drag just one of the associated numeric gadgets you can adjust the corresponding layer in one dimension–width or height.

- In similar fashion, drag the pointer over the *Rotation* button with the left mouse button depressed to turn the overlay source on three axes as follows:

  o Drag left/right to rotate the source about the Y (vertical) axis.

  o Drag up/down to rotate about the X (horizontal) axis.

  o Drag while holding *Alt* down to rotate about the Z axis.

*Overlay* layers are automatically shown on the *Preview* monitors when the *Position* panel is open.

This allows you to adjust positioning without the result being inadvertently shown on output.

o   Drag on a single numeric slider, or hold down *Ctrl* to constrain rotation to one axis.

> *Hint: If you click a numeric field (or right-click it), you can type a value into the gadget using the keyboard; press Enter to complete the editing action, or Esc to cancel it.*

## Crop

The *Crop* controls are similar to those just described, but allow you to crop the *Picture in Picture* layer overlay (only – the original source viewed elsewhere remains un-cropped).

> *Hint: As for most similar controls, individual Edges settings can be reset to their default values by double-clicking with the Shift key held down. Restore default settings to all parameters of the Position or Edges tabs by clicking Reset.*

### 10.3.3  Overlays and Transparency

Sources assigned to *Overlays* are often partially transparent. Items in the CLIPS playlist file can include an embedded *alpha channel*, as can NDI sources and title pages.

In all of these cases, *Overlay* layers automatically respect the transparency channel supplied by the source. The *Background* layer will appear through or around sources with transparency as appropriate.

> *Important Note: Use files with straight (a.k.a. "non-premultiplied") alpha channels in the CLIPS players. Premultiplied files will generally not yield correct results when overlaid on other imagery.*

*The PiP* layer offers a lot of creative possibilities. Beyond the obvious, it can serve to display a station ID 'bug' or company logo, to add a 'spinning globe' animation playing in CLIPS, or many other purposes.

### 10.3.4  Delegating Overlays

Normally, clicking a Switcher source only transitions the *Background layer*. You might, however, wish to configure AV-HLC100 to automatically show a title page when the *Background layer* transition occurs.

To delegate an *Overlay layer* to transition simultaneously with the *Background layer*, simply click the *Overlay layer label* (PiP 1 or PiP 2) above the small viewport for the layer. The label button will turn blue to indicate the layer is delegated.  The next time you click a *Switcher* button, the *Overlay transition* and *Background transition* will both be initiated at the same time.

> *Hint: The Look Ahead Preview monitor respects your Overlay delegate selections, allowing you to configure layers for upcoming switcher operations with great confidence.*

# Chapter 11  Media Players

AV-HLC100 includes two internal *Media Players*, referred to as CLIP and STILL players.
These names of these players gives you an idea what different media types they are designed for:

- The *CLIP* player is designed to display video clips – including long format 'movies'. It can also play audio files.

- The *STILL* player is provided to show image files such as photos, graphics, etc.

*Note: The video and audio file formats supported by the Media Players are extended by installing the optional NewTek Streaming for AV-HLC100 plugin.*

## Section 11.1 Playlists

The content of AV-HLC100's internal *Media Players* is organized in a storyboard-style playlist, shown in a tab in its *Input Configuration panel* (Figure 74).

*Hint: As a reminder, open this panel by clicking the gear that is shown when you move the mouse over the CLIP or STILL viewport in the monitoring section of the Live Desktop.*
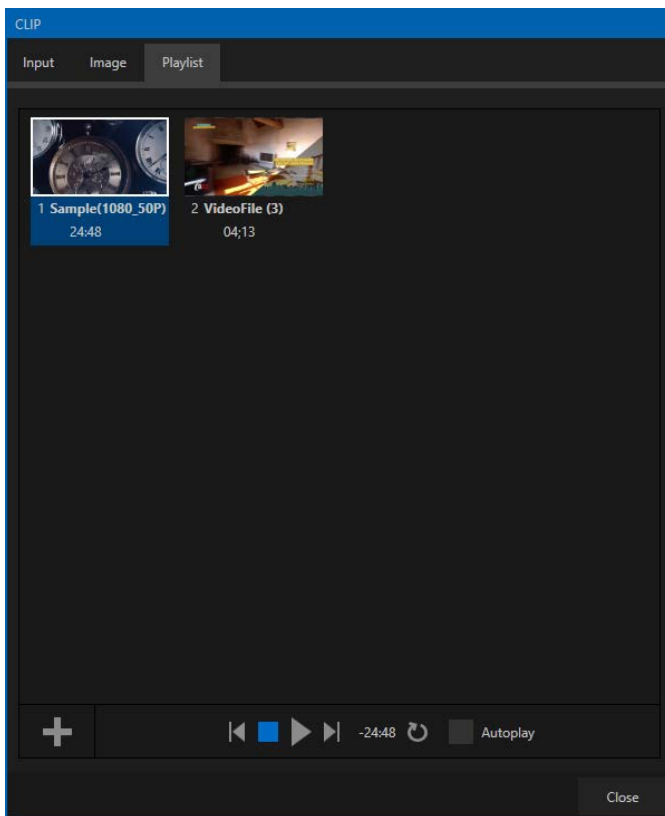


The play position for the CLIP player is automatically set to the first frame when a clip is newly selected.

Double-clicking a thumbnail (or clicking the *Play* button) begins playback from the *In Point* of the current file, as does clicking the + sign in the footer.

Double-clicking elsewhere in the playlist pane opens the Media Browser (hold down shift when clicking to open a system file explorer instead of the custom Media Browser).

During playback, the footer of playlist items illuminates in blue as each is played in turn. When necessary, the playlist pane scrolls to display the icon for the currently playing item. A progress bar is displayed in the label beneath the currently playing thumbnail.

FIGURE 74

*Hint: During playback, selection status is independent of the clip playing. Selected items have a white border in the Playlist pane.*

## 11.1.1 File Operations

A scrollbar at right accommodates long playlists when necessary. Icons in the playlist can be re-ordered quickly and easily using familiar drag and drop techniques. The playlist can even be altered during playback (of course, if the currently playing item is removed, playback stops immediately).

An *Alias* (by default, the item's filename) is displayed below the icon. Items in the *CLIP player* playlist also show their duration. Clicking an item in the playlist selects it. Standard *Shift + click* and *Ctrl + click* multi-selection operations are supported, and all selected items are denoted by a white border around their icon.

- Click the large + (*Add Media*) button at left beneath the playlist pane to open the *Media Browser* (see Section 11.1.3). Alternatively, double-click in an empty part of the *Playlist* pane.

- Newly-added files become selected items in the *Playlist* pane.

- Right-click in the playlist pane to show a menu with context-relevant items from the following list (operations affect selected playlist items):

  o *Cut*

  o *Copy*

  o *Paste*

  o *Remove*

  o *Properties*

- Standard *Cut, Copy, Paste* and *Delete* keystrokes are supported for playlist entries.

- Un-playable (missing, corrupt, or unsupported) file icons are dimmed.

*Hint: Multi-selection is supported for most operations, including Set Duration (applies to Still and Title only).*

Most of the clip context menu items are self-explanatory, but let's talk about one of them in just a bit more detail.

## 11.1.2 Properties

### Display Name

The *Properties panel* allows you to edit the *Display Name* for a file in the playlist. This entry defaults to the filename, but is actually a local alias, or 'nickname'.

Editing the name does not actually change the name of the file on your hard drive. Roll the mouse over the icon to see the true filename and its path.



FIGURE 75

75
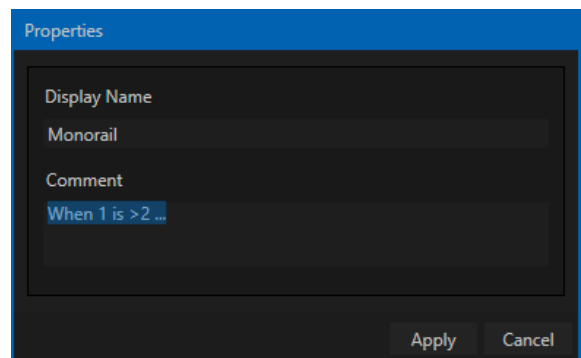
The *Comment* box permits to enter metadata to associate with the file.

> *Hint: Both the Display Name and Comment box content for the selected clip are available as DataLink keys, which can in turn be served to live title pages. See Section 7.1.4 and Section 12.2.*

### Alpha Channel Support

For files with transparency such as 32bit image files, use non-premultiplied (or 'straight') alpha channels. Premultiplied files will not give the correct results when overlaid on other imagery.

## 11.1.3  Media Browser

AV-HLC100's custom *Media Browser* provides easy navigation and selection of content. It is available anywhere in the *Live Desktop* that you might wish to select content, transitions or effects for use in your production.

The panel layout is principally comprised of two panes, left and right, that we'll refer to as the *Location List* and *File Pane*.



FIGURE 76

### Location List

The *Location List* is a column of favorite "locations", grouped under headings such as Clips, Titles, Stills, and so on.
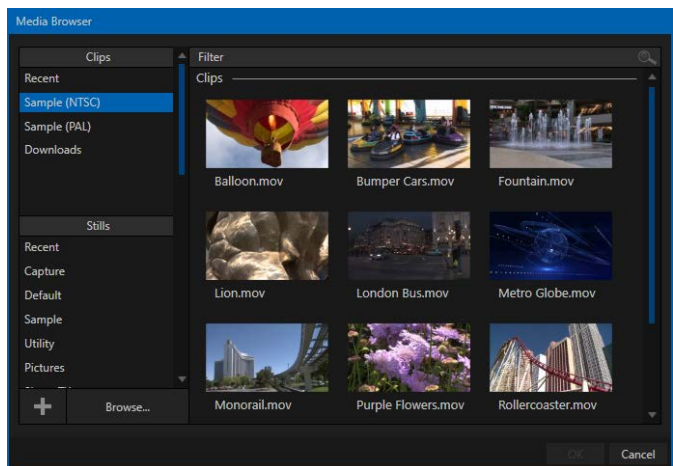
The *Media Browser* is context sensitive, so the headings shown are always appropriate for the purpose for which they were opened.

A list of sub-headings may appear under each main heading in the *Location List*. When you select a sub-heading, the right hand pane – the *File Pane* – is populated.

### Browse

Clicking *Browse* opens a standard system file explorer, rather than the custom *Media Browser*.

> *Hint: To jump to the standard system file explorer (rather than the custom Media Browser) from a Media Player, hold keyboard Shift while clicking the Add button.*

### File Pane

Icons appearing in the *File Pane* represent content located inside the sub-heading selected at left in the *Locations List*. These are grouped under horizontal dividers named for subfolders, which allows you to organize the related content.

### File Filters

The *File Pane* view is filtered to show only relevant content. For example, when selecting *Titles*, the browser only shows *Title page* files (.cgxml).
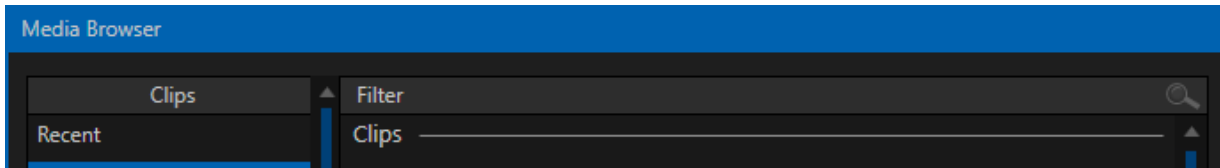
FIGURE 77

An additional filter appears above the *File Pane*. This filter quickly locates files matching criteria you enter, doing so even as you type. For example, if you enter "PNG" into the filter field, the *File Pane* displays all content at the current location with that string as part of its filename. This would include any file with the extension ".PNG" (a Portable Network Graphic formatted image file), but also "PNGirl.jpg".

## File Context Menu

Right-click on a file icon in the *right-hand* pane to show a menu providing *Rename* and *Delete* options. Be aware that *Delete* really does remove content from your hard drive. (This menu is not shown if the item is write-protected.)

## 11.1.4 Player Controls
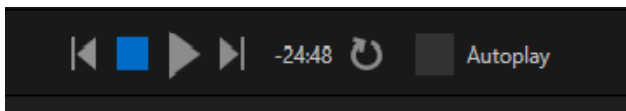


FIGURE 78

A simple set of controls beneath the *Playlist pane* provides playback-related functions:

- *Previous* button:      go to previous playlist entry
- *Stop* (clicking *Stop* when already stopped goes to the first frame)
- *Play*
- *Next* button:      go to next playlist entry
- (Not shown):      *Double-click* an entry in the playlist pane to begin playback at the start of that playlist entry
- *Timecode*:      counts down while the item plays; turns amber and then red to indicate 10 seconds and 5 seconds remaining to play.

## Loop
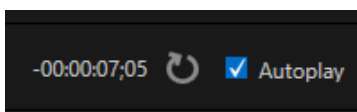


FIGURE 79

Enabling the circular *Loop* gadget repeats playback of the item continuously.

77

When enabled, the *Autoplay* switch has several important effects. First, it initiates playback automatically when the associated *Media Player* is placed on *Program* by a *Switcher* operation either directly or by being displayed via an *Overlay* operation.

Second, if player output is displayed on *Program,* the reverse *Switcher transition* occurs automatically as the end of play approaches. Then the playhead position advances to the next item in the *Playlist* after playback is automatically stopped.

> *Note: Unlike Switcher transitions, the Overlay 'out' effect does not occur automatically as the end of play approaches.*

# Chapter 12 Title Editor

We discussed the use of the *Overlay layers*, including the *Title* overlay, back in Section 10.3. The *Titles* option is shown exclusively for PiP 2, and provides important titling controls when selected. In this chapter we will concentrate on managing and editing titles. The integrated *Title Editor* is a vital part of this feature.
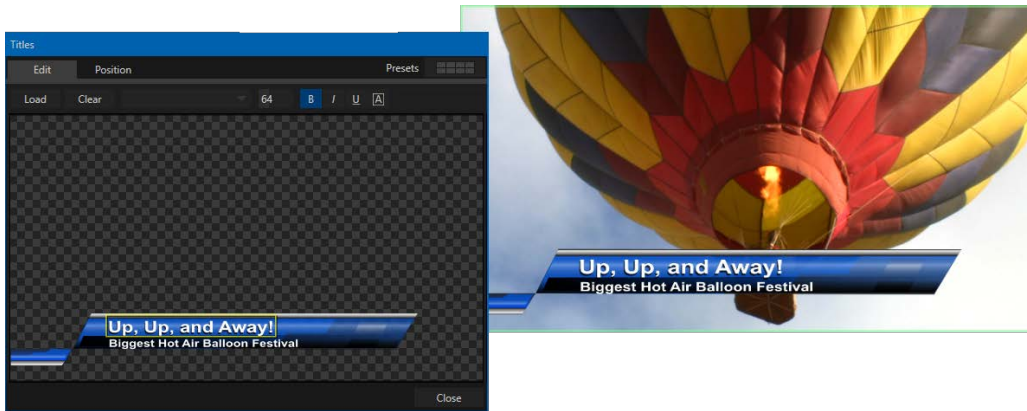
Open AV-HLC100's *Title Editor* by clicking the gear icon that appears at lower-right when you move the mouse over the *PiP 2* viewport when *Titles* is assigned as the current source for the layer. (Figure 81).
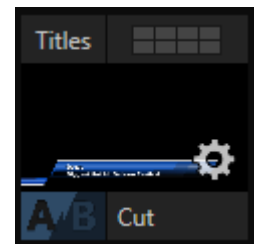
> Hint: This panel can be re-sized by dragging its lower-right corner, and re-positioned by dragging the titlebar.

Opening the pop-up *Title Editor* during display is permitted, allowing you to modify *title pages* during live production (changes are shown immediately). When you move the mouse pointer over editable text in the *Title Page Editor's* preview, a white bounding-box surrounds the text. If you click inside the box the text object is selected and a text edit field is shown.

Press *Enter* or click outside the box to complete editing operations, or press *Tab* to advance to next entry field (press *Shift + Tab* instead to jump to the prior text field).

> Hint: A red line under a character or word indicates the spell-checker is questioning its spelling. Right click the word to open a menu suggesting alternatives. Click any entries shown if you wish to update the original.

Note that the cursor keys – that is, the left/right and up/down arrows – can also be used to navigate in and between text fields on the current title page.

> Hint: Selected text can be 'nudged' a pixel at a time using ALT + the keyboard arrow keys. If you hold down both SHIFT and ALT, the arrow keys move the text object in five pixels increments.

## Section 12.1 Edit tab

The *Title Editor* has two tabs, labeled *Edit* and *Position.* The controls in the latter tab are identical to those discussed under the heading *Position Tab* in Section 10.3.2. In this chapter, we will concentrate on the *Edit* tab.

### 12.1.1 Text Tools
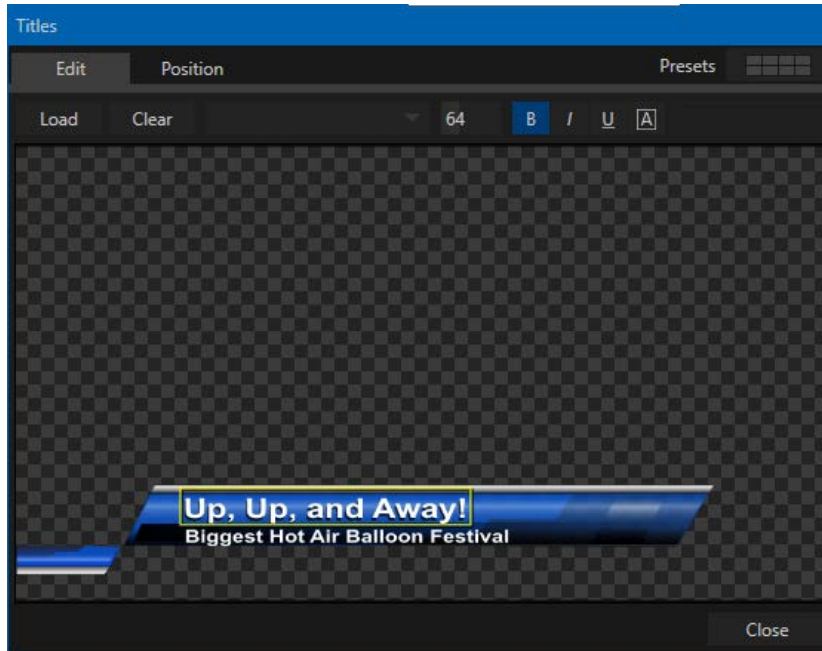


FIGURE 82

The header of the *Title Editor* holds an assortment of text attribute controls. These include a *Font* selector menu, numeric *Size* control, and *Bold*, *Italic*, *Underline* and 'ALLCAPS' switches.

As you would expect, clicking *Load* opens AV-HLC100s Media Browser allowing you to select a title template. *Clear* removes the current page.

### 12.1.2 Stand-In Images

Images embedded in *Title Pages* may be locked, or they may be editable 'stand-ins'. When you roll the mouse over an embedded image and a white border is displayed around the image, the image is a *stand-in*. Click a stand-in to open the *Media Browser*, and select an image file (hold Shift to use the system file explorer instead).

If you right-click a stand-in image, a context menu (Figure 83) lets you select between optional methods of fitting the image to its frame. *Stretch* causes the image to completely fill the frame.
*Fill Area* retains the interested image's original aspect, cropping as necessary to fit inside the frame.
*Show All Image* also retains the original image aspect, but fits the complete image into the frame (which may result in 'pillar-boxing' or 'letter-boxing').
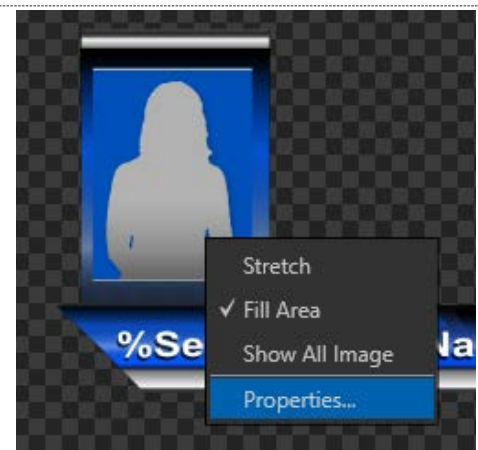


FIGURE 83

This menu also allows you to open the *Image Properties* panel (Figure 84).
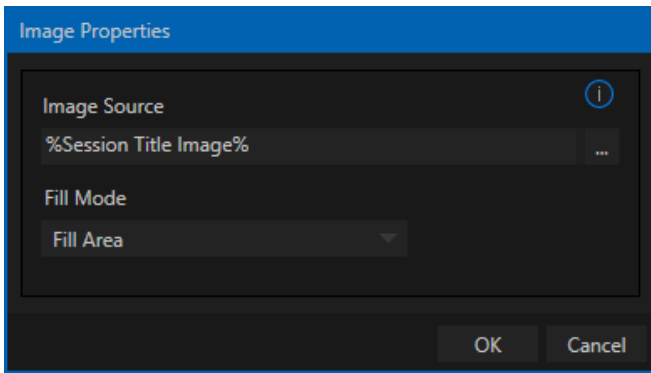
This dialog provides the same set of *Fill Mode* options, but adds an *Image Source* box supporting direct entry of the path to an image file. The *Image Source* box comes into play in connection with the next topic, *DataLink*.

## Section 12.2 DataLink
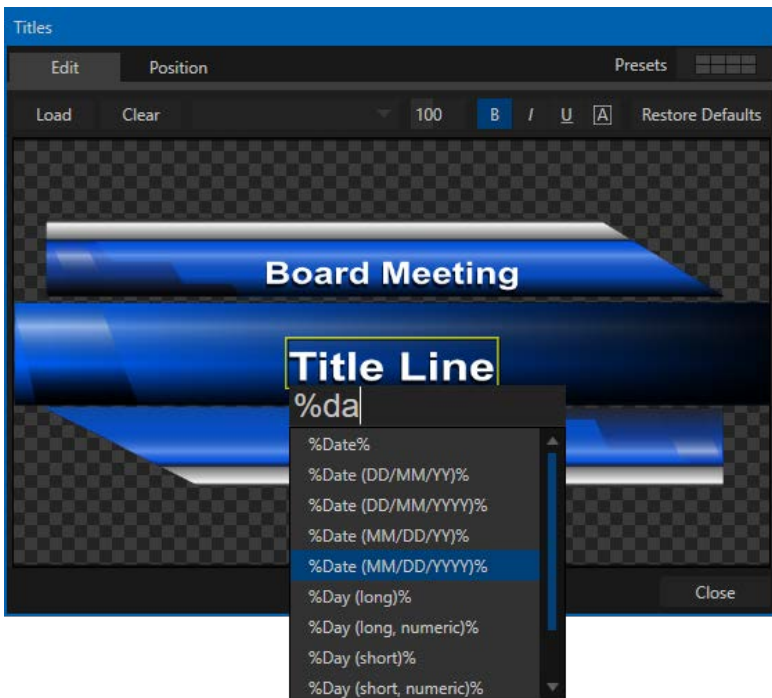


FIGURE 85

Both text and images on title pages accept *DataLink keys* as input. The *Title Editor* indicates which entry boxes accept *DataLink* keys by showing a custom mouse pointer (%DL). To make *key* entry faster, available *DataLink keys* are listed in a drop-down menu as soon as you enter a % sign into a text entry box (*key names* are in the format %*key name*%). If you continue typing, the list shown is filtered to show only relevant key names.

A line of text or image on a title page that has been set to a key name will be automatically replaced by the current value assigned to that key when the page is displayed.

There are endless uses for this technology, and a wealth of methods to provide and update the values assigned to *DataLink keys*. For one example, refer to the heading Title Pages and DataLink in Section 7.1.4. See also Section 11.1.2 to see how *DataLink* can draw on metadata you enter for video clips to automatically update title page values. You can also take advantage of the DataLink extension for the popular Chrome web browser, which makes it easy to populate title pages across the network from a browser running on virtually any platform.

## Section 12.3 Presets
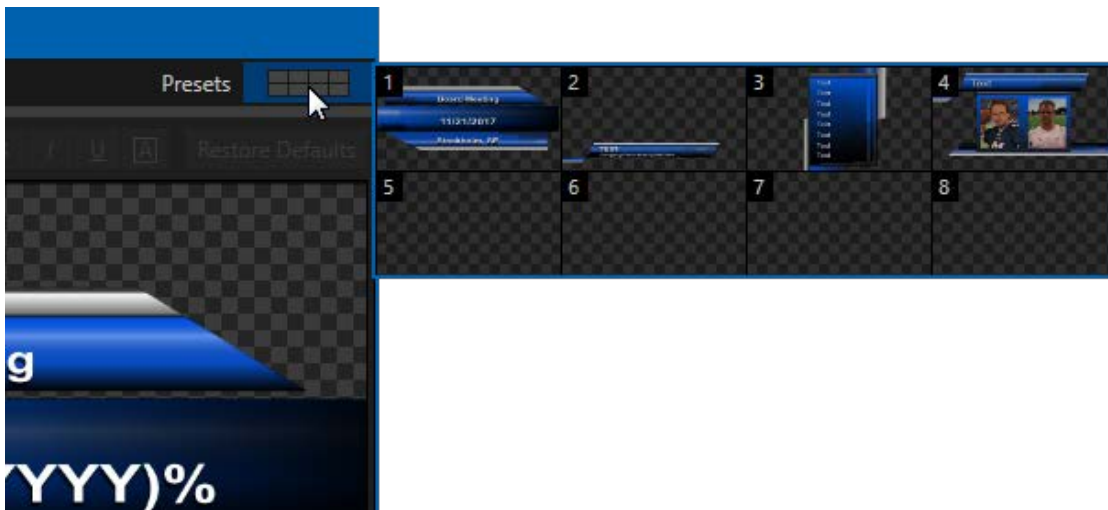


FIGURE 86

The *Presets* control at top-right in the *Title Editor* pops up a bin with 8 preset slots. When you move the mouse over a preset slot, a *Snapshot* (camera) gadget is shown. Clicking this gadget stores the current title page, including any settings applied in the *Position* panel. Right-click to *Clear* or *Update* the preset using the context menu.

A similar preset gadget appears in the header label of the *Titles Overlay* control in the *Switcher*. Clicking it opens the preset bin, to permit you to quickly change from one preset to the next during production.
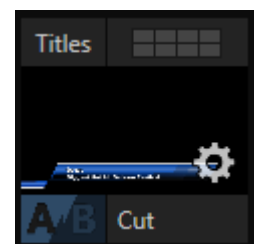


FIGURE 87

External audio connections and basic configuration were introduced in Sections 6.2.1 and 6.3.1. AV-HLC100 presents precise control over individual audio sources and outputs in a graphical *Audio Mixer* panel (Figure 88).
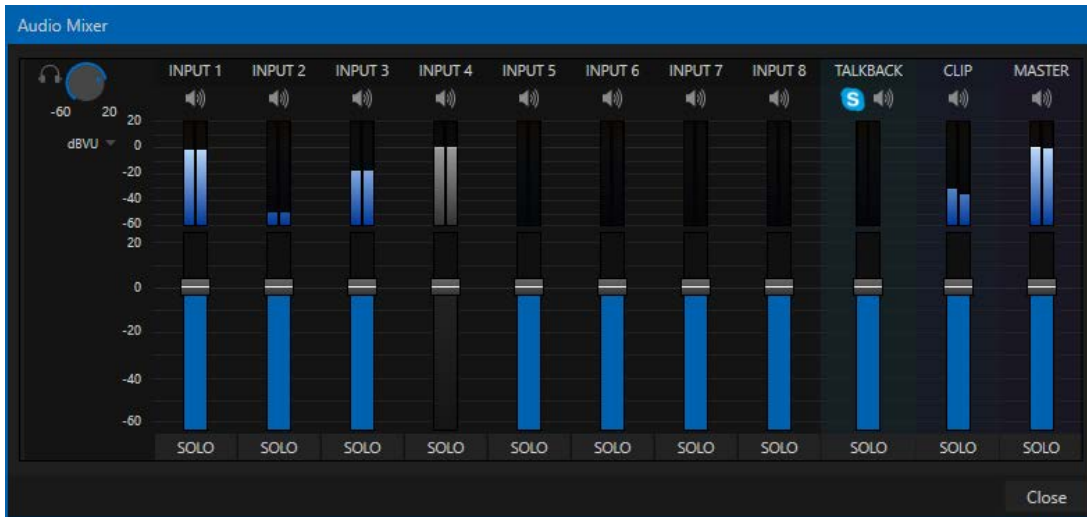


FIGURE 88

To open the *Audio Mixer*, click the button with the same name in the *Dashboard* at the top of the *Live Desktop*.

Compact sub-panels in this pane provide configuration and control for individual audio sources and also audio outputs as follows, from left to right:

- Controls for audio Inputs 1-8.

- TALKBACK:                a special input provided for use with SkypeTX inputs.

- *CLIP*:                sound embedded in video clips in the *CLIP player* playlist.

- *Master*:                controls the primary audio bus.

*AV-HLC100's stereo analog output connections carry the first two channels of the Master audio mix.*

## Section 13.1 Specifications

AV-HLC100's analog audio conforms to SMPTE RP-155. The maximum input/output level is +24 dBu. Nominal input level is +4 dBu (-20 dBFS), and the sample rate is 48 kHz. Levels above 0 dBVU are shown in red in the *VU meters*, to caution you that overly high levels can result in clipping in recordings.

## Section 13.2 Headphones
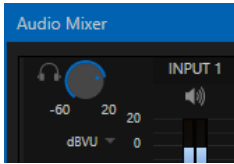


FIGURE 89

At the extreme left side of the *Audio Mixer* you will observe a simple volume control for the *Headphones* output. By default, headphones connected to this stereo output jack will carry the first two channels of the audio signal from the bus designated *Master* – that is, the same audio carried by analog outputs marked *1* and *2* in the *AUDIO OUT* group on the unit's backplane.

Remember that the *Headphone* output is also affected by *Solo* switches located at the bottom of each control group in the *Audio Mixer*. When *Solo* is enabled for one or more sources, *only* the soloed sources are sent to the connector. (See *Solo* in Section 13.7.2 for more information on this feature.)

## Section 13.3 VU Meters

 *VU* (Volume Unit) *meters* are located right above the *Volume* control sliders throughout the *Mixer*. The calibration of the *VU meters* can be changed to suit your preference. Click the label below the *Headphone* control at left to open a small menu offering three options as follows:

- *dBVU :*           Well known to users of typical analog audio mixers

- *dBFS* :           dB 'Full Scale' – the digital standard; see notes under the heading Audio Headroom in Section 6.9

- *dBU* :           based on a voltage of 0.775 VRMS (a shy scale rarely seen in public, supplied for completeness, comparison, and the amusement of audiophiles)

## Section 13.4 External Sources

Columns in the first set of control groups are numbered as *Input 1-8.* Each of these can be assigned to any audio source available – whether analog (line level) sound supplied to rear panel connectors, SDI or HDMI embedded audio from one of the backplane video inputs, or any available network audio source.
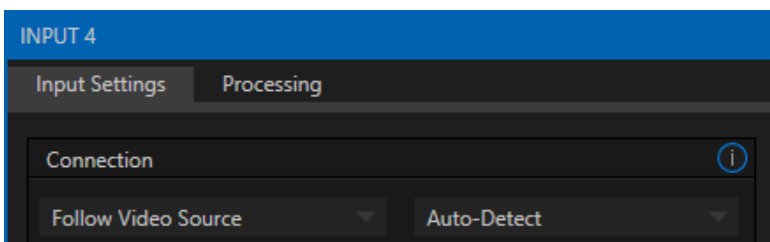


FIGURE 90

To access the *Connection* menu, move the cursor into the label of an input, and click the *Configure* (gear) button that appears just at right. The *Advanced Audio Configuration* panel (Figure 90) will be shown. The drop-down *Connection* menu at the top of this pane allows the selection of one of the supported sources:

- By default, local physical sources are listed as *Input 1*, *2*, and so on
- *Follow Video Source* – the default selection, follows the same numbered *Switcher* video input
- All available NDI (network) audio sources

You may choose to think of these audio sources as being associated with the same-numbered *video* inputs in the nearby rows on the rear connector panel. This notional linkage is not strictly enforced, however.

You can connect directly to any external audio source in the *Advanced Configuration* panel. Also, for reasons of your own, you may well prefer to treat various audio sources as independent of the nominally associated video input.

### 13.4.1  Connection Type

Only one connection can be active for an audio input. To access the *Connection* menu, move the cursor into the label of an input, and click the *Configure* (gear) button that appears just at right. The *Advanced Audio Configuration* panel will be shown. The drop-down *Connection* menu at the top of this pane allows the selection of one of the supported sources.

- By default, local physical sources are listed as *Input 1*, *2*, and so on
- *Follow Video Source* – the default selection, follows the same numbered *Switcher* video input
- All available NDI (network) audio sources

### 13.4.2  Analog Audio Input

For most Inputs 1-8, the connection type control at right defaults to either *Auto-Detect* (or *Embedded in Video*), providing automatic detection of sound from HDMI, SDI and NDI video sources. To connect to the analog audio input connectors, instead, select Input 2 and then choose the Line option from this menu.

## Section 13.5  Skype TX and Mix Minus

The default *Connection* option for external *Audio Mixer* inputs is *Follow Video Source*. When one of AV-HLC100's video inputs is assigned to the Skype TX Caller source, the audio control group is thus automatically assigned to govern incoming audio from that remote Skype caller by default.

*Note: It is not necessary to configure a special audio 'mix minus' to serve as the return sound for the remote Skype caller. AV-HLC100 handles this automatically, ensuring that (except when the TalkBack feature is engaged) the remote caller receives a special mix comprised of the Master mix with the remote caller's sound removed.*

## Section 13.6  TalkBack

The *Audio Mixer* input labeled *TALKBACK* serves a special purpose, providing a way to converse with remote Skype TX Callers off-air (i.e., without intruding into your live program). You can choose what audio source to supply for *TalkBack* purposes from a variety of input types, as discussed in the previous sections.

As mentioned earlier, the default *Connection* option for an external *Audio Mixer* input assigned to a Skype TX channel allows the corresponding controls to govern audio from the remote Skype caller. In this case (that is, when an audio control is 'listening' to a Skype TX channel), a new button labeled *TALK* is added beside the group's SOLO button.
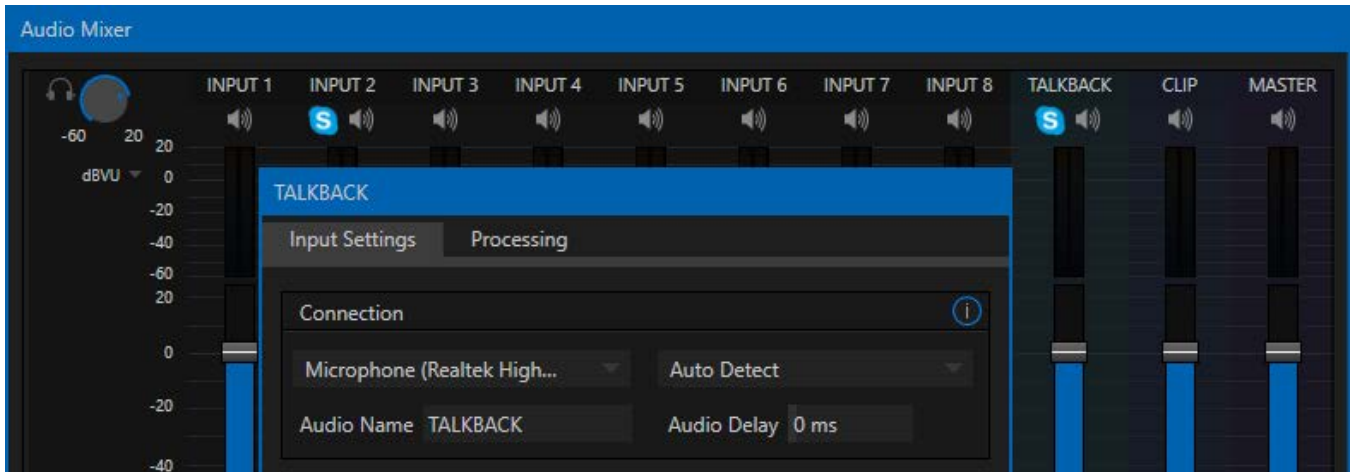
FIGURE 91

When the *TALK* button is lit, audio you supply via the *TALKBACK* input (perhaps sound from the 1/8" motherboard audio input) is sent to the remote caller, temporarily replacing the normal mix-minus sound that remote caller would otherwise hear. At the same time, AV-HLC100 sends the incoming sound from the remote Skype caller to its *Headphone* output, enabling you to have a two way conversation off-air.

> *Note: You'll want to take steps (such as by enabling Mute, or perhaps Follow Program Video) to prevent sound from the Skype caller being sent to your live audio mix during TalkBack conversations.*

## Section 13.7 Common Controls

Many important features and optional settings are common to most source types, and some even appear for outputs. Let's review these before continuing.

### 13.7.1 Mute

*Mute* switches for inputs and outputs appear as 'speaker' icons located just above in the main *Mixer* panel. A single switch controls multiple channels, as appropriate for that source. Enabling *Mute* removes the sound from that source from all downstream audio mixes and outputs.

> *Hint: Muted sources still show signal activity on the VU meters, but levels are drawn in gray rather than full color. This is also true for sources with Follow set that are not currently audible on output.*

### 13.7.2 Solo

Consider a few basic design concepts:

❖ Enabling *Solo* for a source sends its (post-fader) sound to the *Headphones* output, and removes all other sources from that output.

❖ *Solo* has no impact on the *Master* audio mix.

❖ The *Solo* feature is normally operates as what it often called 'exclusive Solo' (or 'X-Or' type). This means that enabling *Solo* for a given source disables all other *Solo* buttons.

86

❖ It is possible to use what is called 'Solo latching', ganging multiple sources for Solo output. Hold down the Ctrl key and click additional *Solo* buttons to add or remove their respective audio contributions from the latched *Solo* group.

## Auditioning an Audio Source

1. First *Mute* the source, removing it from primary outputs. (This step may not be required if you are using the audio *Follow* option.)

2. Then enable *Solo* to hear it on the *Headphones* output.

### 13.7.3  CLIP Player

Video and audio-only files in *the CLIP player* playlist may contain audio. At most, the *CLIP player* outputs the first four audio channels – additional embedded channels are ignored. Other options and controls in these sub-panels are similar to those provided for external audio sources.

## Section 13.8 Advanced Configuration

The controls for all inputs (including internal audio sources) as well as the *Effects*, *Stream*, *Aux* and *Master* output groups include a configuration button shown when you move the mouse over the input label.

The familiar 'gear' icon opens the *Audio Configuration* panel. We touched on this panel earlier when we discussed selecting and configuring *Connections* for external audio inputs. The *Audio Configuration* panel offers additional features and controls, however. Let's explore these now.

### 13.8.1  Audio Delay

Audio and video arriving at inputs in sync will *maintain* sync throughout the system to output or recording. However, you should note that *upstream issues* can cause video to arrive later than the corresponding sound.

To mitigate this sort of external problem, AV-HLC100 provides an adjustable *Audio Delay* setting.
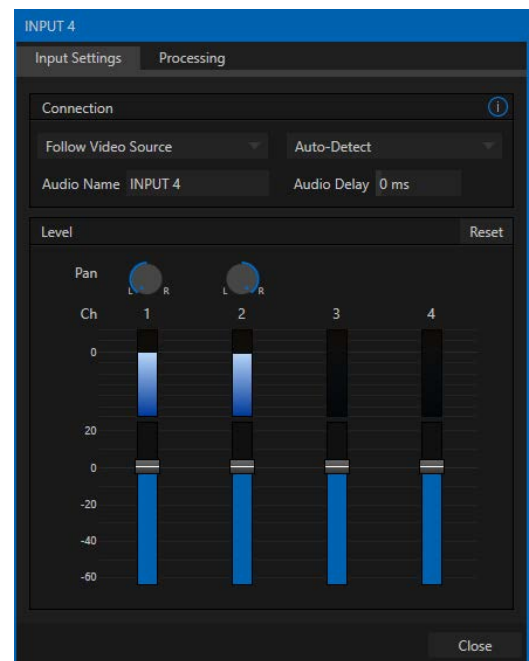


FIGURE 92

*E.g., many cameras support simultaneous digital and analog audio output. In-camera processing can delay digital a/v output, resulting in analog audio output actually leading the digital output by a meaningful measure.*

## 13.8.2 Pan
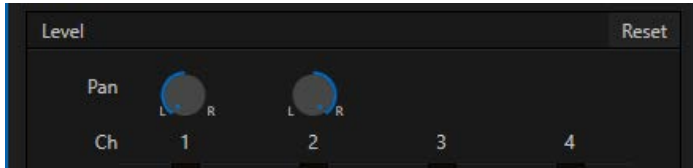


FIGURE 93

The *Audio Configuration* panel also provides *Pan* control. It adjusts *placement* of sound from source audio channels on the stereo channels comprising the audio mix(es).

Using *Pan*, you can place all or part of *channel 1* onto *channel 2*, and vice versa. When *Pan* is set to the extreme left position for *channel 1*, its audio is sent exclusively to the first channel for the *Input 1* group. Centering the *Pan* knob labeled 1 splits the sound from *Input 1* equally onto *channels 1* and *2*.

Sliding *Pan* for *channel 1* all the way to the right results in that source only being audible on *channel 2*, removing it completely from its original channel. Pan also modulates the sound levels on the left and right channels so that the overall volume neither rises nor drops as a result of adjustments.

> Hint: "Pan" is not the same as "Balance". The balance control in a stereo system varies the relative level of the left and right channels, but sound from the left channel will never come out of the right speaker, or vice versa (Pan does permit this).

## 13.8.3 Processing

### Equalizer

The seven-band equalizer allows you to 'shape' sound to taste, accommodate sources with different acoustic characteristics (say, mismatched mics), minimize feedback or roll off unwanted parts of the audio spectrum.

Enable or disable the *Equalizer* using the switch beside the label above its control group. The vertical sliders attenuate or boost the tonal range centered on the frequency shown at the top.

The effect applied falls off gradually as sound draws closer to neighboring frequencies on either side. Click *Reset* to return all sliders to 0 dB.

> Hint: Naturally, reducing or increasing the level of one or more tonal bands affects the overall output level as well. This may call for you to trim the main level setting for the affected input or output.
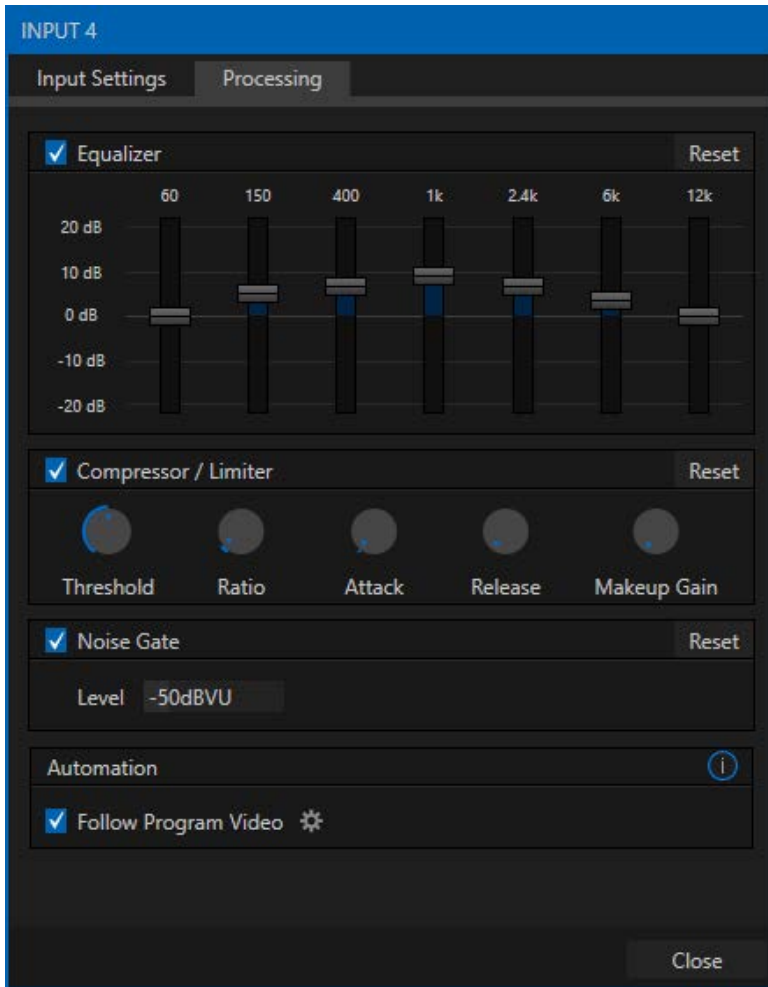
FIGURE 94

Compressor … Limiter – what's the difference, anyway?

Compression and limiting are not really different processes, but rather a matter of degree and perceived effect. In principle, compression takes the form of a subtle, almost imperceptible modulation of the sound level. A limiter is applied more for the purpose of managing, even 'crushing', unwanted spikes and transients.

That distinction aside, a limiter is essentially just a compressor set to a high ratio and, generally, a fast attack time. Audio engineers typically consider 'compression' with a ratio of 10:1 or more as 'limiting'.

## Compressor Limiter

The Compressor/Limiter is capable of preventing clipping (see Section 13.9.1) from unexpected peaks or transients.

### THRESHOLD

Sound above the set *Threshold* level will be compressed; the amount of compression and the manner in which it is applied are both dictated by the other settings.

### RATIO

A *Ratio* of 4:1 means that if input level is 4 dB over the threshold, the output signal level after compression will be just 1 dB over the threshold. The gain (level) is reduced by 3 dB. Very high ratio settings are the reason the word "limiter" is part of the title for this feature. The highest ratio setting will effectively reduce any signal that would rise above the threshold all the way down to the threshold level (with the exception of a brief period during a sudden increase in source loudness, as dictated by the *Attack* setting).

89

*Attack* (like Release) is labeled in milliseconds. The setting represents the amount of time it takes for the gain to change by a specified amount. It would not be grossly incorrect to think of this setting as changing the slope of a graph depicting how aggressively the compressor pursues the target value (defined by applying the *Ratio* setting to the amount the signal surpasses the *Threshold*). Shorter values are more aggressive, while longer values are more subtle (and tend to be less noticeable to the audience).

RELEASE

*Release* is similar to *Attack* in many ways, but refers instead to the speed with which the compression effect is removed as a source signal falls back on its own so that it no longer exceeds the *Threshold*.

GAIN

Compression impacts the overall output level of the source or output. The *Gain* control allows you to compensate, bringing the post-compressor/limiter signal back to a comfortable nominal range.

> *Hint: Different circumstances call for different Attack and Release strategies. For example, much less aggressive settings could work nicely for vocals, but fail badly when applied to a snare drum. Many websites provide suggestions on establishing the best compressor/limiter settings for different environments.*

### Noise Gate

The *Audio Mixer's* advanced options panel also include a configurable *Noise Gate* for each audio source, as well as all outputs. This lets you ensure that unwanted low-level sounds are prevented from inadvertently intruding into the mix.

### 13.8.4  Automation

An input *Automation* feature is also hosted in the *Processing* tab.

### Follow Program Video
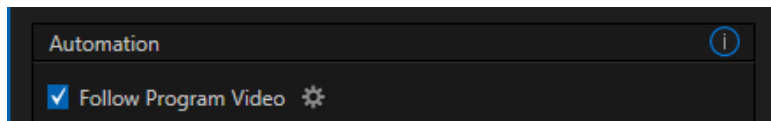
Enabling *Follow Program Video* options for an audio source directs it to track switcher operations affecting the related video source. Audio for sources with *Follow Program video* enabled in the *Audio Configuration* panel is automatically removed from mixed outputs until one or more specified video sources are actually displayed on *Program Output*.

> *Hint: When the corresponding video source is <u>not</u> displayed on output, the audio source's VU meter level is displayed as a grayscale.*

## Section 13.9 Output Control

*MASTER* audio output is represented by its own control group in the *Audio*, and regulates sound sent to both physical AUDIO OUT connectors and the MIX and AUX NDI video outputs.

> *Hint: Shift + double click Volume knobs to restore their default values (0 dB).*

Master settings take effect downstream from all audio sources.

### 13.9.1 Headroom Notes

In digital audio systems, signal levels that exceed maximum values are uniformly assigned the maximum value, a condition known as "clipping". Clipping inevitably results in annoying audible issues. Worse, over-modulation that may not be apparent while listening during live production may nonetheless appear in recorded files. This is often true even when levels *appear* to be below the ceiling level (0 dBFS, the maximum allowable digital level).

> *Hint: AV-HLC100 notifies you when clipping has occurred by temporarily turning the Audio Mixer label for the problem channel red.*

Due to this problem, digital audio system designs customarily allow substantial 'headroom' above the benchmark 'alignment level', making over-modulation much less likely. Often this allowance seems high to those familiar with analog audio systems; headroom levels between 18 and 24 dB are not uncommon in professional digital audio realms.

AV-HLC100's *Record* level defaults to -20 dBFS (set in the *Record Configuration* panel), approximating typical professional practice. This has no impact on levels at the system's audio outputs, but all but ensures clipping in recorded files will be avoided. Advanced users can thus record files conforming to regional standards or personal preference, substantially reduce the possibility of audio clipping in recorded files, and even adjust the level on the fly if necessary.

The main point to remember from all of this is that for digital audio recording "less is often more". When it comes to levels, by all means go as high as necessary – but it's equally practical to go no higher than necessary.

> *Hint: The Audio Mixer also provides Compressor/Limiters for each input and output. These can also be invaluable in defeating clipping due to over-modulation.*

# Chapter 14  Stream/Record

## Section 14.1 Installation

*Important Note: All features and capabilities discussed in this chapter require the installation of the NewTek Streaming for AV-HLC100 plugin.*

1. Connect the unit to the Internet.

2. Click *Stream/Record* button in the *Dashboard* area on the live operation GUI screen (Figure 96).
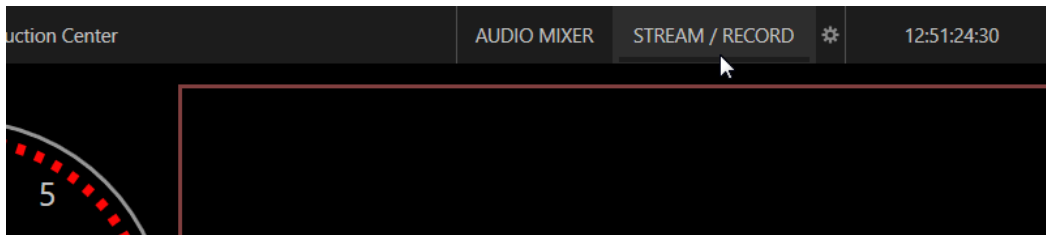


FIGURE 96

3. "Do you want to download and install this plugin?" appears in a pop-up screen. Click the *Download* button (Figure 97).
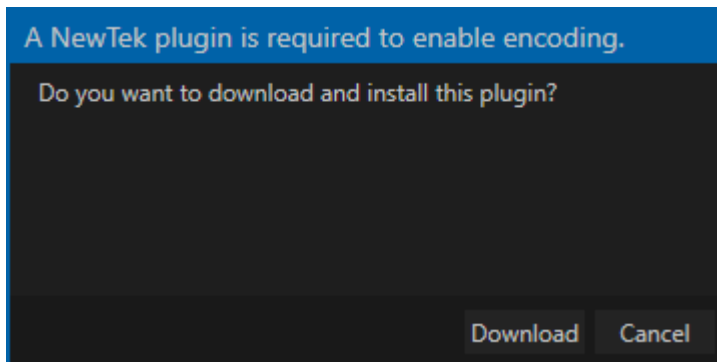


FIGURE 97

A dialog box pops up, and "Please wait..." is displayed and the installation process is performed (Figure 98).
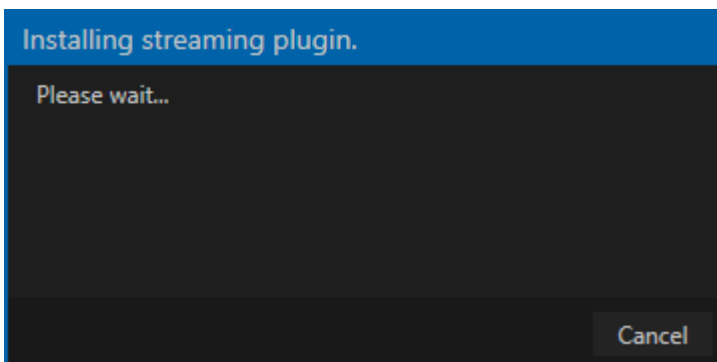


FIGURE 98

4. When "A restart will be needed for full plugin functionality." appears on the screen, the installation is finished. Click the *Close* button to close the screen (Figure 99).



Streaming plugin Installed.

A restart will be needed for full plugin functionality.

Close
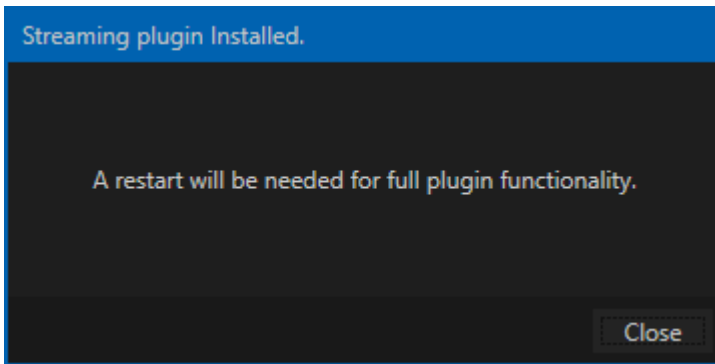
FIGURE 99

5. Restart the live operation GUI screen. You can now use the grab and stream/record functions.

## Section 14.2 Overview

> *Important Note: All features and capabilities discussed in this chapter require the installation of the NewTek Streaming for AV-HLC100 plugin.*

Encoding for a/v streaming and other purposes involves a wide variety of attributes. At times, too, account login details are required for your streaming service or CDN (Content Delivery Network).

Further, you may maintain multiple streaming service accounts for different purposes, as well. In addition, you may capture encoded video files for other purposes.
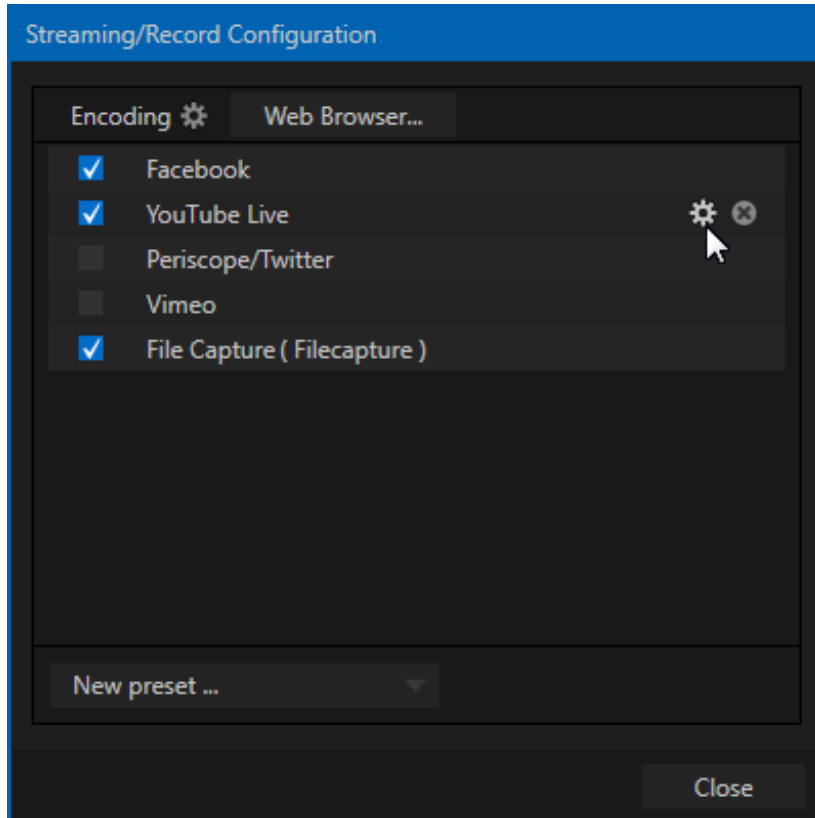


FIGURE 100

AV-HLC100's *Streaming Configuration* panel supports the creation and configuration of all of the information and settings you are likely to need in this context. To open the *Streaming Configuration* panel (Figure 100), click the *Configure* button (gear) at right of the *Dashboard*'s large *STREAM/RECORD* button.

# Section 14.3 Encoder Configuration
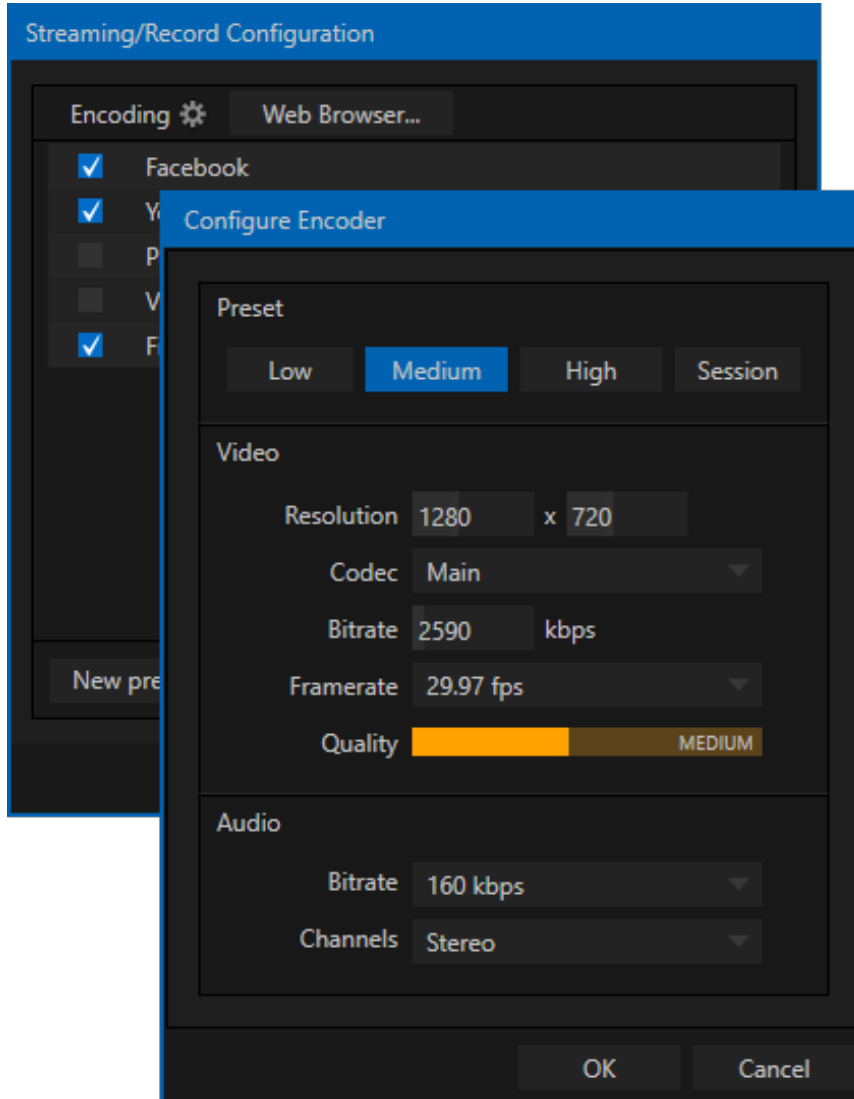


FIGURE 101

Settings for the encoder are configured in the *Configure Encoder* dialog (Figure 101). Open this dialog by clicking the configuration (gear) icon labeled Encoding at left in the header of the *Streaming Configuration* panel. Select an encoder *Preset* (such as *Medium* or *High*), or manually configure custom settings using controls in the *Video* and *Audio* control groups below, and click *OK*.

# Section 14.4 Presets

The information for a given CDN (Content Delivery Network) or other encoder target is also retained in a *preset*. New presets are added to the main *Streaming Configuration* panel using the *New Preset menu* at left in the footer of the panel.

Hint: A default File Capture preset allows you to capture output from either encoder to a file.

Checkboxes beside each entry you add to the *Streaming Configuration* preset list allow you to toggle streaming output from the *Encoder* to the preset at right.
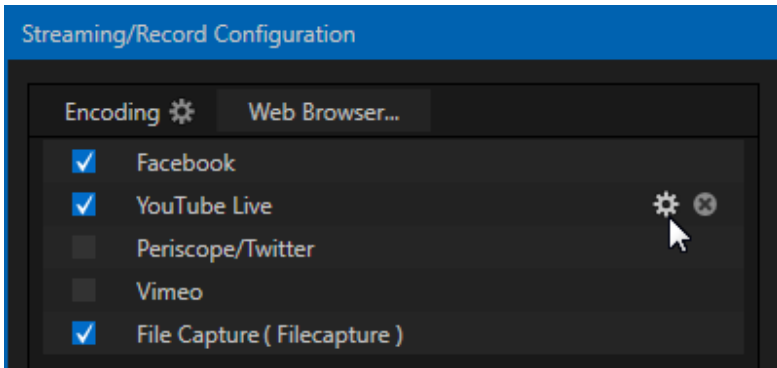


FIGURE 102

If you move the mouse pointer over a *Preset,* two new gadgets are shown at right (Figure 102). Click the familiar *Configure* gear to open a suitable dialog. It may invite you to enter your account credentials for a site and *Sign In*, or provide suitable controls for other relevant settings that are required. Or, for a *File Capture* preset, you can choose the path for encoded file output.

Not surprisingly, clicking the little (x) gadget instead will delete the *Preset*.

### 14.4.1  Custom Presets
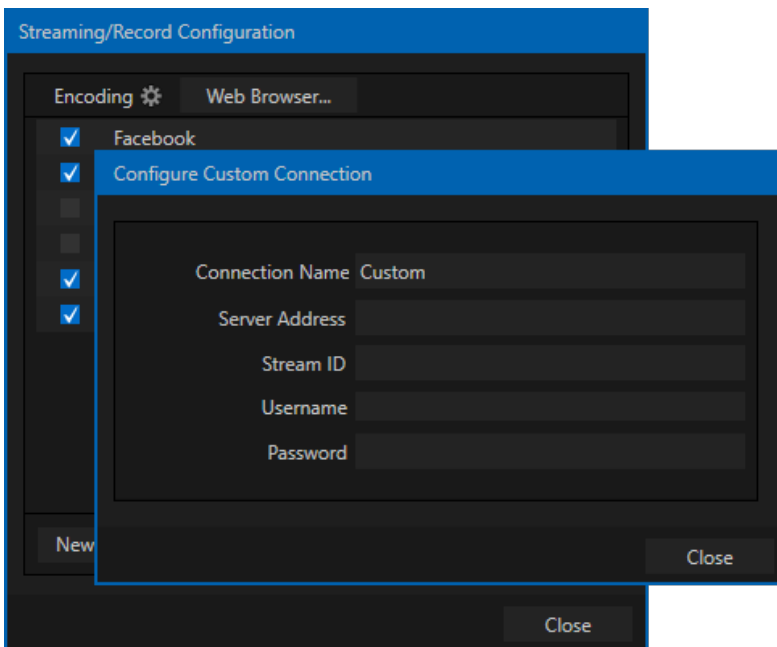


FIGURE 103

In addition to the many recognizable names listed in the *New Preset* menu, you will observe a menu item labeled *Custom*. The dialog this selection opens allows you to enter the details typically required by generic streaming services.

### 14.4.2 Record (File Capture)

Recording program output involves archiving your live stream file created by the encoder. Simply configure and check-mark a *File Capture* preset for this purpose.

## Section 14.5 Web Browser
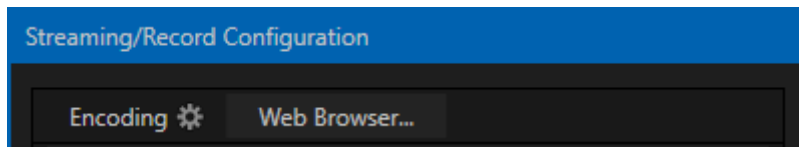
The *Web Browser* button in the header of the *Streaming Configuration* panel opens a web browser. This feature is provided for when working with web streams or your content delivery network account. We do not recommend general purpose web surfing during live operations.

> *Hint: If the web browser is hidden from view because a Live Desktop operation took precedence, you can re-use this button to bring the browser window to the front again.*

## Section 14.6 Initiating the Stream

When you are ready, initiate streaming to the *Preset* targets you have check-marked in the *Streaming Configuration* panel by clicking the *STREAM/RECORD* button in the *Dashboard* at the top of the *Live Desktop* panel.

## Section 14.7 Streaming Strategies

One of the best approaches when beginning (to stream your productions) is to establish a relationship with a commercial streaming media provider. A good provider can guide you past firewalls, provide public addresses for everyone to view your stream, and provide no end of valuable guidance.

And it may not be as expensive as you think (costs vary based on considerations such as how many viewers you expect, how much web bandwidth you use each month, and so-on). Some services based on an advertising model will even host your stream free.

### 14.7.1 On Demand or Live Streaming?

Not all 'streaming' is 'live streaming.' The difference is similar to i) watching a television program you previously recorded at a time convenient for you, or ii) watching a live event.

On demand streams are stored on a server (often supplied by an external service provider), ready to be transmitted whenever a viewer wishes. Live streams are available at the time they are broadcast, such as during a live concert or event (some CDNs blur the boundaries between live streaming and VOD by offering DVR-style pause and rewind features).

## On Demand Hosting

As noted in Section 14.4.2, and when the NewTek Streaming for AV-HLC100 plugin is installed, AV-HLC100 permits you to record live productions to local storage. The resulting files can be hosted on a network later, so viewers can connect whenever they like. If you have the resources available, you can host the video yourself – but if many people will likely want to view your production, you will likely avail yourself of a service to stream it on your behalf.

Ideally, 'on demand' streaming video begins to play on request after a few moments. (Letting the stream get a bit ahead of the client playback device is called 'buffering', and helps ensure smooth playback). This stands in contrast to other types of online video distribution which requires the viewer to completely download the video file before he can begin play. Given a sufficiently high speed connection between host and viewer, they may well be able to enjoy a seamless viewing experience without stuttering or other issues.

## Live Streaming

Rather than record a file and deal with it later, live video is transmitted over the network (in 'near realtime' - give or take a little time 'in the pipe', as it were.)

Delivering a good quality stream requires that you consider both your network connection capabilities and that of your viewers. As well, to ensure reliable delivery, you will ideally have some idea of the size of your audience. Naturally, streaming video is highly compressed to reduce bandwidth demands and make it available to a wider group. The decision as to which encoding format to use for your live stream is up to you or – in some cases – your client. Here are some things to consider:

❖ Some corporate and institutional network administrators opt to support one or another format exclusively. (Check with your IT department to find out if this affects your decision).

❖ *RTMP and RTSP* combined have a very wide installed user base, and work well across multiple platforms (PCs, Macs, Linux, etc.).

## Bandwidth Considerations

In relation to streaming, 'bitrate' refers to data throughput per second (generally measured in Kilobits per second or Kbps.)

Once the stream leaves your immediate environment, even if you can supply good throughput locally, bandwidth may be constricted elsewhere along the transmission path. The level of Internet traffic can impose limits, but another major factor is the sort of connections your viewing audience may have.

> *Consider one scenario: Even though you know that most of your audience is going to connect to your program using (relatively slow) wireless devices, you use a very high outgoing bitrate – thinking that this will surely be enough to fill the need. The fact is, though, a high bitrate actually ensures a poor viewing experience in this case. The client player tries to play at the specified bitrate, but (in this example) the wireless bottleneck impedes flow. Sadly, the final data stream will be quite insufficient, and the output from the client player will be falter badly.*

For reliable performance, try to ensure the potential upload bandwidth from your system to the net is around twice the bitrate you choose. You *can* broadcast at a rate closer to your actual ceiling, but reliable performance cherishes headroom.

Also consider the expected download abilities of your viewers. Ideally, a safety margin 1.5 times the stream's bitrate is desirable. This may mean you need to consider using a lower resolution, or lower framerate for your stream – but doing so when required will generally deliver a smooth result, and is the wise course. (See "Speed Tests" in Section 14.8.1 for some useful resources.)

## 14.7.2 Streaming Media Providers

Using a commercial streaming media provider (sometimes referred to as a Content Delivery Network, or simply 'CDN') bypasses otherwise high-bandwidth requirements for the encoding computer. When you have made arrangements for a streaming media provider to distribute your stream, the encoder only needs enough bandwidth to get a single a/v stream to the provider. All end users connect to the *provider* to view the stream.

Most streaming providers have access to massive bandwidth (and often, with very little notice, they can scale up your allotment to meet a temporary need.) Since your local bandwidth is really only used for uploading a single stream, you can send a high quality stream, secure in the knowledge that it will not degrade as soon as a second viewer attempts to see it.

### Other Factors

The elements to keep in mind when you are creating a video for the web are contrast and motion. During video encoding for web distribution, a fair amount of video information and detail can be lost. For this reason, good lighting of your source video is essential.

Also, web streaming doesn't handle detail, transitions and motion all that well -- so your best shots should be close up, and without a lot of movement. When using the camera or camcorder, you should at least use a small, clip-on microphone to record only the audio you really want.

# Section 14.8 Diagnostics and Troubleshooting

Video streaming has a lot of different standards and diverse environments to consider. AV-HLC100 gives you the necessary tools, but there are still some teething problems you may encounter. This section describes the countermeasures.

## 14.8.1 Testing your stream

When it comes to using your system in a professional live production environment failure to test beforehand is not merely unwise - it can be professional suicide.

You should already be aware of the need for redundancy in a professional environment (you didn't bring just one camera, did you?) As reliable as any device may be, Murphy's Law has not been repealed … so you plan for this, bringing the appropriate equipment, such as uninterruptable power supplies, and perhaps backup recording devices. But you also need to perform on-site testing, to ensure your live stream is working well before 'zero hour'.

1. Set up and enable a test program stream from AV-HLC100.

2. You can use the integrated web browser to scrutinize the stream, but you should probably confirm using an external system, too.

Success at this point does not necessarily mean you're done. You may be able to see the stream locally, but can someone outside the local environment connect to it over the Internet? The best way to find out is to have someone at a remote location verify that your stream is streaming properly. If it is, great; otherwise, please keep reading…

Before your stream can be seen - whether on a local intranet or the Internet - client computers (or your service provider) need to be able to establish a network connection with your system.

*Ping* is a simple and effective tool to ensure the basic connection exists and can also help you with streaming connection issues. (and it works just fine in a multi-platform environment). Ping sends a small set of data packets to the target host (IP number), then 'listens' for an echo response in return. Ping estimates the round-trip time in milliseconds, records any data losses, and displays a summary when finished.

Bottom line, if you can't 'ping' your target, your connection has problems (the problem might be as simple as a bad cable connection). To issue a ping, you need know the IP number of the target computer.

For Windows

1. Type "run" (without the quotation marks) into the *Search* field, then press *Enter* on the keyboard.

2. Type "cmd" (without the quotation marks) into the dialog, and press *Enter* on the keyboard.

3. In the command shell that opens, type "ipconfig" (without the quotation marks) and press *Enter* again.

4. The *IP Address* for the system will be reported in the window (listed next to "IPv4 Address"), along with other data.
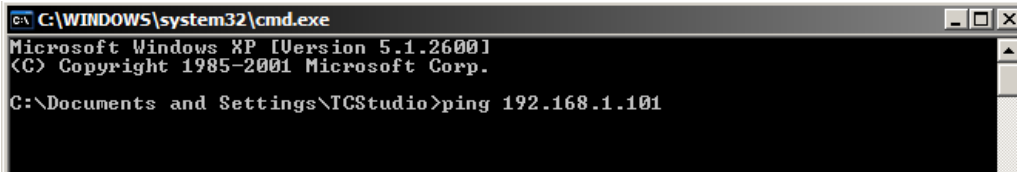
To find the IP Address for a system running OS X

1. Click the Apple icon at upper left on the Desktop, and select About *This Mac.*

2. Click *More info …* in the panel which opens.

3. Click *Network* in the *Contents* column at left.

4. The IP number for the system will be listed in the right hand pane.

**Issuing a Ping**

Ping is a command line program, and must be run from a command shell on the issuing computer. To open a command shell and send a ping, follow the procedure below that applies.

Windows
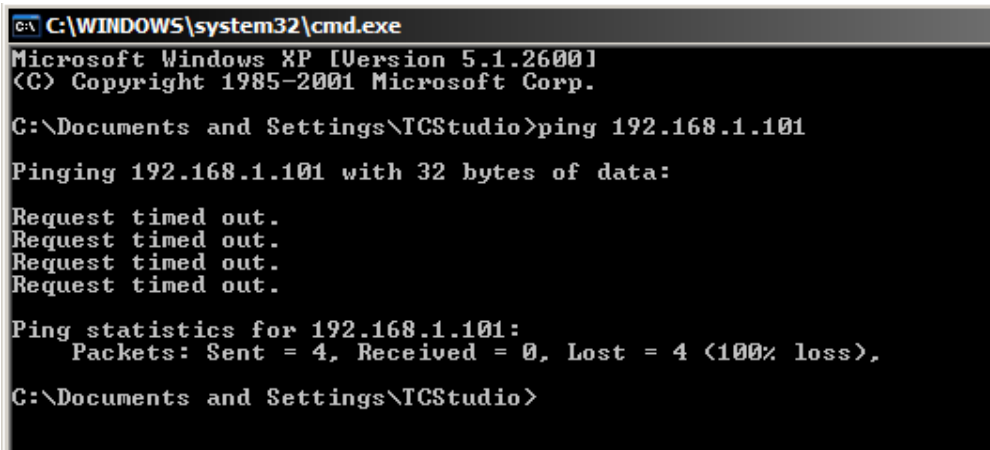
1. Repeat the steps you performed above to re-open a command shell.

2. Type "ping" (without quotes) followed by a space and the target IP number, as in the image below – then press Enter.

```
C:\WINDOWS\system32\cmd.exe                                          _□×
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\TCStudio>ping 192.168.1.101
```
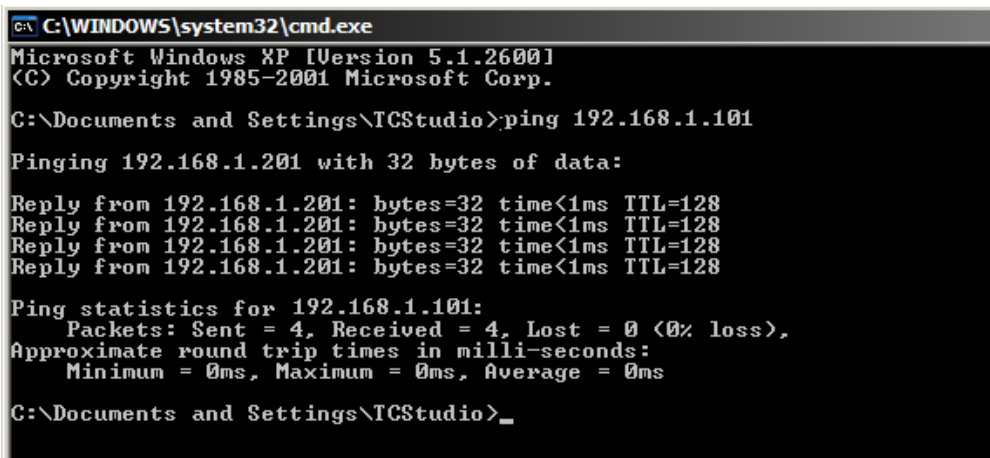
FIGURE 105

3. Ping will go to work, and in a moment or two begin reporting results. A ping failure (indicating a network problem) will look like Figure 106. A success ping will display a report like Figure 107.

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\TCStudio>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Documents and Settings\TCStudio>
```

FIGURE 106

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\TCStudio>ping 192.168.1.101

Pinging 192.168.1.201 with 32 bytes of data:

Reply from 192.168.1.201: bytes=32 time<1ms TTL=128
Reply from 192.168.1.201: bytes=32 time<1ms TTL=128
Reply from 192.168.1.201: bytes=32 time<1ms TTL=128
Reply from 192.168.1.201: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\TCStudio>_
```

FIGURE 107

For a system running Apple's OS X:

1. Double-click Terminal in the Applications\Utilities folder.

2. Type the following command into the Terminal (without quotations) and then add the IP number, and press *Enter*:

   "ping –c 4 *ipnumber.*"

   (So, for example, you might type: ping –c 4 192.168.1.101)

The response will be similar to the Windows example described above. Again, a ping failure indicates a problem with the network connection.

### 14.8.2  Speed Tests

Are you sure your upload bandwidth is adequate to the bitrate you've set for your stream? It's a good idea to test and verify. Again, a number of websites provide free speed testing. These will give you a basic idea of what your local bandwidth really is.  One site which provides a list of online speed test resources is:    http://www.dslreports.com/speedtest?more=1

### 14.8.3  Is it Really a Local Issue?

With regard to streaming issues, don't overlook the fact that AV-HLC100 is just one of the pieces of the puzzle. There are many others that are just as important. One useful thing to try is to check the streaming file. Use a File Capture preset to archive the streaming output file locally, and then examine it to see if it has any problems. This file corresponds exactly to what AV-HLC100's encoder is sending the downstream server. In cases of sync problems, low frame-rate problems, audio popping problems, etc., if it's an encoding issue, the problem will be seen in this file. On the other hand (if the file looks good), then the issue has to be downstream of your Panasonic system.

## Section 15.1 Surface Layout

Generally, you can think of the various control groups provided as being organized into several groups.
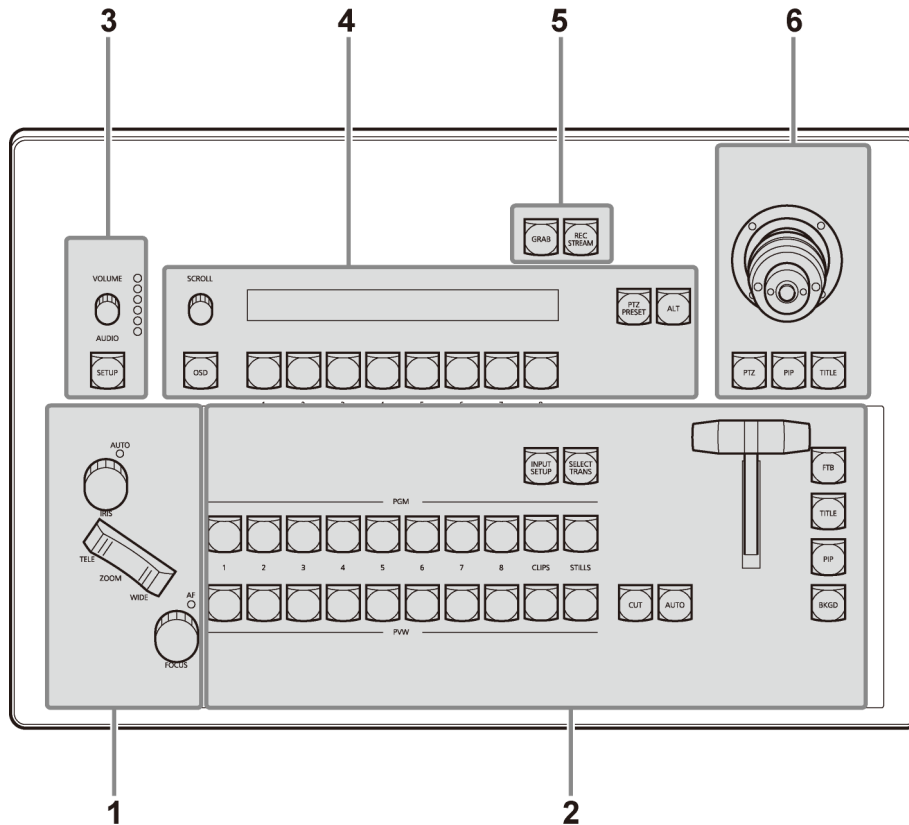
FIGURE 108

### 15.1.1  Control Groups

Controls in each horizontal stripe can be grouped into the following groups:

  **1 – Camera controls:** Zoom, Focus and Iris
  **2 – Switcher:** Manage the video layers that combine to form your *Program* using these controls
  **3 – Audio:** Master Volume, VU meters, and selection
  **4 – Menu:** LED display and selection buttons governing A/V sources and more
  **5 – Grab & Stream/Record**
  **6 – Joystick:** PTZ and Positioning

In the sections that follow, we'll look at each the functions of controls in each of these groups.

## Section 15.2 Camera Controls
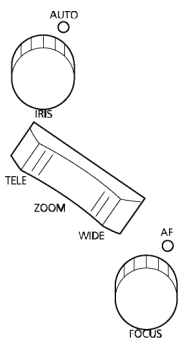


This control group falls conveniently under your left hand, making it easy to find for quick adjustments.

> Hint: Operations in this group are directed to the same camera that the Joystick is currently controlling.

The dominant control in the group is a *Zoom* rocker that you can comfortably operate using index middle fingers to zoom network-connected and configured cameras in and out.

The *Iris* and *Focus* knobs fall conveniently under middle finger and thumb, respectively. Rotate these knobs to adjust the names camera setting, or press them to toggle *Auto Iris* and *Auto Focus* options (nearby red LEDs indicate when these are active).

FIGURE 109

## Section 15.3 Switcher Group
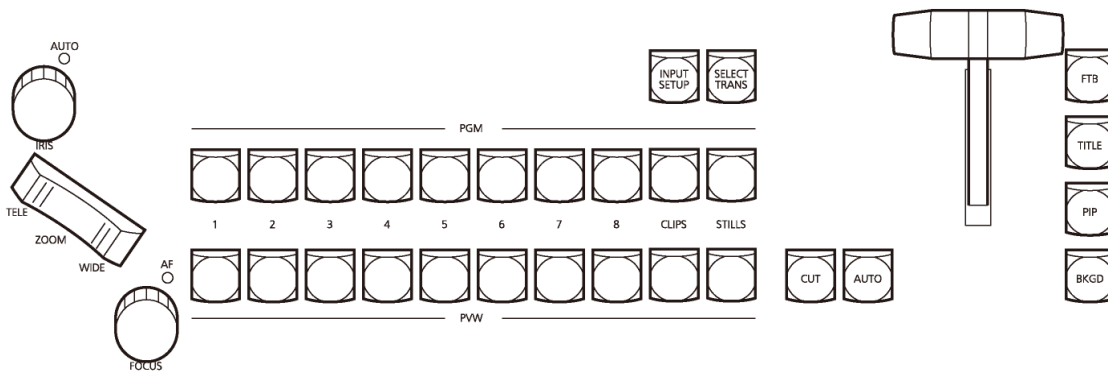


FIGURE 110

### 15.3.1 Program and Preview

This all important control group is dominated by red and green button rows labeled to identify the *Switcher* inputs that can be selected as *Program* and *Preview* row sources.

#### AUX Video Output

The *Preview* row can also be used to determine what video source is sent to the *AUX* video bus (carried by the SDI 2 and the AUX NDI outputs). As noted in Section 8.3.3, AUX output can be set to default to either *Program* or (clean)*Preview*, but can also be assigned in the *Live Desktop* to show a selected *Switcher* source (see Section 10.1.1).

Similarly, if you hold down the control surface *ALT* button before pressing a *Preview* row button, the corresponding Switcher source is sent to the *AUX* outputs. Subsequently, the *AUX* source button in the

*Preview* row lights when *ALT* is pressed. To revert to the default *AUX* source, hold down *ALT* and press the button that is lit on the *Preview* row.

## 15.3.2 Switcher Delegates
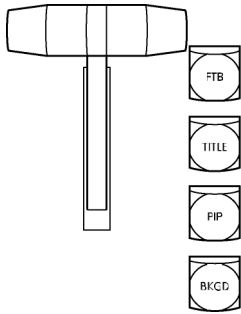
A short column of buttons positioned at right beside the fader lever determines what video layers (see Section 10.1.2) are affected by *Cut*, *Auto*, and *Fader lever* operations.

These buttons are referred to as delegate buttons. When you press the *TITLE* button, the *PiP 2 (Title) Overlay* layer is 'delegated', and moving the *Fader lever* (for example) will govern the display of the current title page.

Switcher delegate buttons support multi-selection, allowing you (for example) to introduce a new *Background* source from the Preview row while simultaneously displaying a suitable *Title* overlay.

FIGURE 111

*Hint: FTB (Fade to Black) is located above the delegate button group, but is not itself a delegate button.*

### FTB

Since it has come up here, let's discuss the *FTB* feature next. The acronym stands for *Fade to Black*.

The result of punching *FTB* will not likely surprise you very much. *FTB* offers a convenient method of doing what its name implies – fading *Program output* completely to black. It might help to think of *FTB* as a final video layer added above all others before *Program* output, completely obscuring everything below it.

As a memory aid, the *FTB* button pulses when the feature is on. *FTB*'s fade in/out duration is taken from the *BKGD* layer transition duration setting.

*Note: Hiding or displaying FTB triggers Autoplay and Audio Follow Video when these are active and the CLIP player is displayed. FTB also fades Master audio out when displayed, and back in again when removed.*

## 15.3.3 Cut and Auto

Clicking the *Cut* button performs a straight cut for all video layers (other than *FTB*, which is a special case as mentioned above) currently selected.

Likewise, if you press *Auto* (or the keyboard *Spacebar*), the transitions assigned to any delegated video layers are performed. You can halt an *Auto* operation partway by clicking the *Auto* button a second time during the transition. The operation will be completed the next time you click the button.

## 15.3.4 Fader lever

Adjust the *Fader lever* to manually modify the progress of a transition between delegated video layers.

*Hint: When the fader lever is dragged part way, a partial transition occurs. With certain transitions this can be useful for split screen effects, among other things.*

### 15.3.5 Setup



FIGURE 112
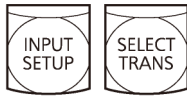
This small group just above the right-hand end of the *Program* row comprises two buttons:
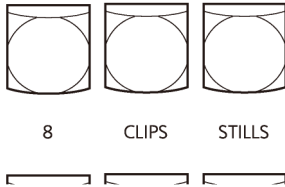
- *INPUT SETUP*
- *SELECT TRANS*

The *Input Setup* button allows you to configure the Switcher input video sources without using the graphical user interface. The *Select Trans* button lets you quickly choose transitions.

To discuss these functions, we must also briefly consider the *Menu* control group, which includes the blue LED display (Figure 113).



FIGURE 113

Input Setup

*INPUT SETUP* provides complete control over *Switcher* video source configuration  (You can set up Switcher sources using the features of the Live Desktop as well - See Chapter 9.)

To configure a *Switcher* source, press *INPUT SETUP* to show a list of *Switcher* sources on the LED display in the *Menu* group. Select the one you wish to set up using the buttons below the LED. The LED display will update to show a list of source options, the first of which is *CFG SRC* (Configure Source).

*Hint: In addition to CFG SRC, the LED display will show all processing options from the Color tab of the Live Desktop's Input Configuration panel. (Use the Scroll button beside the LED display to reveal even more options.)*

Select *CFG SRC*, and the display updates again. You can now select *LOCAL*, then choose between *Black*, *Inputs 1-4*, or *Skype TX Caller* or any available NDI video source. If you choose a hardware input (1-4), you can continue to specify whether AV-HLC100 will auto-detect the video format (this is the default behavior), or manually designate a specific format (see Appendix D).

CLIP AND STILL

*CLIP* and *STILL* appear first in the top level *CFG SRC* menu, ahead of *Inputs 1-8*. This is to provide quick access to player controls unique to these two modules. For example, selecting *CFG SRC > CLIP* reveals *PREV, STOP, PLAY*, and *NEXT* controls on the LED display.

Select Trans

When you press *SELECT TRANS*, the *Menu* group shows options labeled *TRNS 1-8*. Making a selection, using the buttons below the LED display, selects the transition effect from the *transition bin* preset slot for the video layer currently selected in the *Switcher Delegates* button group beside the *Fader lever* (see Section 15.3.2).

## Section 15.4 Audio

The *Audio* control group, at upper left on the surface, includes a *Volume* knob, *LED VU* meter, and *SETUP* (configure) button.
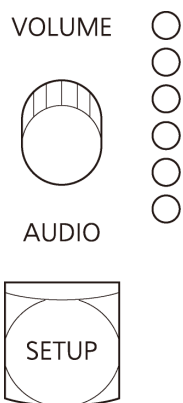


FIGURE 114

- *VU meter* – displays *Master* output volume. The red LED at the top indicates that clipping has occurred.

- *Volume* – by default, adjusts the Master volume level, but can be used in conjunction with the *SETUP* button to control the level of individual channels from selected sources.

- *SETUP* – provides similar functionality to the *CFG SRC* button in the *Switcher* group (discussed previously).

  o Pressing the *SETUP* button causes the *LED display* in the *Menu* control group to list all audio sources.

  o Making a selection (using the buttons beneath the display) shows *CFG SRC* and *GAIN* items for each audio channel from the source.

  ▪ *CFG SRC* - this option allows you to select from the following:

    • *Silence*

    • *Follow Video* (default)

    • *Local* - one of the hardware audio inputs (*Input 1-4*), the motherboard microphone jack, shown as *Micr Real* (an abbreviation form of "Microphone (Realtek)"), and *Skype TX Caller*.

    • Other detected inputs, including NDI audio sources

  ▪ *GAIN* – the *Volume knob* will control the level of the selected channel.

## Section 15.5 Menu
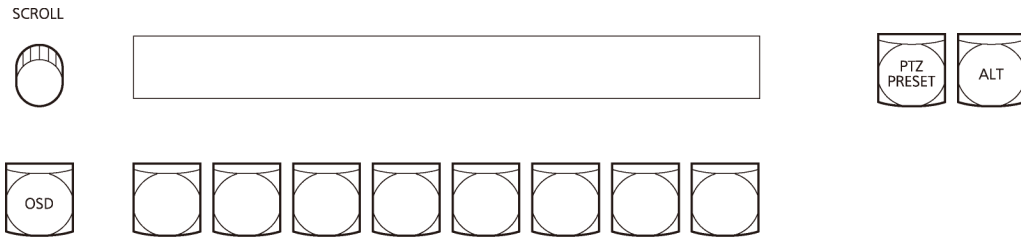


FIGURE 115

We've discussed using the controls in this group several times thus far. There are other features such as the following.

- *OSD* – Press this button to display the *On Screen Display* menu for a network-connected Panasonic PTZ camera. The *Camera's OSD display* will be enabled on its output. Use the Scroll knob to navigate cursor up/down, and press the knob to confirm a selection. (If the camera menu requires left/right navigation, this is supplied by the nearby *Volume* knob in *OSD mode*.

- *Scroll* – Rotate this knob to move up and down through *Menu* display pages. Press the knob to go back to the previous menu level.

- *PTZ Preset* – Press this button to show a list of *presets* for PTZ camera the *Joystick* is currently controlling (see Section 15.7).

  - o Make a *Menu* selection to recall the stored preset.
  - o Press *ALT* and select a preset to store/update the preset.
  - o Use the *Scroll* knob to access the extended list of presets for the camera.

- *ALT* – Press this button to modify or extend other features, as described in context elsewhere in this discussion.

Hint: A complete listing of all Menu options can be found in Appendix D.

## Section 15.6 Grab & Stream/Record
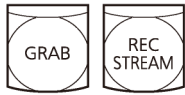
These two buttons relate to capture and internet streaming.

- *GRAB* – Punch this button to capture a still image from *Program* output.

FIGURE 116

- *REC/STREAM* – This button toggles the *STREAM/RECORD* feature found in the *Dashboard* at the top of the *Live Desktop*.

*Note: Stream/Record requires the installation of the the optional NewTek Streaming for AV-HLC100 plugin.*

## Section 15.7 Joystick
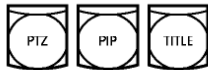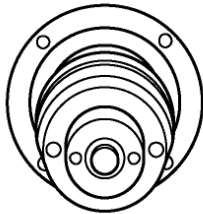
This unit's 3-axis joystick provides more functionality than a simple PTZ camera control.

Three delegate buttons located just below the joystick assign the joystick to control various features as follows:

- *PTZ* – Press this button, and choose a PTZ camera to control using the *Menu* controls at left.

FIGURE 117

- *PIP* – Press this button to use the joystick to move or re-size the *Picture in Picture* overlay. Choose the PiP source in the *Menu.*

- *TITLE* – In similar fashion, this button delegates the joystick to control the position and size of the *Title overlay*. Choose the *Title Preset* to load using the *Menu.*

By default, pushing the joystick forward (away from the operator) tilts a PTZ camera down, while pulling back on it tilts it upward, just like the joystick in an airplane would do. But pushing the joystick forward when *PIP* or *TITLE* is delegated has the reverse effect, moving the overlay upward on the screen.

Twisting the joystick clockwise zooms a camera in, or scales an overlay up. And, naturally, twisting in the other direction to does the reverse.

*Hint: The application of PTZ control operations can be inverted in the Live Desktop (see Section 9.2.)*

# Chapter 16 Web Control

At times it can be very useful to operate your AV-HLC100 remotely from a laptop or mobile device on the same network. AV-HLC100's powerful Web Control applets allow you to conveniently access many features from a web browser.

## Section 16.1 Accessing Web Control
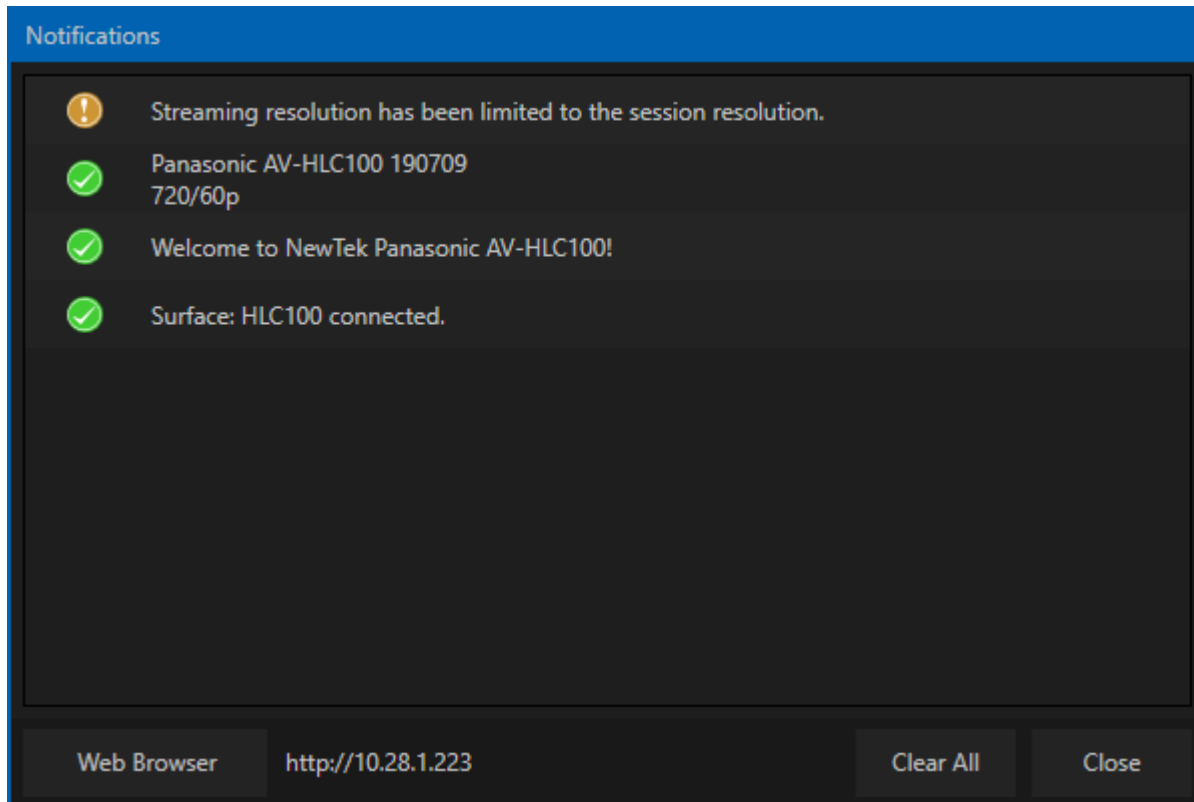


FIGURE 118

Earlier (Section 8.3.6), we mentioned that you could click the *Web Browser* button in the footer of the *Notification* panel to open AV-HLC100's convenient Web Control page.

Normally, though, you'll want to navigate to the URL shown at right of the *Web Browser* button using a browser on an external system connected to the same network. This will open the Home page of AV-HLC100's Web Control system (Figure 119).

> *Note: You will be asked to enter network credentials to open this page. To change the default password, use the "Set LivePanel Password" button in the Utilities control group of AV-HLC100's Administration panel.*

## Section 16.2  The Home Page
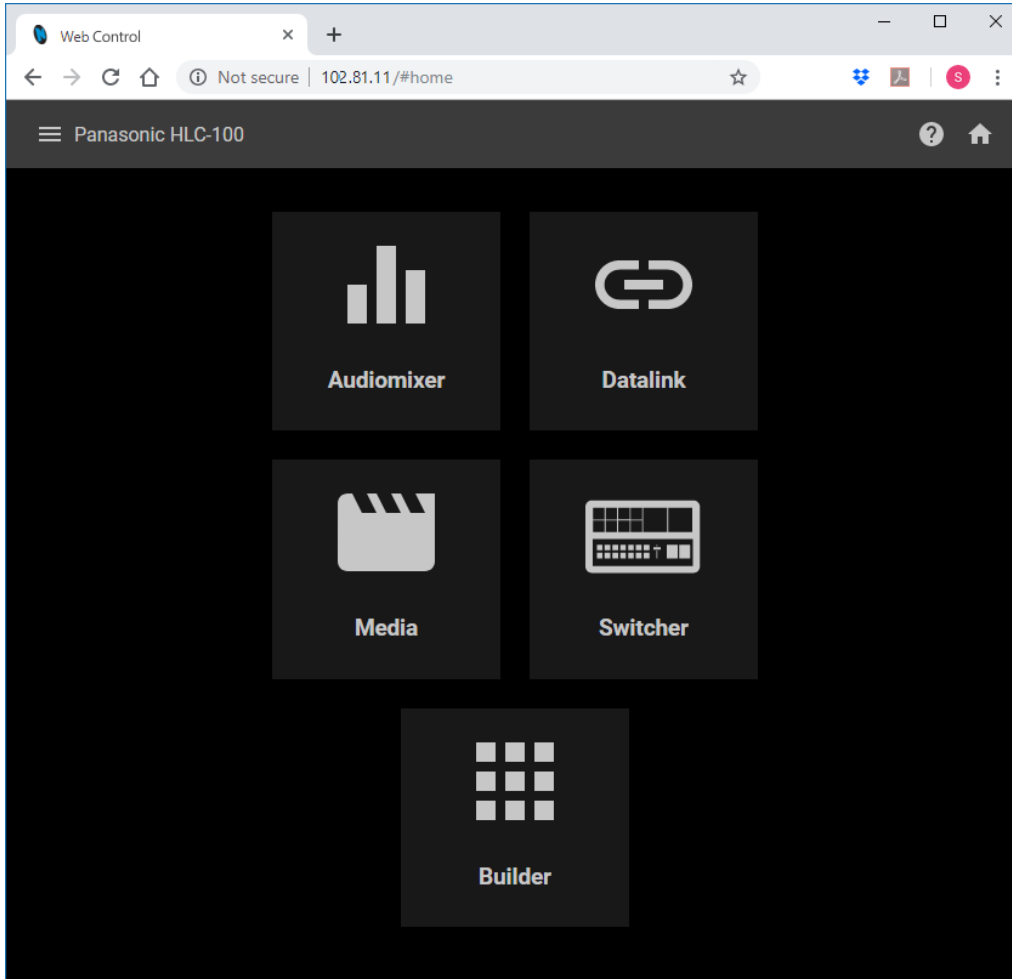


FIGURE 119

The *Home page* shows icons for a group of control applets, as follows:

- **Audio Mixer** – monitor and control volume levels for *Audio Mixer* sources and outputs.

- **DataLink** – view and edit DataLink keys and their values to remotely update title page content.

- **Media** – modify the makeup of your *STILLS* and *CLIPS* playlists, and exercise playback control remotely.

- **Switcher** – Switch your show from a tablet or other mobile device.

- **Builder** – Design your own remote control interface using this powerful tool.

*Hint: Web Control applets are deliberately simple in design and operation; an explanation of the use of each one can be found by clicking the (?) icon in the titlebar of each applet.*
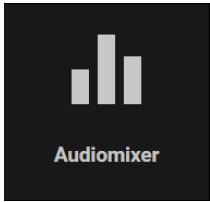
The web-based *Audio Mixer* applet provides convenient outboard audio level control for all audio sources.

Each input and output is represented by a primary volume fader and VU meter. Volume for a source can be adjusted by dragging the fader up or down; click the speaker icon located above the VU meter to toggle Mute.
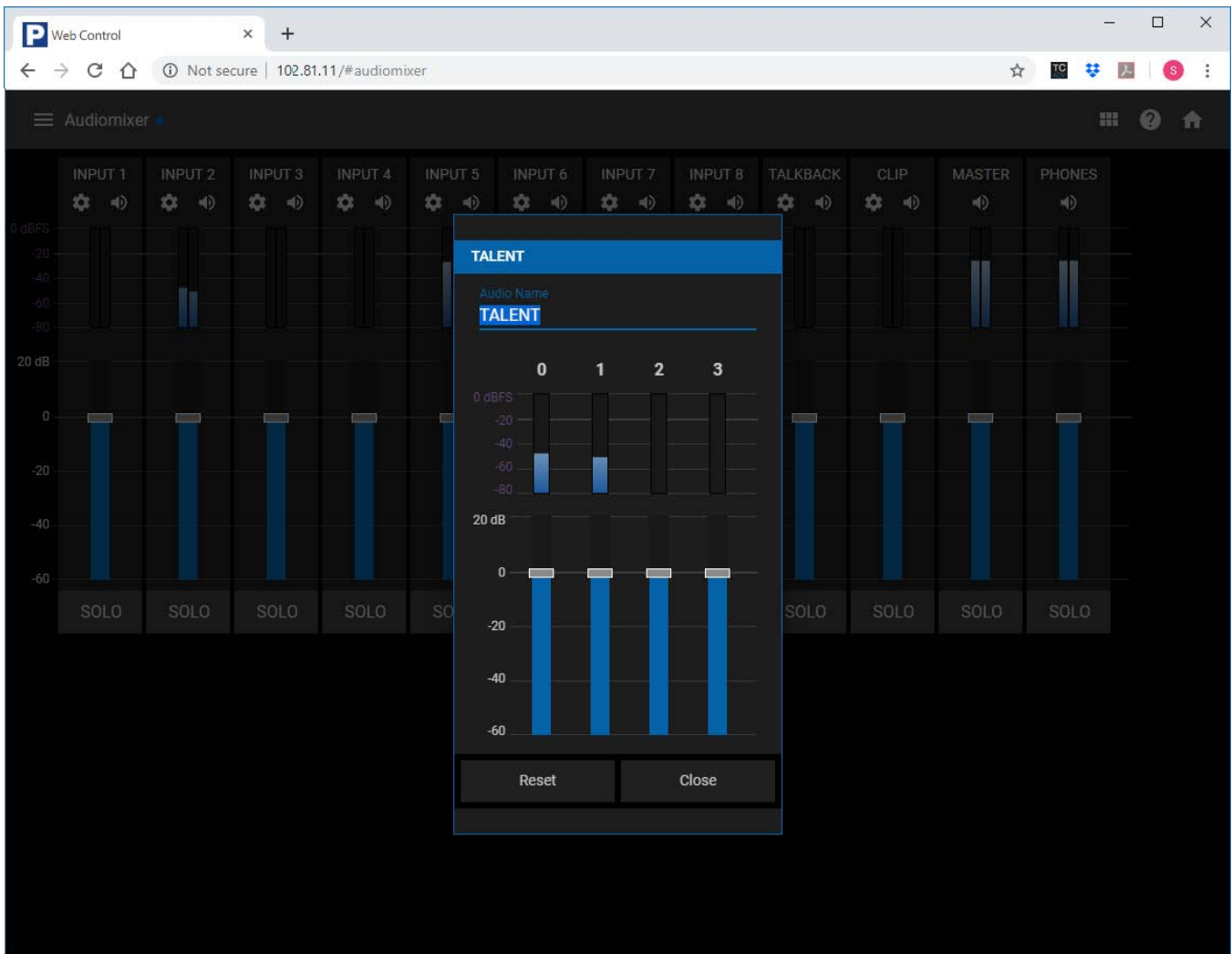


FIGURE 120

Clicking the gear icon beside the Mute button opens a small panel providing VUs and level controls for each individual channel supplied by the related source. Note, too, that you can modify the source name in this popup dialog (Figure 120).

A unique feature of the Mixer applet is that is hosts *Audio Mixer* presets (Figure 121). Click the *preset bin* button just left of the (?) in the Audio Mixer applet's titlebar to open the preset bin. Click an empty preset to store the current Mixer setup, then click it again later to recall it. Right-click an existing preset to *Rename*, or *Clear* it.
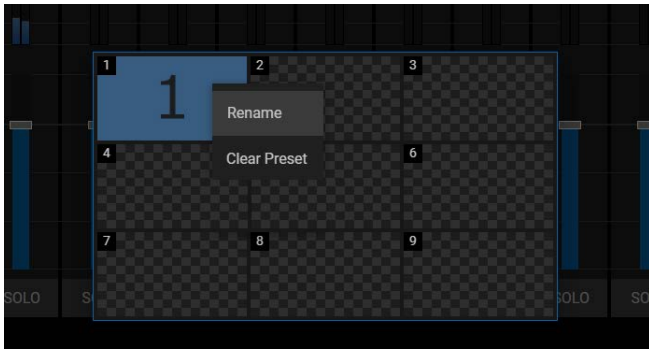
FIGURE 121

Clicking the SOLO button allows you to exclusively listen to the related source on AV-HLC100's headphone output.

To return to the *Home page* after making adjustments, click the *Home page* icon at right in the page header, or use the menu (marked by a three-barred icon) at extreme left to jump to another applet.

## Section 16.4 Datalink
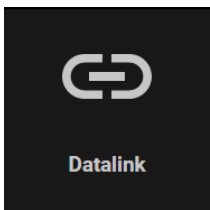


The DataLink™ page allows you to remotely enter new values for DataLink keys (which, you'll recall can be used to greatly extend AV-HLC100's titling system (see Section 12.2).
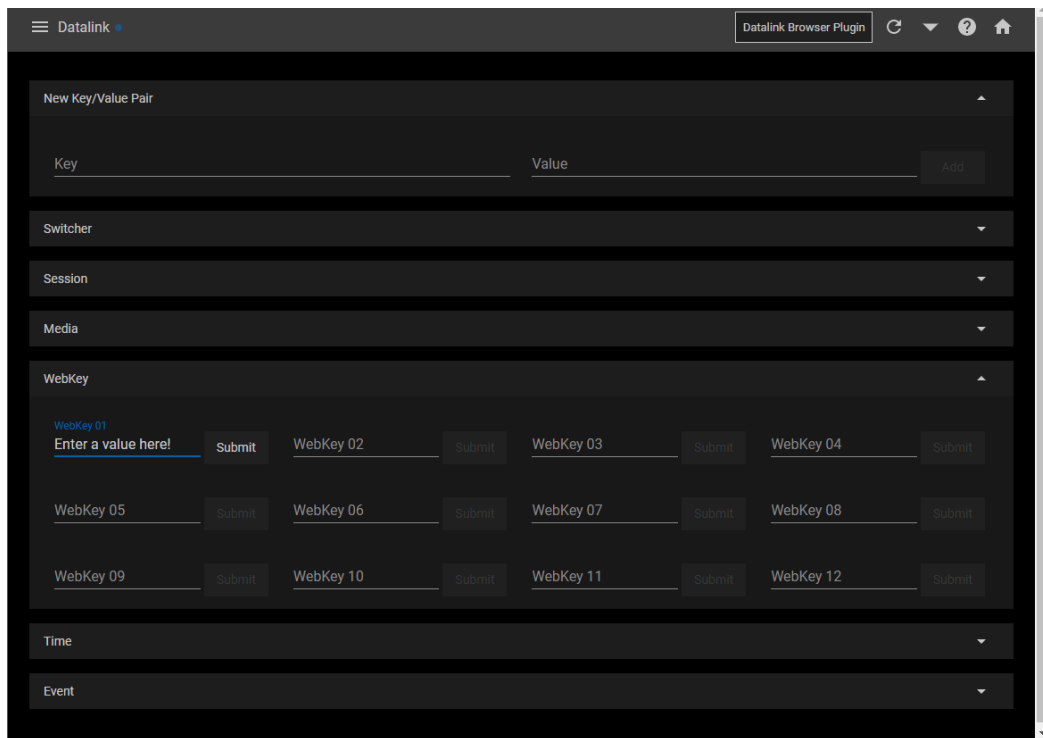


FIGURE 122

Key names are group by type under expandable headers. The *New Key/Value Pair* group actually allows you to create your own custom DataLink keys and set their values, which can then be updated remotely using the applet.

Note that, since key values can come from a variety of sources, some of which can be modified externally or updated *automatically, the titlebar contains a Refresh icon.

> \* For example, values for some keys in the *Time* group change constantly – thus any local edit you make could well be overwritten moments later.

> *Hint: The WebKey section exposes the keys and values supplied by the DataLink plugin, which is a free download prepared for the Chrome® web browser. To access this, click the corresponding button in the applet's titlebar.*

## Section 16.5  Media
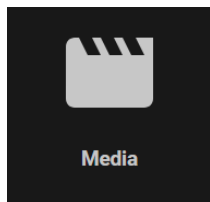
Controls on the Media page provide remote access to AV-HLC100's internal media players (*CLIPS* and *STILLS*).
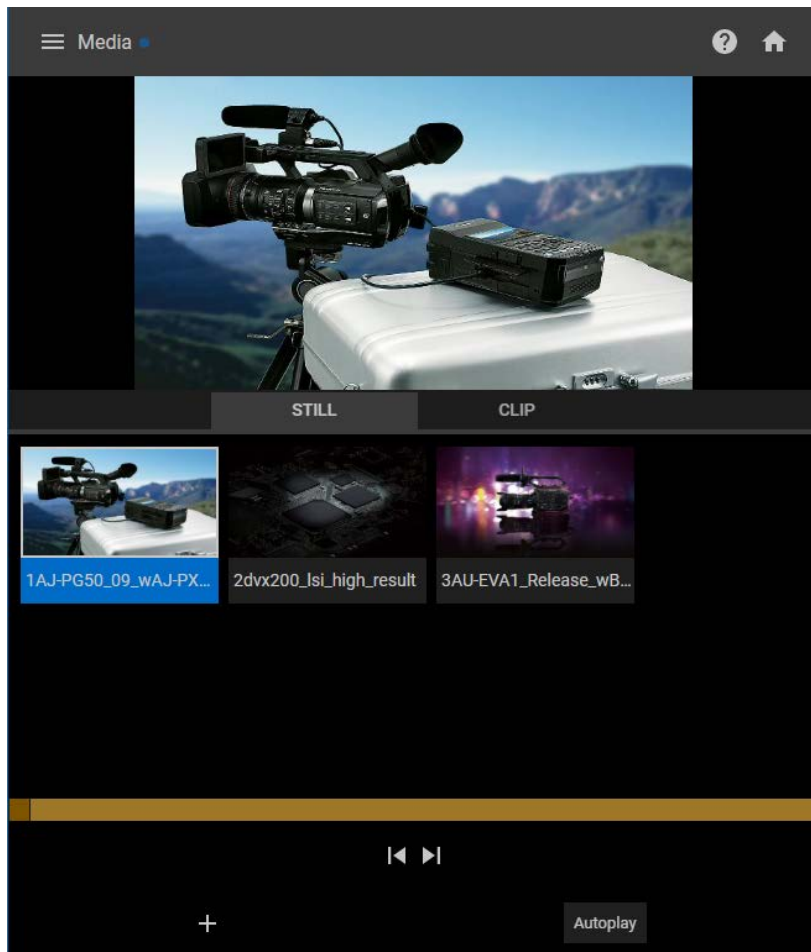


FIGURE 123

Click either the *STILL* or *CLIP* tab to see the live player output, and the content of the corresponding playlist. *Previous* and *Next* selection controls are located just below the scrub bar, or you can simply click a playlist icon to select it.

The *Autoplay* button at the bottom of the *Media* applet toggles the corresponding feature in the CLIP player.

## Section 16.6  Managing Media

Click the + icon to open a *Media Browser* providing access to relevant folders on AV-HLC100, and make a selection to add the item to the playlist. Or, very conveniently, click the blue *Browse* button in the footer of the *Media Browser* to open a local file explorer to access files on the device hosting the web browser (or elsewhere on the local network).

In the latter case, the selected file(s) will be copied across the network to the appropriate storage location on AV-HLC100 (in addition to being added to the playlist).

> *Hint: Depending on available bandwidth, it may not always be suitable to transfer large video clips across the network to AV-HLC100 in this manner during live production.*

## Section 16.7 Switcher
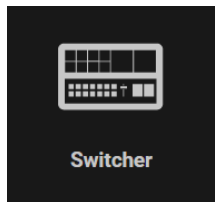
The *Switcher* applet, while quite simple, is one of the more powerful *Web Control* features.



FIGURE 124

116
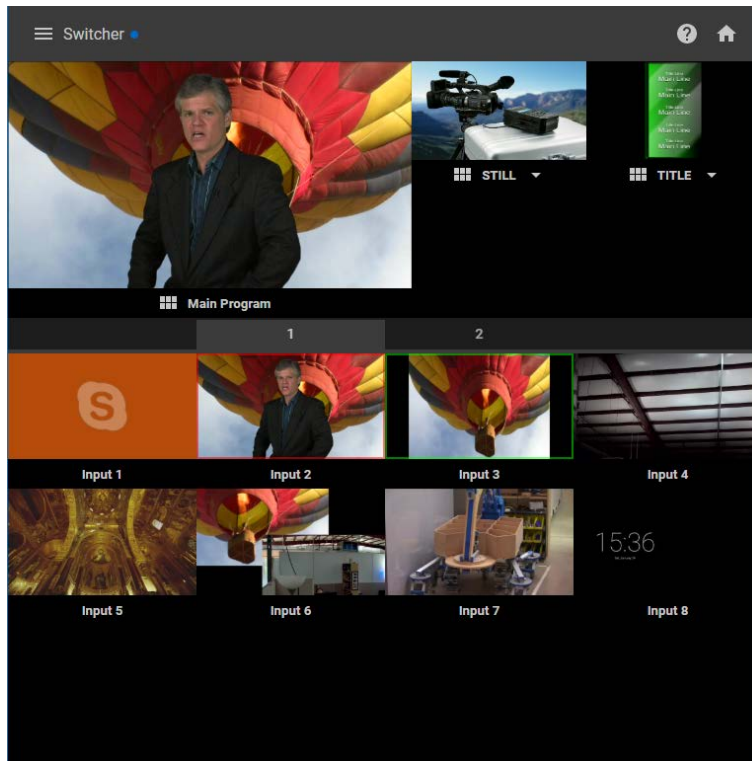
Video from each of AV-HLC100's connected and internal sources is displayed in one of the two tabbed panes comprising the lower half of the applet display. *Program* output is shown at left above these tabs, and the two overlay channels (*PiP* and *Title*) are shown at right next to this.

Drop-down menus beneath the overlay monitors allow you to change the source assigned to these channels.

As well, the small 'matrix' gadget beneath the overlay channels and Program opens a transition preset bin for the associated video channel. This dialog allows you to choose one of nine transition presets, and change the speed with which your selection is applied.

> *Hint: The preset effects in the bin must be configured in the AV-HLC100 interface. The first two presets are permanently assigned to CUT and FADE, to provide quick access to these two important effects.*

Switching the Program source or displaying (or hiding) an overlay channel is a simple matter – just tap the viewport for the desired source to CUT, and swipe (or click and drag) horizontally on it to transition using the selected effect.

## Section 16.8  Builder
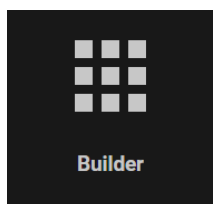
The Builder is probably the most powerful and flexible applet in the *Web Control* arsenal. At its core, Builder lets you assign any AV-HLC100 command (drawing on the list of operations that can be assigned to a keyboard shortcut) to buttons that appear in the browser interface. In turn, buttons can be styled, labeled, and can even show images or moving video streams.
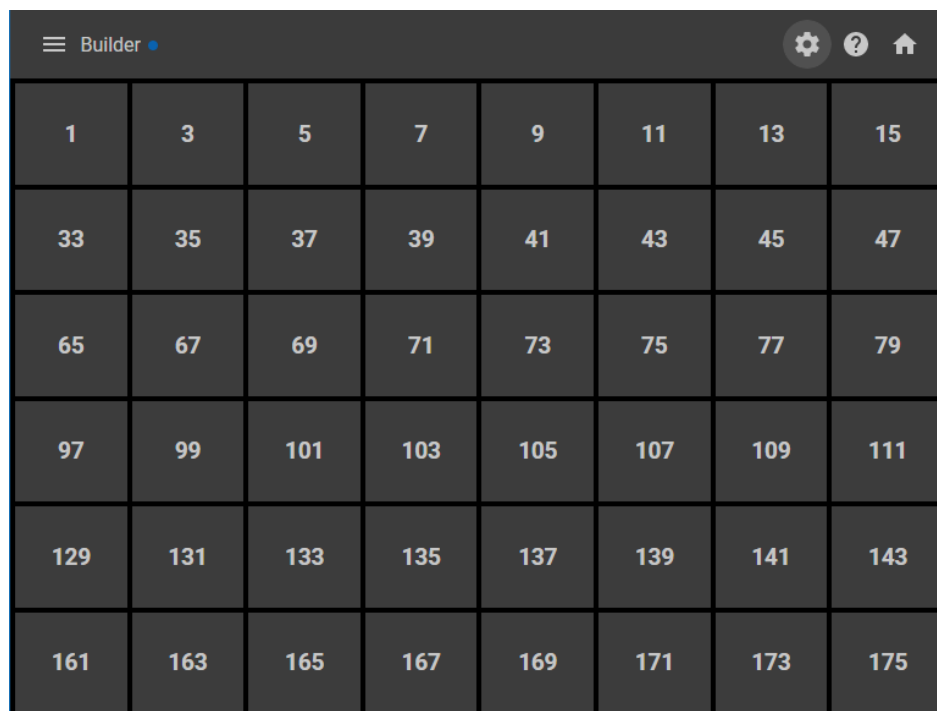


FIGURE 125

Initially, there is not much to see here – just a set of square buttons that, when clicked, do nothing at all. You might wonder at the seemingly odd numbering scheme. Let's spend a few moments designing a few custom buttons and all will become clear.
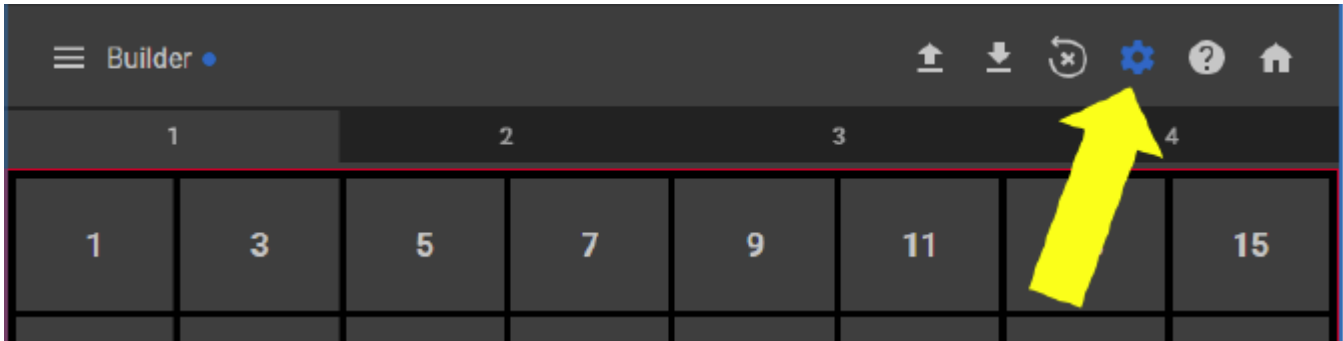


FIGURE 126

To assign a function to a button, we need to enable Builder's *edit mode*. To do so, click the gear icon at right in Builder's titlebar. A red border is added to the button panel to signify that *edit mode* is active.

In addition, note that a set of four number tabs is added above the button panel. Builder gives you four separate pages of buttons to work with, allowing you to set up different layouts for unique control requirements.
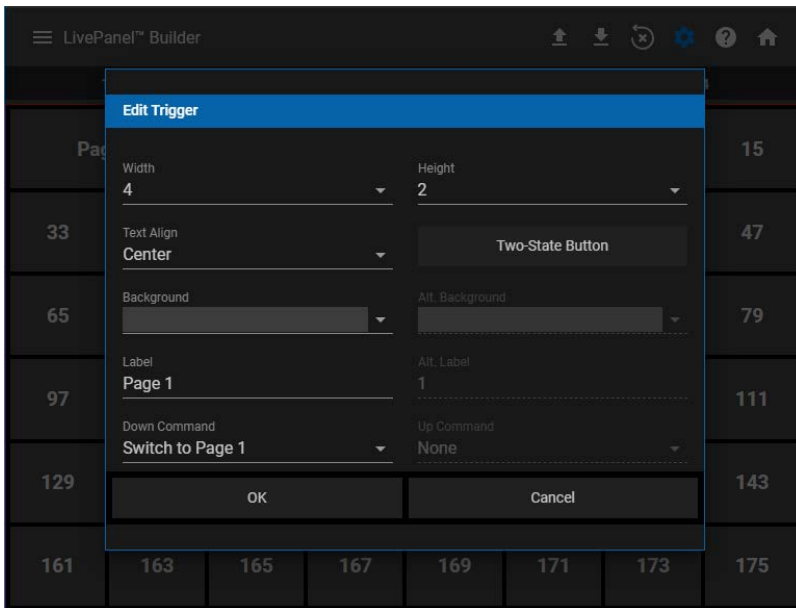


FIGURE 127

Let's begin by adding a simple button:

1. In edit mode, then, click the button numbered "1". The button configuration dialog shown in Figure 127 opens.
2. Change the *Width* value to "4", leaving *Height* at the default value of "2".
3. Click the *Background* color swatch and select the darkest gray color.

118

4. Edit the Label value by entering "Page 1".
5. Then use the *Down Command* menu to choose "Switch to Page 1"
6. Click OK
7. Now click button 5, and repeat steps 2-4, but this time select "Switch to Page 2" as the *Down Command*.
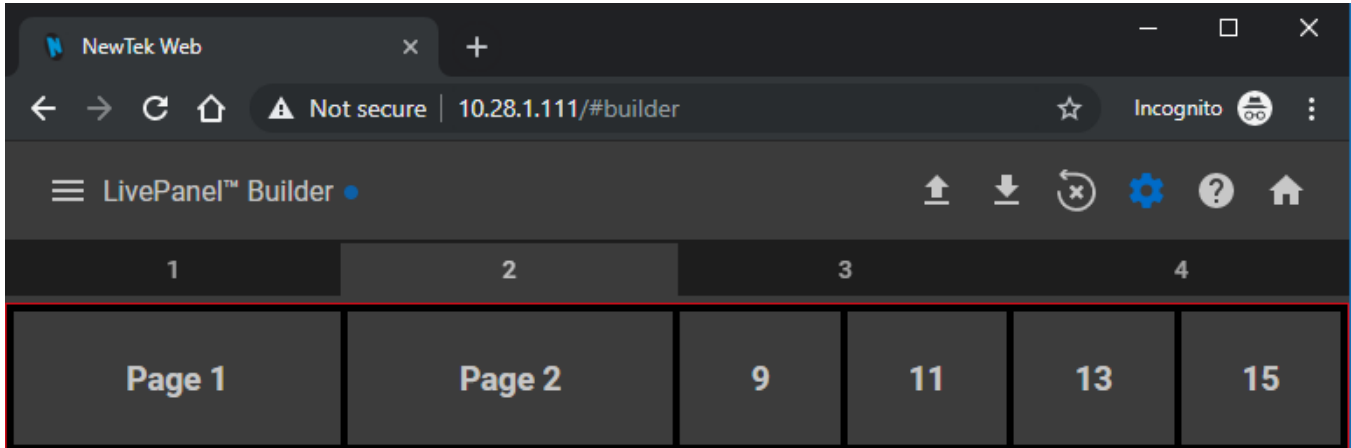


FIGURE 128

At this point, we've added two 'page buttons' to the first page (Figure 128). Continue to create two similar buttons to go to pages 3 and 4.

At this point, we could exit edit mode by clicking the gear icon again, and we would be able to switch from Page 1 to a different page in Builder … but, having done so, we would be unable to switch back from to Page 1, because we haven't added any functions to Page 2.

To solve this, let's save the layout for Page 1, then copy it to Pages 2-4.
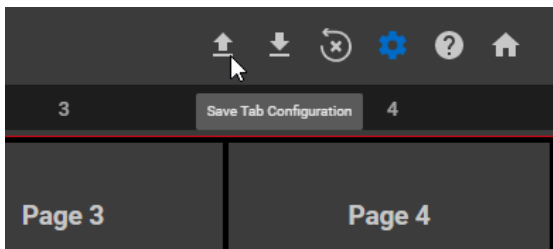


FIGURE 129

8. Having added four 'go to page' buttons to page 1 as outlined above, click the *Save Tab Configuration* (Figure 129) icon in the titlebar to store this button layout in the local Downloads folder.
9. Go to the second *Builder* tab, and click the nearby *Load Tab Configuration* icon.
10. Navigate to your local Downloads folder, and load the (JSON format) file you saved above.
11. Repeat the last two steps for the remaining *Builder* tabs.

Now we can freely switch pages, but since they are identical there isn't much reason to do so. Let's add some useful functionality beginning with Page 1.

12. Still in *edit mode*, return to page 1 by clicking tab 1 at the top of the page.

119

13. Click button 33 to open its configuration dialog.
14. Set Width to "8" and Height to "4".
15. Remove all text from the button Label field, leaving it empty.
16. Click the *Background* menu, and select the *Choose Video Source button*.
17. In the *Trigger Video Source* popup dialog, select the TITLE entry.
18. Select "Title: Perform Auto" as the *Down Command*.
19. Click OK to complete setup for this button.

At this point, if you leave *edit mode*, "Page 1" should look something like Figure 130 (assuming you have a title page stored in preset 1 of the title module).

You can now view the currently active title page in your web browser, and better yet, it's a button; clicking it will cause AV-HLC100 to show or hide the title on *Program output* using the currently designated transition effect.

FIGURE 130

Let's add a little more useful functionality to Page 1.
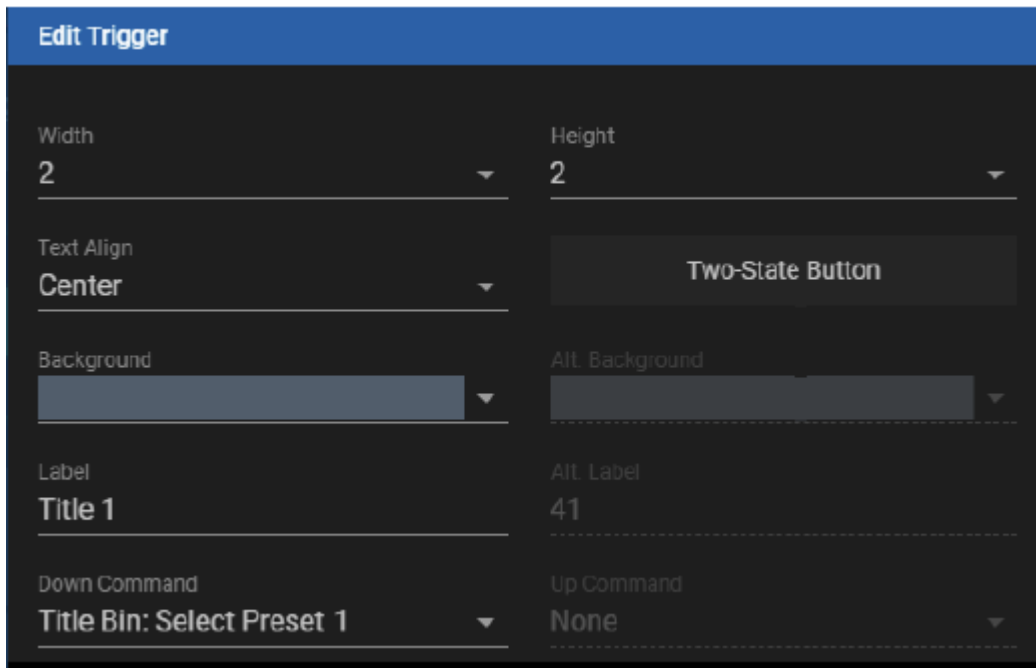
FIGURE 131

20. Edit button 41, changing its *Label* to "Title 1", and assigning the command "Title Bin: Select Preset 1" as the *Down Command*.
21. Repeat the last step for buttons 43, 45, 47, 73, 75, 77 and 79 –incrementing the number in the *Label* field ("Title 2", "Title 3", etc.) and the preset ("Select Preset 2", "Select Preset 3") for each successive button.

120

FIGURE 132

Now you have created something really quite useful. The handful of controls you've added would allow someone to use the web browser of a mobile device, such as a tablet or phone, to easily select a specific title page, display it, and finally remove it from view after a few moments.

Let's continue our exploration of *Builder* by configuring Page 2.

22. Re-enable *edit mode* by clicking the gear icon in *Builder's* titlebar, and select the second tab.
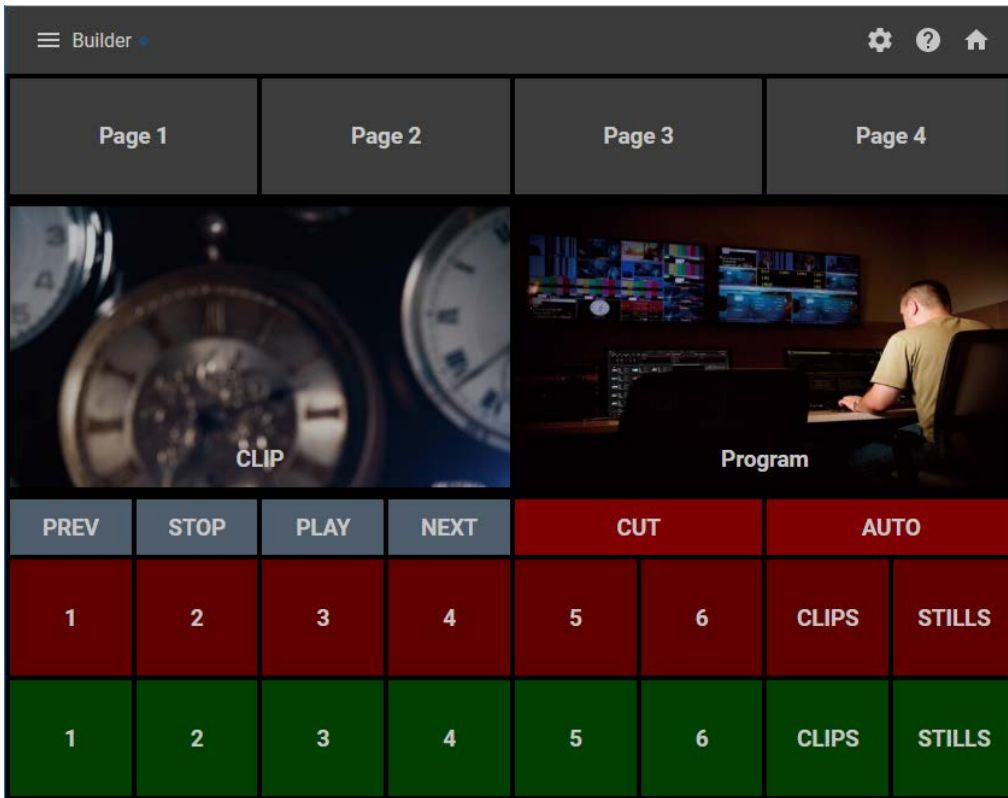


FIGURE 133

23. Assign two large (8x5) "buttons" as shown to serve as 'live monitors' by selecting the CLIP and Mix 1 video sources as their respective Backgrounds.
24. Continue using the button commands listed below and the skills you learned above to complete the layout shown in Figure 133:

121

a. Clip: Previous
b. Clip: Stop
c. Clip: Play
d. Clip: Next
e. Transition: Perform Cut
f. Transition: Perform Auto
g. PGM Row: Set Index 01-06
h. PGM Row: Set Clips
i. PGM Row: Set Stills
j. PRV Row: Set Index 01-06
k. PRV Row: Set Clips
l. PRV Row: Set Stills

With this page complete, you can now cut directly to a *Switcher* source by selecting a red 'Program row' button, or queue your upcoming source on *Preview* and transition to it using the AUTO button. As well, you can select and preview the current item in your *CLIPS* playlist source, and control playback.

This mini-tutorial has introduced the versatility of the *Builder* applet, which can serve to provide remote control convenience and simplicity for many purposes.

# PART III  Appendices

A time-saving question and answer section, followed by an extensive listing of Shortcut Keys, schematic diagram and keyword index …

# A. Performance Considerations

## A.1 IMAG and Latency

What does the term IMAG relate to? It's a compression of the expression "Image MAGnification." Typically in modern IMAG applications, video cameras supply live imagery to projection systems, magnifying speakers and performers so that audience members further back in large venues can still see what's going on.

IMAG is a very tricky task at the best of times, one that calls for excellent planning, and where possible, testing. Those designing an IMAG installation have, not just one, but *two* inter-related broadcasts to consider – in the form of the audio and video streams.

### Relativity and the Speed of Light

Sound travels very slowly compared to the light of the video image, so even in a relatively small venue, the sound reaches at the rear seats significantly later than the front seats.

> *In loose terms, for a mid-size auditorium 600 feet long, it takes around a half-second for the audio to reach those in the back. For this reason, audio engineers often position speakers throughout the 'house', then introduce carefully considered delays by electronic means – to ensure 'late sound' from front speakers does not arrive after sound from the nearest speaker to those further back.*

Light, on the other hand, travels so much faster that for all intents transmission can be considered instantaneous in the same setting. So a person in the rear will see the image on a screen at the front long before sound from a *co-located* speaker arrives.

### Latency and Your Audience

"Latency" – what's that you ask? In this context, latency refers to the time it takes for the video signal to transit one part of the IMAG path, from camera lens to final display. Latency is usually expressed either in milliseconds or in video "frames" (typically either 25 or 29.97 to the second.)

As we said above, really a little video latency is not a bad thing as viewed from a surprisingly short distance back into the audience. This is just as well, since for all practical purposes a little latency is also unavoidable.

Even so, as long as audio and video are in sync *at your seat*, only a rather 'significant' degree of latency will be objectionable – underline unless you happen to be very near the stage. For those in the front rows, a few extra frames of latency *may* be rather disconcerting. (It's true that IMAG was conceived primarily for the benefit of those further back, but if the latency is too obvious for those nearest the front it can be disconcerting distraction.)

For this reason, it's desirable to keep video latency to an agreeable minimum – but put away any notion of 'zero latency.' Not only would this require bending the laws of physics, it would be a bad idea.

Before considering minimizing the latency in the device chain, acknowledge the practical staging. For example, if you design your IMAG layout in such a fashion that those in the front row are unlikely to be

able to see the screen(s) without lifting their eyes from the onstage talent, they are unlikely to notice a small amount of latency.

## Latency and Your AV-HLC100

Your AV-HLC100 live production system constitutes just one (albeit critical) link in a chain of devices. It is common for each device to contribute a little to the combined total latency for the system.

AV-HLC100's portion of the total latency sum is well within acceptable standards for devices of this sort – roughly between 1 and 2.5 frames (the actual amount can vary slightly within this range, depending on several factors).

> *For example, suppose a 'video frame' supplied by a camera arrives at an input one millisecond after a different frame has been sent to the output. Obviously the new arrival must wait its turn; it can't be transmitted until the correct duration for its predecessor has elapsed. Thus the newly arrived frame must 'wait' almost one entire frame, until its turn comes.*

You can actually perform a rough assessment of the latency of your pipeline fairly easily. Run timecode directly to 1) a monitor and at the same time 2) through the switcher to a second (identical) monitor. Take a photograph that encompasses both monitors, and compare the timecode shown.

## Other Sources of Latency

More often than not, significant latency is added by other devices in the IMAG chain that come *after* the switcher. Projectors are a common contributor, but cameras are often a factor, too.

Here are some helpful points to consider when designing and connecting your system:

- If at all possible, match the resolution sent from the switcher to the native resolution of the projector. (On some projectors this allows the unit to avoid using its own internal scaling, which is often a significant factor in unwanted latency.)

- Certain projectors provide a 'low latency mode' to disable features of the unit that carry a heavy toll in latency. Enabling this mode can make positioning the projector slightly more challenging (as you may sacrifice some ability to position and scale the image using projector menu functions) – but the latency reduction can be very worthwhile.

- Some cameras include features that add more latency than you would expect. For instance, image stabilization (by definition) adds one field of latency and sometimes more. Disable anything of that sort that you can.

- Latency can be slightly lower for progressive sessions, so for lowest latency, progressive modes are theoretically.

# B. Keystroke Shortcuts

| Operation | Shortcut |
|---|---|
| (Show/Hide) Switcher Input Configuration Dialog | top row number (1-8) |
| (Show/Hide) Input Configuration Dialog for Preview Selection | * |
| (Show/Hide) CLIPS Configuration Dialog | i |
| (Show/Hide) STILLS Configuration Dialog | o |
| CLIP PREV | j |
| CLIP Stop | k |
| CLIP Play | l |
| CLIP NEXT | ; (semi-colon) |
| CLIP Toggle Autoplay | ' (apostrophe) |
| STILL PREV | , (comma) |
| STILL NEXT | . (period) |
| STILL Toggle Auto Advance | / |
| Title Editor (show panel) | t |
| Recall Title Preset # | numpad (1-8) |
| Store/Update Title Preset # | CTRL + numpad (1-8) |
| Close dialog | ESC |
| Display software version | Alt + b |

# C. Using Skype TX

AV-HLC100 supports Skype TX input and output with the following features:

- Begin by assigning one a/v input as a Skype TX input that can be mixed into your program just like an SDI or NDI source. Use the *Source* menu in AV-HLC100's *Input Configuration* panel to select the *Local>Skype TX Caller* option.

- Incoming audio from the remote Skype caller is normally controlled just like any other sound source. When a video input has been assigned to "Skype TX Caller", the corresponding *Audio Mixer* input shows a Skype icon, and a *TALK* button is added to it (beside *Solo*).

- AV-HLC100 automatically prepares a "mix-minus" audio return mix to send back to the remote caller, consisting of the Master program sound with the caller's audio removed. (This prevents the caller from hearing an annoying 'echo'.) No configuration is necessary to set up this special audio mix or assign it to the Skype audio return.

- You can also configure a special "TALKBACK" input in the *Audio Mixer* (you might select one of the two 1/4" Line level audio connectors, or the small pink (Mic level) connector on the motherboard)

- The AV-HLC100 operator presses the TALK button for his Skype channel incoming sound to talk directly to the remote Skype caller without being heard 'on air'. This causes incoming Skype TX sound to be removed from the Master audio mix, and redirected to the headphone output.

- At the same time, sound from the TALKBACK input goes to the remote caller (only). This is used for 'call screening' and off air direction.

## C.1 Skype TX Control Application
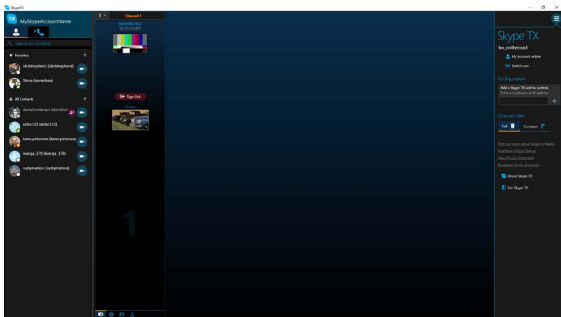


FIGURE 134

The Skype TX system includes a standalone application - referred to as "Skype TX Control".

Note: Skype TX Control runs on another device (such as a laptop) on the same network as AV-HLC100.

Download the Skype TX installer here:

https://www.microsoft.com/en-us/download/details.aspx?id=45887
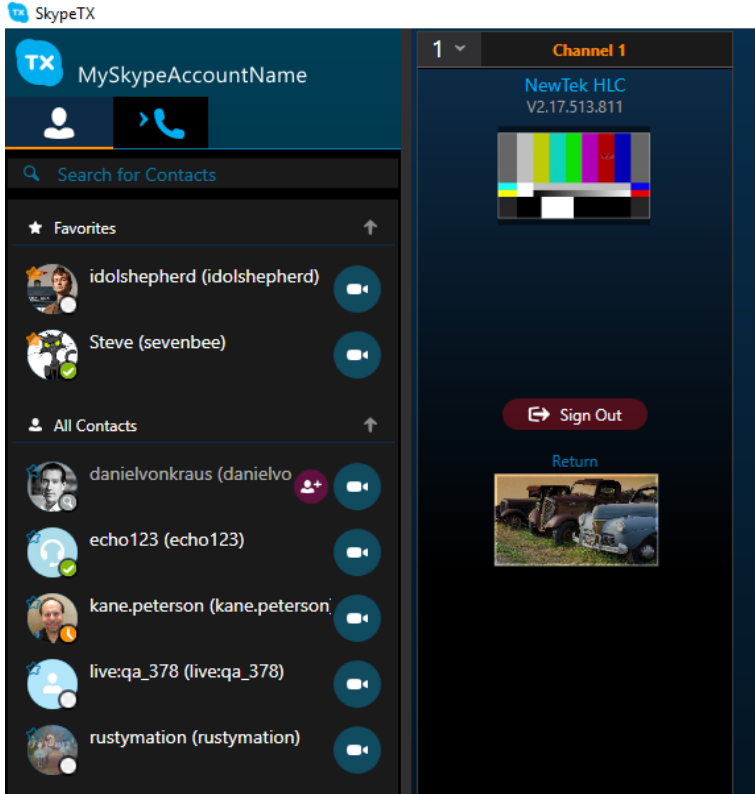
FIGURE 135

Think of this application as the 'switchboard' for Skype TX. It is how Skype calls are initiated, or answered.

Skype TX Control can connect to and control calls sent to multiple Skype TX Clients at one time, including HLC-100, but also (for example) NewTek TriCaster and TalkShow systems.

It provides many features, including access to the Contact list of the Skype account used to log into the control application.

## C.2 Connecting the Control Application to AV-HLC100

You must connect the Skype TX channel(s) of each Skype TX client device (in this case, AV-HLC100) to the Skype TX Control application to send a/v feeds between the devices.

128

- Begin by telling Skype TX Control to connect to your AV-HLC100.

  Do this by entering the entering the target system's IP address into the "Add a Skype TX unit to control" into the Configuration panel of the Control application.

- A new column will be shown at left in the main panel of the Control application, asking you if you want to add a channel to control.
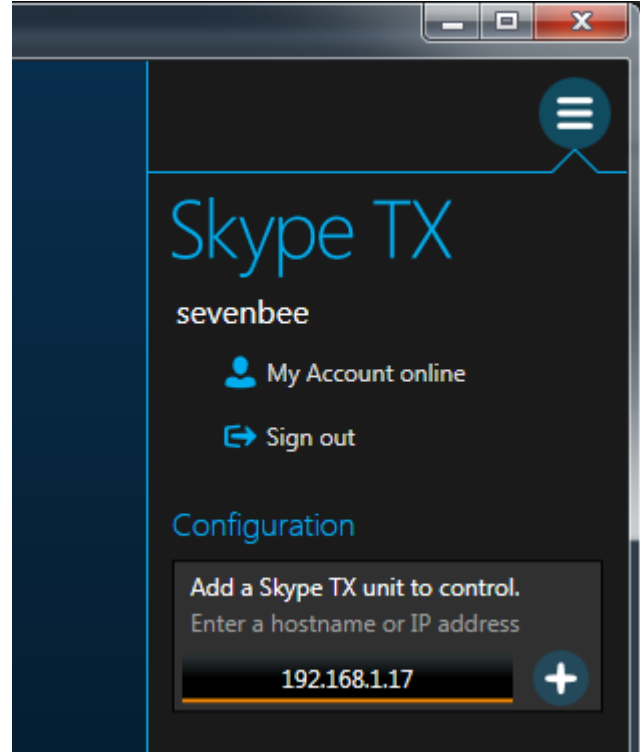


FIGURE 136

- Select the channel shown, and you will be asked to enter credentials to access that system.

  Note: Your AV-HLC100 must be set to require a password to work with Skype TX.

- After this, the Control application connects to the available Skype TX channel from AV-HLC100, and is ready to accept Skype traffic.

Notes: Much more information on using Skype TX Control is available at this URL:

https://media.skype.com/skype-tx/

(Although configuring SkypeTX Control takes a little time, and can be a little intimidating at first, it's easy to use once you learn how – and only needs to be done once.)
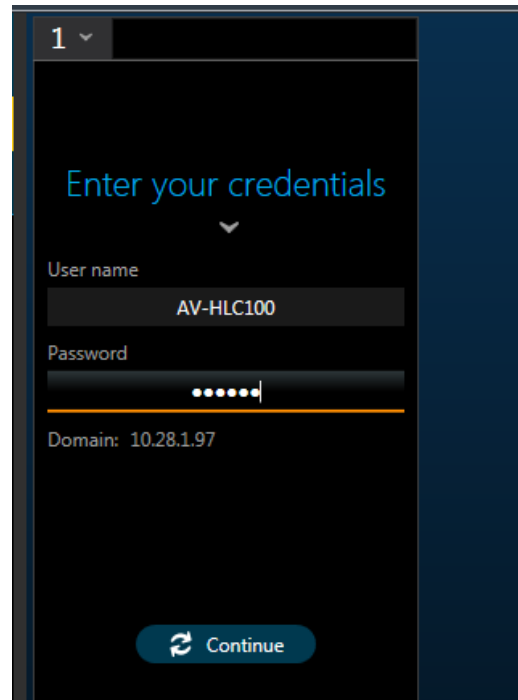


FIGURE 137

# D. Control Surface Menus

| 1 | 2 | 3 | 4 | 5 | 6 | Description |
|---|---|---|---|---|---|---|
| **INPUT SETUP** | | | | | | Configure Switcher input |
| | **CLIP** | | | | | Configure Clip player |
| | | PREV | | | | Go to previous playlist item |
| | | STOP | | | | Stop/Go to first frame |
| | | PLAY | | | | Play clip |
| | | NEXT | | | | Go to next playlist item |
| | | RESE ALL | | | | Reset all color settings |
| | | BRT NESS | | | | Adjust brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | CONTRAST | | | | Adjust contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | HUE | | | | Adjust video hue |
| | | | -5 Deg, -1 Deg, +1 Deg, +5 Deg | | | Adjust by value |
| | | SAT | | | | Adjust saturation |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | U OFST | | | | Adjust U Offset |
| | | | -5 IRE, -1 IRE, +1 IRE, +5 IRE | | | Adjust by value |
| | | V OFST | | | | Adjust V Offset |
| | | | -5 IRE, -1 IRE, +1 IRE, +5 IRE | | | Adjust by value |
| | | RED BRGT | | | | Adjust red channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | RED CONT | | | | Adjust red channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | BLUE BRGT | | | | Adjust blue channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | BLUE CONT | | | | Adjust blue channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | GRN BRGT | | | | Adjust green channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |

| 1 | 2 | 3 | 4 | 5 | 6 | Description |
|---|---|---|---|---|---|---|
| | | GRN CONT | | | | Adjust green channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | RED WBAL | | | | Adjust red White Balance value |
| | | | -5 RED, -1 RED, +1 RED, +5 RED | | | Adjust by value |
| | | BLUE WBAL | | | | Adjust blue White Balance value |
| | | | -5 BLU, -1 BLU, +1 BLU, +5 BLU | | | Adjust by value |
| | | GRN WBAL | | | | Adjust green White Balance value |
| | | | -5 GRN, -1 GRN, +1 GRN, +5 GRN | | | Adjust by value |
| | **STILL** | | | | | Configure Still player |
| | | PREV | | | | Go to previous playlist item |
| | | NEXT | | | | Go to next playlist item |
| | | RESE ALL | | | | Reset all color settings |
| | | BRT NESS | | | | Adjust brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | CONTRAST | | | | Adjust contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | HUE | | | | Adjust video hue |
| | | | -5 Deg, -1 Deg, +1 Deg, +5 Deg | | | Adjust by value |
| | | SAT | | | | Adjust saturation |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | U OFST | | | | Adjust U Offset |
| | | | -5 IRE, -1 IRE, +1 IRE, +5 IRE | | | Adjust by value |
| | | V OFST | | | | Adjust V Offset |
| | | | -5 IRE, -1 IRE, +1 IRE, +5 IRE | | | Adjust by value |
| | | RED BRGT | | | | Adjust red channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | RED CONT | | | | Adjust red channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |

| 1 | 2 | 3 | 4 | 5 | 6 | Description |
|---|---|---|---|---|---|---|
| | | BLUE BRGT | | | | Adjust blue channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | BLUE CONT | | | | Adjust blue channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | GRN BRGT | | | | Adjust green channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | GRN CONT | | | | Adjust green channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | RED WBAL | | | | Adjust red White Balance value |
| | | | -5 RED, -1 RED, +1 RED, +5 RED | | | Adjust by value |
| | | BLUE WBAL | | | | Adjust blue White Balance value |
| | | | -5 BLU, -1 BLU, +1 BLU, +5 BLU | | | Adjust by value |
| | | GRN WBAL | | | | Adjust green White Balance value |
| | | | -5 GRN, -1 GRN, +1 GRN, +5 GRN | | | Adjust by value |
| | **IN (1-8)** | | | | | Select Switcher Input to configure (1-8) |
| | | CFG SRC | | | | Configure the selected video input |
| | | | LOCAL | | | Configure a local hardware video source |
| | | | | Black | | Black |
| | | | | Inpu 1 | | |
| | | | | (NTSC) | HDMI Auto | HDMI Auto-Detect |
| | | | | | HDMI COMP | HDMI Auto-Detect (Computer display) |
| | | | | | 1080/60p | HD SDI 1080/59.94p |
| | | | | | 1080/60i | HD SDI 1080/59.94i |
| | | | | | 1080/30p | HD SDI 1080/29.97p |
| | | | | | 1080/30s | HD SDI 1080/29.97PsF |
| | | | | | 1080/24p | HD SDI 1080/23.98p |
| | | | | | 1080/Tele | HD SDI 1080/23.98 Telecine |
| | | | | | 720/60p | HD SDI 720/59.94p |
| | | | | | 720/30p | HD SDI 720/29.97p |
| | | | | | 720/24p | HD SDI 720/23.98p |
| | | | | | 480i 16:9 | SDI 480/59.94i (16:9) |
| | | | | | 480i 4:3 | SDI 480/59.94i (4:3) |

| 1 | 2 | 3 | 4 | 5 | 6 | Description |
|---|---|---|---|---|---|---|
| | | | | (PAL) | HDMI Auto | HDMI Auto-Detect |
| | | | | | HDMI COMP | HDMI Auto-Detect (Computer display) |
| | | | | | 1080/50p | HD SDI 1080/50p |
| | | | | | 1080/50i | HD SDI 1080/50i |
| | | | | | 1080/25p | HD SDI 1080/25p |
| | | | | | 1080/25p | HD SDI 1080/25PsF |
| | | | | | 720/50p | HD SDI 720/50p |
| | | | | | 720/25p | HD SDI 720/25p |
| | | | | | 576i 16:9 | SDI 575/50i (16:9) |
| | | | | | 576i 4:3 | SDI 575/50i (4:3) |
| | | | | Inpu (2-4) | | |
| | | | | (NTSC) | 1080/60p | HD SDI 1080/59.94p |
| | | | | | 1080/60i | HD SDI 1080/59.94i |
| | | | | | 1080/30p | HD SDI 1080/29.97p |
| | | | | | 1080/30s | HD SDI 1080/29.97PsF |
| | | | | | 1080/24p | HD SDI 1080/23.98p |
| | | | | | 1080/Tele | HD SDI 1080/23.98 Telecine |
| | | | | | 720/60p | HD SDI 720/59.94p |
| | | | | | 720/30p | HD SDI 720/29.97p |
| | | | | | 720/24p | HD SDI 720/23.98p |
| | | | | | 480i 16:9 | SDI 480/59.94i (16:9) |
| | | | | | 480i 4:3 | SDI 480/59.94i (4:3) |
| | | | | (PAL) | 1080/50p | HD SDI 1080/50p |
| | | | | | 1080/50i | HD SDI 1080/50i |
| | | | | | 1080/25p | HD SDI 1080/25p |
| | | | | | 1080/25p | HD SDI 1080/25PsF |
| | | | | | 720/50p | HD SDI 720/50p |
| | | | | | 720/25p | HD SDI 720/25p |
| | | | | | 576i 16:9 | SDI 575/50i (16:9) |
| | | | | | 576i 4:3 | SDI 575/50i (4:3) |
| | | | (NDI Device Name) | | | Select an NDI Device |
| | | | | (NDI Channel) | | Select an NDI Channel |
| | | AUTO C ON | | | | Enable Auto Color |
| | | AUTO C OFF | | | | Disable Auto Color |
| | | RESE ALL | | | | Reset all color settings |

| 1 | 2 | 3 | 4 | 5 | 6 | Description |
|---|---|---|---|---|---|---|
| | | BRT NESS | | | | Adjust brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | CONTRAST | | | | Adjust contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | HUE | | | | Adjust video hue |
| | | | -5 Deg, -1 Deg, +1 Deg, +5 Deg | | | Adjust by value |
| | | SAT | | | | Adjust saturation |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | U OFST | | | | Adjust U Offset |
| | | | -5 IRE, -1 IRE, +1 IRE, +5 IRE | | | Adjust by value |
| | | V OFST | | | | Adjust V Offset |
| | | | -5 IRE, -1 IRE, +1 IRE, +5 IRE | | | Adjust by value |
| | | RED BRGT | | | | Adjust red channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | RED CONT | | | | Adjust red channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | BLUE BRGT | | | | Adjust blue channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | BLUE CONT | | | | Adjust blue channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | GRN BRGT | | | | Adjust green channel brightness |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | GRN CONT | | | | Adjust green channel contrast |
| | | | -5%, -1%, +1%, +5% | | | Adjust by value |
| | | RED WBAL | | | | Adjust red White Balance value |
| | | | -5 RED, -1 RED, +1 RED, +5 RED | | | Adjust by value |
| | | BLUE WBAL | | | | Adjust blue White Balance value |
| | | | -5 BLU, -1 BLU, +1 BLU, +5 BLU | | | Adjust by value |

| 1 | 2 | 3 | 4 | 5 | 6 | Description |
|---|---|---|---|---|---|---|
| | | GRN WBAL | | | | Adjust green White Balance value |
| | | | -5 GRN, -1 GRN, +1 GRN, +5 GRN | | | Adjust by value |
| **SELECT TRANS** | | | | | | Choose a transition for the delegated video layer |
| | **TRNS (1-8)** | | | | | Select a transition preset |
| **AUDIO** | | | | | | Configure an audio source |
| | **AUD (1-8)** | | | | | Select an Audio Mixer input to configure |
| | | SET SRC | | | | Assign a source to an Audio Mixer input |
| | | | Silence | | | Silence |
| | | | Follow Video | | | Follow video |
| | | | Local | | | Choose a local hardware audio source |
| | | | | Inpu (1-4) | | Select audio from input 1-4 |
| | | | | Micro Real | | Select the motherboard microphone jack |
| | | | | Skyp TX C | | Select the Skype TX Caller audio source |
| | | | (NDI Device Name) | | | Select an NDI Device |
| | | | | (NDI Channel) | | Select an NDI Channel |
| | | CH (1-4) GAIN | | | | Adjust the gain for a single channel (1-4) |
| | **TALK** | CH (1-4) GAIN | | | | Adjust the gain for a single channel (1-4) |
| | **CLIP** | CH (1-4) GAIN | | | | Adjust the gain for a single channel (1-4) |
| **PTZ PRESET** | | | | | | Select a PTZ Preset for the delegated PTZ camera |
| | **IN1-8   P(1-100)** | | | | | Select a PTZ Preset (1-100) |
| **PTZ** | | | | | | Assign the Joystick to a PTZ Camera |
| | **IN(1-8) PTZ** | | | | | Select PTZ Camera (1-8) |
| **PIP** | | | | | | Assign the Joystick to the PIP Overlay |
| | **IN(1-8)** | | | | | Select Input 1-8 |
| | **CLIP** | | | | | Select the Clip player |
| | **STILL** | | | | | Select the Still player |
| **TITLE** | | | | | | Assign the Joystick to the Title Overlay |
| | **TTL(1-8)** | | | | | Select a Title Preset |

Unit: mm (inch)



355 (14)

158 (6-7/32)

93 (3-21/32)

220 (8-21/32)

278 (10-31/32)

59 (2-11/32)

427 (16-13/16)
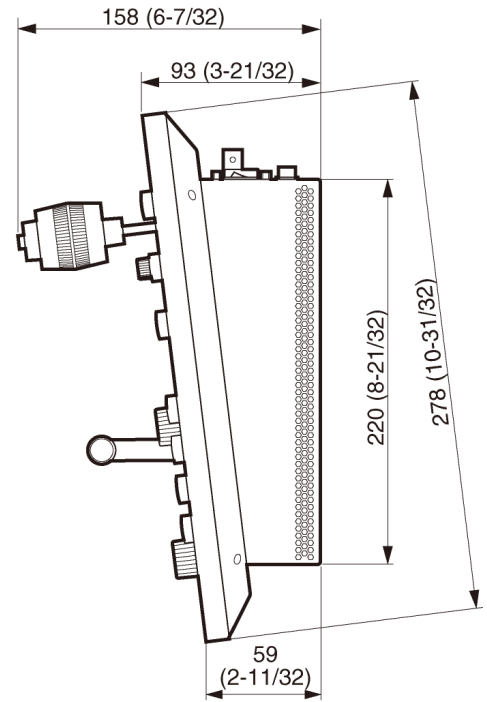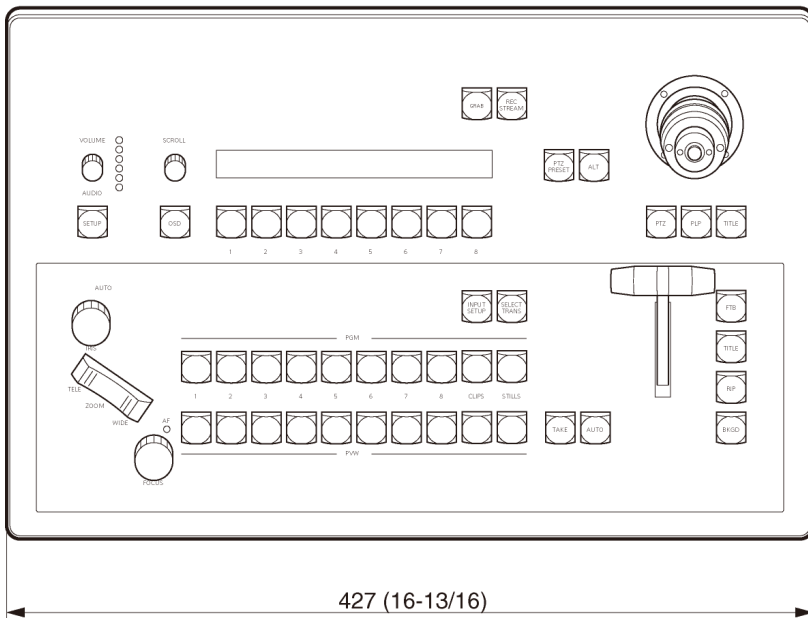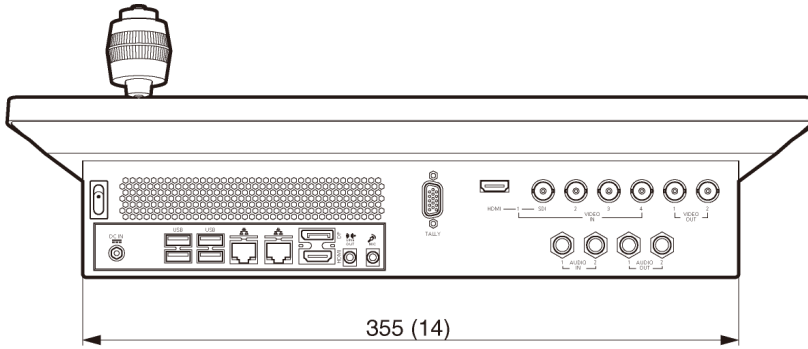
# F. Specifications

Weight and dimensions when shown are approximately. Specifications are subject to change without notice.

| | |
|---|---|
| **Power supply:** | 19 V (16.2 V - 22.8 V) DC (⎓)<br>(during AC Adaptor use) |
| **Power consumption:** | 110 W |

▭ indicates safety information.

| | |
|---|---|
| **Ambient operating temperature** | 0 °C to 40 °C (32 °F to 104 °F) |
| **Ambient operating humidity** | 20 % to 80 % (no condensation) |
| **Dimensions (W × H × D)** | 427 mm × 93 mm × 278 mm<br>(16-13/16 inches × 3-21/32 inches × 10-31/32 inches)<br>[excluding protrusions] |
| **Mass** | Approx. 6.05 kg (13.34 lb)<br>[excluding accessory parts when no options have been installed] |

| Number of ME | 1ME |
|---|---|
| Number of switcher channel | 10:<br>• 8 External (selected from among 4× 3G-SDI, 3× 3G-SDI+ 1× HDMI, 8×NDI sources)<br>• 2 Internal (1× CLIP, 1× STILL) |
| Number of Keyer | 2:<br>• PiP<br>• Title |
| System Video Format | 1080/59.94p*, 1080/59.94i, 1080/29.97Psf, 1080/23.98p, 1080/50p*, 1080/50i, 1080/25PsF, 720/59.94p, 720/50p, 720/29.97p, 720/25p<br>*: 3G SDI corresponds to Level-A only. |
| Video Input | SDI×4 or SDI×3 + HDMI×1*1, *2<br>*1: You cannot use the SDI input 1 and the HDMI connector at the same time.<br>*2: 3G SDI corresponds to Level-A only. |
| Network Input Sources | 8:<br>• NDI input from Panasonic PTZ Camera that supports NDI | HX and NDI compatible equipment<br>• IP input from Skype TX compatible PC. |
| Audio Input | 15:<br>• 4-channel SDI/HDMI embedded audio×4<br>• 4-channel NDI embedded audio×8<br>• 6.35 mm balanced line×2<br>• 3.5 mm diameter, stereo mini jack×1 |
| Video Output | 4:<br>• 1× BNC 3G-SDI (PGM) *1<br>• 1× BNC 3G-SDI (selectable from PGM/PVW/AUX)*1<br>• 1× HDMI or 1× DisplayPort (for GUI)*2<br>• 1× Network output<br>*1: 3G SDI corresponds to Level-A only.<br>*2: HDMI and DisplayPort can not be used simultaneously. |
| Network Video Output | 1:<br>Selectable from MIX(PGM or PVW)/AUX<br>• NDI output<br>• RTMP format streaming output*<br>*: Only available when plug-in provided by NewTek is installed. |
| Audio Output | 6:<br>• SDI embedded audio×2<br>• 6.35 mm balanced line×2<br>• 3.5 mm diameter, stereo mini jack×1<br>• NDI embedded audio×1 |
| Effects and Transitions | Wipe/Mix/Cut<br>• Background Video<br>• PiP<br>• Title |

| | |
|---|---|
| **Audio Mixing** | • 4 ch. Master (Program) mix<br>• 12× faders: 1 for each of 8 external audio inputs, plus 1× internal Clips player and 1× Skype TX Talkback input, plus 1× Master output and 1× Headphones<br>• Plus 1× separate audio fader for video Streaming output<br>• Seven-band equalizer and stereo compressor/limiter per input and output, with per-input audio delay control |
| **Video Clip Memory** | • 1ch, AutoPlay function<br>Supported format:<br>1) When plug-in provided by NewTek is not installed<br>　　Video format:　　avi, mpg, gif<br>　　Audio format:　　wav, wma, au, midi<br>2) When plug-in provided by NewTek is installed<br>　　Video format:　　3g2, 3gp, asf, avi, dif, dv, f4v, flv, h261, h263, h264, m2p, m2t, m2ts, m4a, m4v, mjpeg, mjpg, mkv, mov, mp4, mpeg, mpg, mts, mxf, ts, webm, wmv<br>　　Audio format:　　aif, aiff, mp3, wav, wma |
| **Still Store Memory** | • 1ch, AutoAdvance function<br>Supported image format:<br>1) When plug-in provided by NewTek is not installed<br>　jpeg, bmp<br>2) When plug-in provided by NewTek is installed<br>　3fr, arw, bay, bmp, bmq, cap, cine, cr2, crw, cs1, cut, dc2, dcr, dds, dng, drf, dsc, erf, exr, fff, g3, gif, hdr, ia, ico, iff, iiq, j2c, j2k, jif, jp2, jpe, jpeg, jpg, k25, kc2, kdc, koa, lbm, mdc, mef, mng, mos, mrw, nef, nrw, orf, pbm, pcd, pct, pcx, pef, pfm, pgm, pic, pict, png, ppm, psd, psdz, ptx, pxn, qtk, raf, ras, raw, rdc, rw2, rwz, sgi, sr2, srf, sti, targa, tga, tif, tiff, wap, wbm, wbmp, xbm |
| **Title Buffer** | 1Title Buffer (displays 1 of 8 Buffer presets) |
| **Reference Input** | Internal only |
| **PTZ camera control (Via IP)** | Number of connected cameras: Up to 8 cameras<br>Pan/Tilt/ZOOM/FOCUS control: 3 axis joystick<br>(ZOOM/FOCUS is switched by pressing the upper button)<br>ZOOM control:　　　　　Independent rocker switch<br>IRIS control:　　　　　　Independent IRIS knob, pressed AUTO/manual switching<br>FOCUS control:　　　　　Independent FOCUS knob, pressed AUTO/manual switching<br>Preset control:　　　　　store/recall, up to 100 positions<br>OSD menu control:　　　OSD button*<br>White balance control:　GUI screen Camera menu or OSD screen (Auto/PST A/ PST B/Execute) *<br>CAM/BAR selection:　　GUI screen Camera menu or OSD screen*<br>*: OSD function is available for Panasonic PTZ camera of SDI and HDMI output. It is not available for those of NDI HX output. |
| **Tally Output** | DB-15 Tally port |
| **Network Connector** | 2× RJ-45 1000BASE-T/100BASE-TX/10BASE-TX |
| **USB Host I/F** | 4× USB3.0 |

### ◼ AC adaptor

| | |
|---|---|
| **Power source:** | 100 V– 240 V AC (∿), 50 Hz/60 Hz, 1.8 A |
| **Power output:** | 19 V DC (⎓), 6.32A |

⬚ indicates safety information.

| | |
|---|---|
| **Ambient operating temperature** | 0 °C to 40 °C (32 °F to 104 °F) |
| **Ambient operating humidity** | 20 % to 80 % (non-condensing) |
| **Dimensions (W × H × D)** | 151.3 mm × 75.6 mm × 25.4 mm<br>(5-31/32 inches × 2-31/32 inches × 1 inch) |
| **Mass** | Approx. 450 g (0.99 lb) |

# Index